

ORIGINAL RESEARCH

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The influence of cannabis on sexual functioning and satisfaction

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Abstract

Background The purpose of this study was to examine the perceived influence of cannabis on sexual functioning and satisfaction. This study used Kaplan's and Masters and Johnson's sexual response cycle (desire, excitement, orgasm, plateau, resolution) and included satisfaction to complete the sexual response cycle. Given increased attention in the research literature to the potential benefits of cannabis and the lack of research on the sexual benefits of cannabis use, the current study was completed.

Methods Data were collected using the online survey tool "Qualtrics" from a self-selected, convenience sample of adults over the age of 18 who reported previous cannabis use. The survey, developed by the researchers based on previous literature, included demographic questions followed by a scale to measure sexual functioning and satisfaction in relation to cannabis use ($\alpha = 0.897$).

Results The final sample was 811 participants ranging in age from 18 to 85 years old ($M = 32.11$). The majority of participants were identified as female ($n = 536, 64.9\%$), White/Caucasian ($n = 640, 78.9\%$), and college educated ($n = 650, 80.1\%$). Almost 25% of the participants were identified as LGBTQIA+ ($n = 187, 23.1\%$). Most of the participants reported being in a monogamous sexual relationship ($n = 598, 73.7\%$). Data were analyzed using descriptive statistics, *t*-tests, one-way ANOVA, and multiple regression. Age and gender were not found to have significant effects on cannabis use and sexual functioning and satisfaction. Over 70% of participants reported increased desire ($M = 4.05, SD = 0.962$) and orgasm intensity ($M = 4.05, SD = 0.884$). Participants who reported masturbating indicated that cannabis enhanced their pleasure while masturbating ($n = 620, 62.5\%$). Participants also stated that cannabis enhanced their sense of taste ($n = 583, 71.9\%$) and touch ($n = 576, 71.0\%$).

Discussion The results of this study contrast and establish new evidence within the literature. Demographic results indicate that the people who use cannabis are of a wide range of ages, from a variety of occupations, and have differing cannabis use preferences. The inclusion of LGBTQIA+ respondents is a strength of this study. Overall, results indicated that both men and women perceived that cannabis use increased their sexual functioning and satisfaction, particularly increased desire and orgasm intensity.

Conclusion This study updates the current literature on cannabis and sexuality and provides implications for improving sexual quality. Medical implications of this study include the possible use of cannabis for treating sexual dysfunctions, especially within women.

Keywords Sex, Cannabis, Sensuality, Weed, Marijuana, Sexual pleasure

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Introduction

"*Cannabis sativa* L.," also known as "cannabis" or "marijuana," encompasses different varieties based on cannabinoid profiles (Small 2017). Cannabis has been historically used as a multi-functional crop including use as a medicine (Mechoulam et al. 2014; Mikuriya 1969; Russo, 2005), an aphrodisiac (Touw 1981), and as a potential treatment for sexual dysfunctions, such as low sexual desire or sexual pain (Dawley et al. 1979; Lynn et al. 2019). There has been increased attention given to the benefits of cannabis in recent years as it has become legal in many states (Han et al. 2018). Despite its many uses and the increased attention, there is a lack of research on the sexual benefits of using cannabis. Therefore, the purpose of this study is to examine the influences of cannabis on sexual functioning and satisfaction. This paper uses the term "cannabis" in reference to all forms of *Cannabis sativa* L., except within data collection where the term "marijuana" is used as a more recognizable term for all audiences.

Sexual functioning is physiological responses associated with the sexual response cycle that includes desire, excitement, plateau, orgasm, and resolution (Kaplan 1974; Masters and Johnson 1966). Sexual satisfaction encompasses both emotional and physical satisfaction (Basson 2001). Sensuality involves the different sensual effects (touch, taste, smell, sound, and sight) that are associated with sex. While sexual satisfaction has been shown to be influenced by sexual functioning and sensuality (Basson 2001), there is support for sexual satisfaction to be considered as a component of the sexual response cycle (Kontula and Miettinen 2016; Pascoal et al. 2018). The sexual response cycle provides a framework for this study to be organized by each phase (desire, excitement, plateau, orgasm, resolution, satisfaction).

This study compliments gender equality and may have implications for closing the orgasm inequality gap in our society (Mintz 2018). The orgasm inequality gap refers to the fact that orgasms are less consistent for women (Mintz 2018), yet research shows that orgasm is important to sexual satisfaction (Kontula and Miettinen 2016; Pascoal et al. 2018). The current research study emphasizes an individual's sexual functioning and sexual satisfaction and addresses the need to explore options to help women have more regular orgasms. One possibility for increased orgasm frequency is cannabis (Balon 2017). Using cannabis before sex has possibilities for social change by increasing sexual pleasure within our society as previous research indicates beneficial sexual implications, especially for women (Sun and Eisenberg 2017).

Background

The literature reviewed will be organized by sexual functioning (specifically using the sexual response cycle as a framework), sexual satisfaction, cannabis, and finally cannabis' influence on sexual functioning and satisfaction.

Sexual functioning and satisfaction

Masters and Johnson (1966) established the sexual response cycle that includes four phases: excitement, plateau, orgasm, and resolution. Each phase is identified by physiological responses of the body during sex; however, each phase may not be distinguishable from the next and may differ extensively each time and by each individual. Kaplan's (1979) Triphasic Concept of sexual response included desire as the first stage of the sexual response cycle and Basson (2001) considered sexual satisfaction to be an important component of the sexual response cycle.

Newer research has expanded the sexual response cycle and adds to the original work of Masters and Johnson and Kaplan. Rather than being linear, the sexual response cycle is circular with overlapping phases that follow a variable order and incorporates mental and emotional components, not just physiological responses (Basson, 2005; Cherkasskaya and Rosario 2018).

Sexual desire, also known as libido, is characterized as a sexual drive or interest in sex that lasts throughout the sexual encounter until orgasm or satisfaction is reached (Kaplan 1979). Cherkasskaya and Rosario (2018) found that sexual desire is on a spectrum that varies between absent or diminished to high desire. Without desire, one may not experience the excitement phase or any following stages of the sexual response cycle because one's mental state has greater implications than one's physical desire and arousal (Basson 2008). Toates (2009) created the incentive motivation model that considers the "intertwined progression of desire and arousal" that reinforces the idea that desire and arousal are reciprocally reinforcing.

Excitement is characterized by an increase in sexual tension from an unaroused state and occurs as a result of physical and/or psychological sexual stimulation (Masters et al. 1995). Physiological responses that occur during the excitement phase for both sexes include myotonia (increased neuromuscular tension that occurs throughout the entire body, not just the genital region) and vasocongestion (the swelling of bodily tissues in the genital region due to increased blood flow). Vasocongestion can lead to lubrication in women and an erection in men; however, vaginal lubrication alone is not an accurate measurement of arousal. Women may have genital responses such as lubrication or vasocongestion while not experiencing desire (Chivers and Bailey 2005).

During the plateau phase, sexual arousal is increased while sexual tension levels off prior to reaching the threshold levels required to trigger an orgasm (Masters et al. 1979). During orgasm, there is a release of accumulated sexual tension, and the body induces involuntary rhythmic contractions within the genital region. However, an orgasm is a total body response and is not strictly localized to the pelvic region (Masters et al. 1979).

After orgasm, the body enters the resolution phase and returns to its unaroused state. Yet, if a woman maintains sexual arousal, she is physiologically capable of being multi-orgasmic, meaning having more than one orgasm before returning to her pre-aroused state. Men are typically unable to be multi-orgasmic because of the inevitable phase of the refractory period (i.e., the recovery period required for men to orgasm again after orgasm and ejaculation, which typically gets longer with age).

Sexual satisfaction can be defined as an individual's subjective evaluation of the positive and negative aspects of one's sexual relationships (Lawrance and Byers 1995) and may be influenced by many factors such as relationship quality, physical health, and overall well-being (Pascoal et al. 2018). Multiple and consistent orgasms and frequent sex were found to be correlated with higher sexual satisfaction (Kontula 2009; Kontula and Miettinen 2016).

While more than 90% of men report usually experiencing orgasm during sex, less than 50% of women regularly experience orgasm during intercourse and only 6% reported always experiencing an orgasm during sex (Kontula 2009; Kontula and Miettinen 2016). Mintz (2018) in her book *Becoming Cliterate* coined the term "orgasm inequality" to describe the phenomenon of men having routine and consistent orgasms, while women do not. Orgasm consistency is significantly related to sexual satisfaction in women. Women who experience orgasm infrequently or not at all report, on average, lower levels of sexual satisfaction (Kontula, 2009; Kontula and Miettinen 2016). This implies that orgasms during sex are expected for men, but a bonus if accomplished for women (Kontula 2009).

Sex and cannabis

Cannabis has been identified to have sexually stimulating effects and can intensify sexual experiences (Cohen 1982). The cannabinoid profile in cannabis influences sexual functioning and satisfaction as too much tetrahydrocannabinol (THC) may cause more inhibiting effects (Palamar et al. 2018). Due to its muscle relaxant properties (Small 2017), cannabis use may be inhibitory to men's sexual functioning, yet, does not impair and may be beneficial for women's sexual functioning (Sun and Eisenberg 2017). Cannabis may indirectly enhance sexual

functioning by decreasing anxiety and increasing relaxation and sensory focus (Klein et al. 2012). It also has been found to be independently associated with increased sexual frequency with daily and weekly users having significantly higher sexual frequency compared to never-users (Sun and Eisenberg 2017).

Historically, and among different cultures, cannabis has been suspected to have an aphrodisiac effect increasing desire and sexual arousal among individuals (Chopra and Jandu 1976; Dawley et al. 1979; Halikas et al. 1982; Mayor's Committee, 1944). Recent studies support this early research with reports of increased receptivity to and interest in sexual activity after using cannabis with women reporting higher rates of increased desire from cannabis use as compared to men (Androvicova et al. 2017; Lynn et al. 2019). Research has also found that cannabis users intentionally used cannabis for increased sexual desire as well as to decrease pain associated with sex (Green et al. 2003; Lynn et al. 2019).

Cannabis may also have implications during the excitement phase of the sexual response cycle which is characterized by the attainment of an erection in men and vaginal lubrication in women (Masters and Johnson 1966). Using cannabis has been reported to cause the inability to achieve and maintain an erection among men (Chopra and Jandu 1976; Masters et al. 1979) with a higher likelihood of developing erectile dysfunction among habitual users (Aversa et al. 2008). Foreplay could be considered an important part of the excitement stage and Palamar et al. (2018) found that cannabis use can increase the chances and duration of foreplay. Cannabis is also a vasodilator and because there are cannabinoid receptors in the genital region (Small 2017), cannabis may cause vasocongestion (i.e., lubrication) within female users. However, there is contradictory evidence on the influence of cannabis on female lubrication (Masters et al. 1979; Palamar et al. 2018).

During the plateau stage, which occurs after excitement but before orgasm, the vasocongestion response is at its peak in both men and women and the man's penis is at its full-potential erection (Masters and Johnson 1966). Men are more likely to report increased duration of intercourse when using cannabis compared to women (Palamar et al. 2018; Weller and Halikas 1984). However, time may be *perceived* to last longer when using cannabis due to the altered time effect of cannabis use (Chopra and Jandu 1976; Kaplan, 1974; Palamar et al. 2018) or this may be due to increased time spent during foreplay when couples may engage in sexual exploration and try new behaviors while using cannabis (Palamar et al. 2018).

Orgasm is the release of sexual tension and cannabis use may contribute to more prolonged and pleasurable orgasms (Androvicova et al. 2017; Halikas et al. 1982).

However, men's daily cannabis use has been associated with inability to reach orgasm and reaching orgasm too quickly or too slowly (Smith et al. 2010). Those who are able to orgasm when using cannabis have also reported an increase in the quality and intensity of the orgasm, which was found to be especially apparent for men (Weller and Halikas 1984; Halikas et al. 1982; Palamar et al. 2018).

Cannabis use before sex has been reported to enhance sexual enjoyment and pleasure for individuals, including oral sex (Dawley et al. 1979; Halikas et al. 1982; Traub 1977). Sensuality involves the senses (taste, touch, smell, sound, and sight) and, for the purpose of this study, is incorporated as an aspect of sexual satisfaction. Cannabis has continuously been reported to enhance taste and touch but seems to have less of an effect on hearing, smell, and sight (Koff 1974; Masters et al. 1979; Halikas et al. 1982; Weller and Halikas 1984). Increased sensation and sensuality have been found to be related to cannabis use which may be related to length and intensity of intercourse (Palamar et al. 2018). Cannabis use before sex has been associated with more tender, slower, and compassionate sexual acts while also feeling more relaxed with their partner (Palamar et al. 2018).

There is a need for updated research as cannabis use is becoming more prevalent due to legalization (Substance Abuse and Mental Health Services Administration 2018). The majority of existing literature is outdated and some of it is contradictory, such as the physiological effects of cannabis on sexual functioning and satisfaction.

Research questions

The following exploratory research questions were proposed based on findings from previous literature as well as variables that have not been reported in previous literature: (a) Are there differences between men and women who use cannabis and their perceptions of sexual desire, orgasm intensity, and sexual satisfaction? (b) Does cannabis affect men's ability to achieve and maintain an erection? (c) Does cannabis use affect women's orgasm frequency? (d) How does cannabis use affect pleasure while masturbating? (e) What effect does gender, age, duration of cannabis use, intentionality, frequency of cannabis use, and cannabis form have on predicting sexual functioning and satisfaction?

Methods

This study was approved through the East Carolina University Institutional Review Board and was a self-report survey administered through the online software Qualtrics. Recruitment was purposeful and used snowball sampling. A brief description of the research and the survey were posted on the lead investigator's personal social

media pages (Facebook, Twitter, Instagram, and Tumblr) with encouragement to share with others to increase the sample size. It was also shared on various Facebook groups related to cannabis, cannabidiol (CBD), alternative medicine, and related groups and emailed various cannabis organizations (e.g., medical and legal advocacy organizations) asking members to share the study information on their webpages or through email listservs. The study was voluntary and consent was obtained from all participants. Age and previous cannabis use were the first two questions on the survey to verify inclusion criteria (over 18 years old and have used cannabis in the past). Data collection was open for approximately 5 weeks in January 2019.

Measures

Study recruitment materials and questions in the survey used the term "marijuana" to refer to all forms of cannabis because it is a widely recognized term. The survey included demographic questions followed by a comprehensive scale developed by the researchers to measure sexual functioning and satisfaction in relation to cannabis use in a manner that used easy to understand format and phrasing.

Cannabis use

The questions regarding cannabis measured intentionality of use, benefits of use, where cannabis was obtained, forms used (e.g., flower, wax, etc.), frequency, and duration of use. Sensuality is a construct composed of the five senses. The question measuring cannabis forms asked participants to "check all that apply." To analyze how each form (flower, wax, oil, edible, topical) varied by scale score, each form selected was treated as a separate variable. A dichotomous variable for each of the five forms was created with 1 indicating that form was used by the participant and 0 indicating that it was not used. The frequency of cannabis use question was re-coded to be in the same direction as the other questions with a higher score indicating greater frequency.

Sensuality

Previous literature suggests that relaxation enhances sensuality so one item was included to measure relaxation during sex when using cannabis (Palamar et al. 2018). Sensuality was measured with five items with Likert scale response options ranging from *significantly decrease* to *significantly increase*.

Masturbation

Masturbation was included to measure sexual functioning and satisfaction with participants who use cannabis for self-pleasure purposes or may not have a sexual

partner. Three questions were asked about masturbation: whether or not participants masturbate, if participants use cannabis before masturbating, and if so, how cannabis affects their pleasure while masturbating.

Sexual functioning and satisfaction

A scale was developed to measure the participants’ sexual functioning and satisfaction based on the incorporated framework (desire, arousal, orgasm, resolution, satisfaction) to analyze how cannabis influences each stage. This scale was developed as a direct and complete measure to analyze how cannabis specifically influences one’s sexual functioning and satisfaction through each sexual response phase and overall satisfaction in a clear and concise format. The scale consisted of 14 items using the response options ranging from *significantly decrease* to *significantly increase*. These items were influenced by the following empirical studies: Dawley et al. (1974); Koff (1974); and Weller and Halikas (1984). Following development of the scale, all authors reviewed it for accuracy and clarity and to ensure that it adequately reflected current theory and research on sexual response, functioning, and satisfaction.

Arousal was measured with two questions for men (achieving and maintaining an erection) and one question for women (lubrication). In order to have a consistent number of items for both men and women, a new variable was created to measure arousal using one item measuring the ability to achieve an erection for men and one item measuring lubrication for women. The item on maintaining an erection was not used since lubrication

and achieving an erection are analogous. The final scale included twelve items (see Table 1) with an internal reliability of 0.897.

Covariates

Basic demographic information collected included sex/gender, race, LGBTQIA+ status, state of residency, education level, relationship status, and socioeconomic status. Participants indicated sex/gender by choosing one of three response options: male, female, or other. Eight response options were provided to measure race: White/Caucasian, Black/African American, Hispanic, Asian, Native American, Pacific Islander, Biracial, and Other. LGBTQ+ status was measured by asking participants if they identified as LGBTQ+ by choosing yes, no, or prefer not to answer. A drop-down menu was provided for state of residency. Education level was measured in a single item with seven response options ranging from “less than high school diploma or GED” to “Ph.D/Doctorate.” Relationship status was measured with a single item with the following four response items: (a) In a monogamous relationship with one person, (b) In an open relationship, (c) Casually hooking up, (d) Not engaging in sexual activity with anybody. Socioeconomic status was measured using the participants’ occupation and annual income which were open-ended questions.

Analysis plan

Descriptive statistics were used to determine the effect of cannabis use on pleasure during masturbation.

Table 1 Independent-samples t-tests of individual items of the sexual functioning and satisfaction scale

Item	Men M (SD)	Women M (SD)	Overall M (SD)
How does using marijuana affect your <i>relaxation</i> during sex?*	4.30 (0.830)	4.45 (0.778)	4.39 (0.801)
How does using marijuana influence your <i>desire</i> to have sex (libido, sex drive)?*	3.95 (0.963)	4.10 (0.952)	4.05 (0.962)
How does using marijuana influence your <i>intimacy/emotional closeness</i> during sex?	4.06 (0.844)	4.08 (0.930)	4.07 (0.898)
How does using marijuana influence your <i>physical pleasure</i> ?	4.36 (0.803)	4.31 (0.844)	4.33 (0.830)
How does using marijuana influence your <i>frequency of sex</i> (how often you engage in sex)?	3.55 (0.865)	3.54 (0.862)	3.54 (0.860)
How does using marijuana influence your <i>variety of sexual activities</i> (i.e. locations, positions, times)?	3.63 (0.813)	3.56 (0.877)	3.58 (0.859)
How does using marijuana influence your <i>ability to orgasm</i> ?*	3.48 (1.00)	3.86 (0.978)	3.72 (1.00)
How does using marijuana influence your <i>intensity of orgasm</i> (how strong the orgasm is)?	4.12 (0.822)	4.01 (0.914)	4.05 (0.884)
How does using marijuana influence your ability to have <i>more than one orgasm</i> per sexual encounter (multi-orgasmic)?*	3.45 (0.819)	3.67 (0.901)	3.59 (0.879)
How does using marijuana influence the <i>duration of sex</i> (how long sex lasts)?*	3.89 (0.928)	3.59 (0.856)	3.69 (0.894)
How does using marijuana influence your <i>ability to repeat sex</i> after orgasm?	3.48 (0.837)	3.43 (0.873)	3.45 (0.858)
Arousal			3.45 (1.01)
Males – How does cannabis influence your ability to <i>achieve</i> an erection (boner)?	3.57 (0.892)		
Females – How does using marijuana influence your <i>vaginal lubrication</i> (wetness of vagina)?		3.39 (1.05)	

Means range from 1 (significantly decreases) to 5 (significantly increases) with 3 being “does not change”

*p < .05

Descriptive statistics and independent-samples *t*-tests using individual items from the sexual functioning and sexual satisfaction scale were used to address the first four research questions. Prior to conducting the regression analysis, a Pearson Correlation was performed to examine associations between variables (age, gender, duration of cannabis use, form of cannabis, intentionality of using cannabis prior to sex, and frequency of cannabis use). The results of these preliminary analyses informed the inclusion of variables in the multiple regression. A multiple linear regression was then calculated predicting participants' scores on the sexual functioning and satisfaction scale based on age, gender, duration of cannabis use, form (flower, wax, oil, edible, topical), and frequency of cannabis use.

A one-way ANOVA was conducted to compare the effect of intentionality on and the sexual functioning and satisfaction scale. Intentionality was measured using one item asking if participants intentionally used cannabis before having sex which had two response options, "yes" or "no". All statistical analyses were performed using SPSS Statistics V28 (IBM Corporation).

Results

Sample description

The original sample size was 1299 participants. Participants ($n=133$) were removed from the study if they were under the age of 18 or indicated that they had never used cannabis. Another 355 participants did not answer the sexual functioning and satisfaction scale questions resulting in a final sample size of 811 for this study. Analyses were conducted to compare those who had not answered the dependent variable questions and thus excluded from this study ($n=355$) with those who answered dependent variable questions and were included in the study ($n=811$). These analyses revealed no significant association between race or ethnicity with inclusion in the study, $X^2(7, 1165)=9.974, p=.190$, or between sex or gender with inclusion in the study, $X^2(2, 1165)=2.024, p=.364$. However, a *t*-test revealed that there was a significant difference in age between those included and those who were not included, $t(1159)=1.898, p=.029$. Those included in the study ($m=32.09$ years) were older than those excluded ($m=29.27$ years) which may have reflected greater comfort in responding to sensitive questions regarding sexual behavior and cannabis use.

Participant ages ranged from 18 to 85 years old ($M=32.11$). The majority of the participants stated their sex/gender as female ($n=536, 64.9\%$), but the sample also included men ($n=277, 34.2\%$) and those that identified as other ($n=8, 1.0\%$). Most of the participants stated being White/Caucasian ($n=640, 78.9\%$) had at least some college education ($n=650, 80.1\%$) and almost 25%

of the participants identified as LGBTQIA+ ($n=187, 23.1\%$). A variety of occupations were represented in this study, including police officers, professors, and stay at home moms. The sample included at least one individual from each state, except South Dakota and Wyoming, and also included individuals from D.C., Puerto Rico, and participants ($n=104$) that resided outside the USA. Most of the participants reported being in a monogamous sexual relationship ($n=598, 73.7\%$).

Cannabis use

Over half of the participants reported using cannabis daily ($n=509, 62.8\%$), for recreational and medicinal purposes ($n=468, 57.7\%$), and intentionally using before engaging in sex ($n=485, 59.8\%$). A majority of participants have used cannabis at least a few years ($88\%; n=714$). Almost all participants indicated using cannabis in the form of flower (i.e., pot, weed) ($95.9\%; n=778$). Other forms used by participants included edible ($59.2\%; n=480$), oil ($48.0\%; n=389$), wax ($36.5\%; n=296$), and topical ($18.0\%; n=146$). The majority of participants (78.8%) stated that cannabis does not affect their sexual decision making ($n=639$) and that cannabis *slightly increases* or *significantly increases* relaxation during sex ($87.7\%; n=711$). Results of the Pearson correlation indicated that there was a strong positive association between age and duration of cannabis use ($r=.457, p=.000$), age and frequency of cannabis use ($r=.167, p=.000$), and frequency of cannabis use and duration of cannabis use ($r=.239, p=.000$).

Sensuality

Many participants stated that cannabis *slightly increases* or *significantly increases* enhancement of sense of taste ($n=583, 71.9\%$) and 71.0% stated that cannabis *slightly increases* or *significantly increases* their sense of touch ($n=576$). The majority of participants stated that the enhancement of the following senses does not change with cannabis use: smell ($53.3\%; n=432$), sight ($57.2\%; n=464$), and hearing ($56.7\%; n=460$). Over 70% of participants ($n=583$) reported that taste was slightly or significantly enhanced when using cannabis ($M=3.96, SD=0.943$). Similarly, over 70% ($n=576$) reported that touch was slightly or significantly enhanced when using cannabis ($M=4.02, SD=0.906$). Table 2 provides mean scores for enhancement of the five senses.

Masturbation

In examining the effects of cannabis use while masturbating, the majority of the participants stated that they masturbate ($88.3\%; n=716$). Of the participants who stated that they masturbate, 76.4% reported using cannabis before masturbating ($n=620$) and 62.5% indicated

Table 2 Mean scores of cannabis use and effect on sensuality by gender

Sense	Men M (SD)	Women M (SD)	Overall M (SD)
Taste	4.02 (0.928)	3.93 (0.949)	3.96 (0.943)
Touch	4.00 (0.905)	4.03 (0.911)	4.02 (0.906)
Smell	3.33 (0.895)	3.28 (0.849)	3.30 (0.865)
Sight*	3.12 (0.817)	2.97 (0.791)	3.02 (0.803)
Hearing*	3.42 (0.889)	3.22 (0.797)	3.29 (0.832)

Means range from 1 (significantly decreases) to 5 (significantly increases) with 3 being “does not change”

* $p < .05$

that cannabis slightly increases or significantly increases pleasure while masturbating ($n = 507$).

Sexual functioning and satisfaction

Over 70% of men and women ($n = 601$) reported that cannabis slightly or significantly increases desire ($M = 4.05$, $SD = 0.962$). An independent-samples t -test was conducted to compare desire in men and women. The perceived influence of cannabis on sexual desire was significantly higher for women ($M = 4.10$, $SD = 0.952$) as compared to men ($M = 3.95$, $SD = 0.963$); $t(799) = -2.187$, $p = .029$.

Men perceived either no effect or an increased ability to achieve and maintain an erection when using cannabis. Specifically 255 men (93.4%) reported no change or an increased ability to achieve an erection ($M = 3.57$, $SD = 0.892$) and 254 (92.4%) men reported no change or an increase in maintaining an erection ($M = 3.60$, $SD = 0.928$).

Over 70% of men and women ($n = 582$) reported that cannabis slightly or significantly increased orgasm intensity ($M = 4.05$, $SD = 0.884$). An independent-samples t -test was conducted to compare cannabis use and orgasm intensity in men and women. There was not a significant difference in the scores comparing men ($M = 4.12$, $SD = 0.822$) and women ($M = 4.01$, $SD = 0.914$); $t(798) = 1.586$, $p = .113$. However there was some support for orgasm frequency among women with over 40% of women ($n = 356$) reporting increased ability to have more than one orgasm per sexual encounter ($M = 3.67$, $SD = 0.901$).

Using descriptive statistics of the scale, men and women reported increased sexual satisfaction ($M = 3.825$, $SD = 0.613$). T -test analysis indicated that there was no significant effect based on gender, $t(801) = -0.187$, $p = .852$. However, because there were significant gender differences in other individual items, gender was included in the regression analyses. A multiple linear

Table 3 Results from linear regression model predicting effects of cannabis use on sexual functioning and satisfaction

Predictor	B	SE	β	t	P
Constant	3.518	0.144		24.503	0.000
Gender	0.021	0.046	0.016	0.451	0.652
Age	0.003	0.002	0.061	1.462	0.144
Duration of cannabis use	-0.027	0.022	-0.050	-1.229	0.219
Frequency of cannabis use	-0.001	0.016	-0.003	-0.083	0.934
Form—flower	0.235	0.111	0.077*	2.126	0.034
Form—wax	0.131	0.053	0.103*	2.484	0.013
Form—oil	-0.013	0.049	-0.010	-0.261	0.794
Form—edible	0.050	0.048	0.040	1.039	0.299
Form—topical	0.107	0.061	0.067	1.767	0.078
R^2		0.029			
F		2.582*			

* $p < .05$

regression was calculated predicting participants’ scores on the sexual functioning and satisfaction scale based on age, gender, duration of cannabis use, form (flower, wax, oil, edible, topical), and frequency of cannabis use. The regression equation was significant ($F(9,789) = 2.582$, $p = .006$) with a R^2 of 0.029. The forms wax and flower were significant predictors with topical forms approaching significance (Table 3). A one-way ANOVA was conducted to compare the effect of intentionality of cannabis use prior to sex on the sexual functioning and satisfaction scale. There was a significant effect of intentionality on the scale at the $p < .05$ level [$F(1,806) = 4.938$, $p = .000$] with those intentionally using cannabis before sex having higher scores on the sexual functioning and satisfaction scale.

Discussion

This nationwide study had a large sample size with the majority of participants being White college educated women. The inclusion of LGBTQIA+ individuals is a strength of this study with almost 25% of the sample identifying as LGBTQIA+. Over half the sample ($n = 485$) reported intentional use of cannabis prior to engaging in sexual activities. Results indicate that the people who use cannabis are of a wide range of ages, from a variety of occupations, and have differing cannabis use preferences. This demographic profile of our sample aligns with previous research that indicates cannabis users vary in age and tend to be non-Hispanic White (Han et al. 2017; Mauro et al. 2017; O’Connell and Bou-Matar 2007). However, our sample differs from recent research regarding sex/gender and relationship status. Although approximately two thirds of our sample were women, Carliner et al. (2017) found that men continue to use at higher

rates than women despite the fact that cannabis use has increased for both men and women. Almost 74% of our sample reported being in a monogamous relationship which does not align with recent research that found that regular cannabis users were less likely to be in a relationship (Chan et al. 2021). These differences in our sample as compared to previous research on the sex/gender and relationship status of cannabis users suggest that caution should be used when generalizing results in regard to these demographic characteristics.

Sexual functioning and satisfaction

An important contribution of this study is the high reliability ($\alpha=0.897$) for an expanded sexual functioning and satisfaction scale which incorporated Kaplan's phase of desire, Masters and Johnson's model (excitement, plateau, orgasm, resolution), and sexual satisfaction as the final stage. This comprehensive scale moves beyond the physiological effects (e.g., achieving an erection) and incorporates overall sexual functioning and satisfaction. The creation of the scale was crucial to gain a comprehensive oversight on aspects of sexual functioning and satisfaction with the ability to analyze and report how cannabis affects various sexual responses. The scale also incorporates the influence of cannabis on sexual functioning and satisfaction, as opposed to a scale that only measures sexual functioning and/or satisfaction.

In contrast to early literature (Koff 1974; Weller and Halikas 1984), no gender differences were found in regard to cannabis use and overall sexual functioning and satisfaction. Results from this study indicated that both men and women see benefits from using cannabis before sexual intercourse or masturbation. However, *t*-tests reveal that there were gender differences with the specific scale items of desire, relaxation during sex, and ability to orgasm. Decreased ability to orgasm could be influenced by both reduced desire and difficulty relaxing during sex. Therefore, if cannabis use allows women to relax and increases desire, they may then have improved orgasm capacity.

Many of the results were consistent with existing literature. One notable exception is men's ability to achieve and maintain an erection due to cannabis. Previous literature stated that men would have a more difficult time achieving and maintaining an erection when using cannabis, possibly due to the muscle relaxation properties of cannabis (Masters et al. 1979). The current study found that men did not report a decreased ability to achieve and maintain an erection. However, due to the self-report nature of this survey, social desirability may have prevented them from reporting erectile issues.

Similar to existing literature (Androvcova et al. 2017; Lynn et al. 2019), both men and women perceived

increased desire and orgasm intensity when using cannabis. Women reported increased ability to have more than one orgasm per sexual encounter, which is similar to previous findings (Weller and Halikas 1984). These results align with the increased relaxation when using cannabis; those who use cannabis report being more relaxed, whether mental or physical, which would improve overall sexual functioning and pleasure. There was no difference in sexual functioning and satisfaction scale scores by age. This indicates that despite age, individuals still report sexual benefits from using cannabis. The age of the sample ranged from 18 to 85, suggesting that cannabis use may have benefits across the lifespan. The positive correlations between age and duration of cannabis use and between age and frequency of cannabis use further support the idea of regular use throughout the lifespan. Additionally, the positive correlation between individuals who have used cannabis for a longer amount of time (duration) and frequency of use means that those who use more cannabis more often were more likely to have been using cannabis for a longer period of time. However, neither duration or frequency of use influenced sexual functioning and satisfaction. People that identify as LGBTQIA+ did not differ with cannabis use as one's sexual functioning and satisfaction is not generally impacted by sexual orientation.

Those who reported intentionally using cannabis before sex had significantly higher scale scores than those who reported not intentionally using cannabis before sex. This can be interpreted as those who intentionally used cannabis before sex perceived a greater benefit to their sexual functioning and satisfaction compared to those who do not intentionally use cannabis before sex. These results may be because of the mental mindset that using cannabis will increase pleasure due to the aphrodisiac notions of cannabis rather than a true physiological effect. However, the relaxation effects of cannabis may contribute to increased desire or reduced inhibitions that might contribute to increased sexual functioning and satisfaction. This also aligns with Palamar et al. (2018) who found that cannabis use can result in more and longer foreplay which can also contribute to positive sexual functioning and sexual satisfaction. Individuals may also intentionally use cannabis before sex thinking that cannabis use helps with any sexual issues that they have, therefore increasing their sexual functioning and satisfaction.

While dosage could not be measured, forms of cannabis can give an indication of dosage, which has been found to have an impact on sexual functioning (Palamar et al. 2018). Although duration and frequency of cannabis use were not significant predictors, the forms of wax and flower predicted increased sexual functioning and satisfaction. While there is no literature on specific

cannabinoid profiles regarding sexual functioning and satisfaction, some products may have a greater influence on the physiological effects and overall satisfaction of sex due to the THC potency and cannabinoid profile.

Sensuality is an important aspect of sexual intercourse as it relates to the five senses. During sex, one uses many, if not all, of their senses. Men and women reported increased enhancement to touch and taste when using cannabis, which is consistent with previous literature (Weller and Halikas 1984). The enhancement of taste and touch could increase overall sexual functioning and satisfaction because these are two senses that are heavily used during sexual intercourse.

Implications

This study has the potential to impact policy, medicine, and practice by providing support for policy change and legalization advances for cannabis use. Increased access to cannabis may facilitate more research on its effects. Medical implications of this study include the possible use of cannabis for treating sexual dysfunctions, especially with women. Women with vaginismus (i.e., painful intercourse) may benefit from the muscular relaxation and increased sexual functioning that results from cannabis use, while women with decreased desire could also see possible benefits (Lynn et al. 2019).

Finally, regarding practice, results from this study suggest that cannabis can potentially close the orgasm inequality gap (Mintz 2018). The orgasm inequality gap states that men statistically are more likely to orgasm per sexual encounter compared to women (Kontula, 2009). Women may be more likely to orgasm when using cannabis before sexual encounters, which could contribute to equity in the amount of sexual pleasure and satisfaction experienced by both women and men. Sex therapists could incorporate use of cannabis in states where it is currently legal.

Limitations

While this study had a large sample size and was able to report evidence that has not been found in the literature, there were some limitations. Although the survey was internally reviewed multiple times by all members of the research team, it was not pilot-tested or externally validated. The sample was a convenience sample of individuals who self-selected to participate in the study which may cause selection bias. Additionally, participants were asked to retrospectively self-report based on many years which could result in recall bias. The collection of data by self-report rather than direct observation results in self-report bias in that results are measuring participants' perceptions of the effects of cannabis rather than the

collection of physiological data. Respondents were largely college educated White women, so this study does not represent the majority of US cannabis users.

Dosage was not measured and many individuals are unaware of the amount and potency of cannabis that they are consuming. This is especially true for individuals who do not live in a state where cannabis has been legalized and where all products bought from a regulated dispensary are labeled. Social desirability may be another limitation to this study because of the sensitive nature of the survey questions. Participants may have answered in a desirable manner, particularly related to questions related to erection. This study did not measure medications, mental health status, and other predictors of sexual functioning (Basson 2001; Cherkasskaya and Rosario 2018). Chronic cannabis use has been found to have possible effects (Aversa et al. 2008; Hall, 2014), which this study did not extensively evaluate. Also, several variables were measured using single items and although the scale created had high reliability, it does not have established validity.

Future research

Cannabis has not been studied extensively, partly because of legalization barriers. This is especially true regarding the intersection of cannabis and sexual functioning and satisfaction. This study found that duration of cannabis use or frequency of cannabis use does not predict sexual functioning. However, previous literature indicates that daily and habitual users reported erectile difficulties in men (Aversa et al. 2008). Future research should focus on men's frequency and duration of cannabis use in regard to their sexual functioning. Additionally, age was positively correlated with both duration of cannabis use and frequency of cannabis use and the interaction between these three variables should be researched further.

Future cannabis research should focus on specific cannabinoid profiles, methods, and forms to indicate which has greatest sexual impact and implications. Clinical research to study this would be most accurate due to the social desirability effect of self-report surveys. Future research would also benefit from reviewing the endocannabinoid system and its impact on sexual functioning and satisfaction.

Conclusion

This study extended the limited literature regarding the influence of cannabis on sexual functioning and satisfaction. Results help to update the literature on cannabis and sexuality and contribute to implications for advancing policy, medicine, and practice. Expanding the sexual response cycle to include desire and sexual satisfaction

provided a useful framework for this study and results supported this expanded model. Overall, cannabis use tends to have a positive influence on perceived sexual functioning and satisfaction for individuals despite gender or age and cannabis might help to decrease gender disparities in sexual pleasure.

Abbreviations

THC	Tetrahydrocannabinol
CBD	Cannabidiol
LGBTQIA+	Lesbian/gay/bisexual/transgender/queer or questioning/other

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Not applicable.

Authors' contributions

AM—conceived the topic of study, collected the data, data entry and processing, manuscript writing. SMB—responsible supervisor of AM, data entry and processing, manuscript writing; JJ—contributed substantially to the conception and design of the study, the acquisition of data, or the analysis and interpretation; contributed data and analysis tools; data analysis; manuscript review; and editing of final copy. PA—contributed substantially to the conception and design of the study, the acquisition of data, or the analysis and interpretation; manuscript review; and editing of final copy. All authors consent for publication. The authors read and approved the final manuscript.

Authors' information

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Review Board and all participation was voluntary and anonymous.

Consent for publication

Consent was obtained from all participants.

Competing interests

The authors declare that they have no competing interests.

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Submission Information

Title of Abstract

Assessment of cannabis use before sex by women who report orgasm difficulty

Abstract

Objective

Evaluate the effect of cannabis use before partnered sex on women who report difficulty orgasming.

Method

This IRB-approved observational study was conducted between March 24, 2022 and November 18, 2022 using Qualtrics® software. The survey assessed baseline demographics, health status, cannabis use, sexual relationship status, difficulty orgasming, and the orgasm sub-scale questions of the Female Sexual Function Index (FSFI) with and without cannabis use before sex.

Women 18 years and older, who used cannabis and had partnered sex within the last month were invited to take the anonymous, uncompensated survey. Women who were pregnant, breast

feeding or using other recreational substances were excluded. Women who reported not using cannabis before partnered sex or not having female genitalia, were excluded from the data analysis.

Findings

There were a total of 1,037 survey responses, with 37% (n=387) completed surveys after exclusion and inclusion criteria were applied. The majority of women 52% (n=202) reported difficulty orgasming, were between the ages of 25-34 (45%, n=91), reported their race as white, 75% (n=152), were married or in a relationship (82%, n=165), and 50% (n=100) reported being “very satisfied” in their partnered relationship.

In the group of all women the frequency of orgasming increased for 59.2% (229/387, $p < .0001$) after using cannabis before partnered sex. In the group of 202 women with difficulty orgasming the frequency of orgasming increased 72.8% (147/202, $p < 0.0001$) after using cannabis before partnered sex. Of the women with difficulty orgasming who almost never or never orgasm without cannabis, 28.7% (n=58, $p < .0001$) achieved orgasm when using cannabis before partnered sex.

Conclusion

We conclude that cannabis use before partnered sex provides women who have difficulty achieving orgasm a 28.7% greater likelihood of orgasming for women who almost never or never orgasm without cannabis and 72.8% increase in frequency of orgasm. A randomized controlled trial is planned to explore cannabis as a treatment for the persistently high percentage of women who have difficulty orgasming.

Assessment of the Association of Cannabis on Female Sexual Function With the Female Sexual Function Index

Alex M. Kasman, MD, MS,¹ Hriday P. Bhambhani, BS,¹ Genester Wilson-King, MD,² and Michael L. Eisenberg, MD¹

ABSTRACT

Introduction: Cannabis use has increased in the last decade, and the impact of cannabis on female sexual function remains unclear.

Aim: To assess the impact of frequency of use, chemovar (tetrahydrocannabinol, cannabidiol, or both) type, and method of consumption on female sexual function among cannabis users.

Methods: Adults who visited a single-partner cannabis dispensary's locations were invited to participate in an uncompensated, anonymous online survey October 20, 2019 and March 12, 2020. The survey assessed baseline demographics, health status, cannabis use habits as well as used the validated Female Sexual Function Index (FSFI) to assess sexual function.

Main Outcome Measure: The main outcomes of this study are the total FSFI score (sexual dysfunction cutoff <26.55) and subdomain scores including desire, arousal, lubrication, orgasm, satisfaction, and pain.

Results: A total of 452 women responded with the majority between the ages of 30–49 years (54.7%) and in a relationship or married (81.6%). Of them, 72.8% reported using cannabis more than 6 times per week, usually through smoking flower (46.7%). Women who reported more cannabis use, reported higher FSFI scores (29.0 vs 26.7 for lowest vs highest frequencies of reported use, $P = .003$). Moreover, an increase in cannabis use frequency by one additional use per week was associated with an increase in total FSFI ($\beta = 0.61$, $P = .0004$) and subdomains including desire domain ($P = .02$), arousal domain ($P = .0002$), orgasm domain ($P = .002$), and satisfaction domain ($P = .003$). For each additional step of cannabis use intensity (ie, times per week), the odds of reporting female sexual dysfunction declined by 21% (odds ratio: 0.79, 95% confidence interval: 0.68–0.92, $P = .002$). Method of consumption of cannabis and chemovar type did not consistently impact FSFI scores or odds of sexual dysfunction.

Conclusion: Increased frequency of marijuana use is associated with improved sexual function among female users, whereas chemovar type, method of consumption, and reason for use does not impact outcomes. **Kasman AM, Bhambhani HP, Wilson-King G, et al. Assessment of the Association of Cannabis on Female Sexual Function With the Female Sexual Function Index. Sex Med 2020;XX:XXX–XXX.**

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Key Words: Cannabis; Marijuana; Female Sexual Function; Female Sexual Dysfunction; FSFI

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INTRODUCTION

The impact of cannabis use on sexual function is a matter of debate. An estimated 22.2 million people within the United States use cannabis monthly, and there are more than a 100 million lifetime users.^{1–3} There have been major policy changes governing cannabis use since the 1960s as calls for legalization began with medical legalization in 1996 by California followed by adult use in 2012 by Colorado and Washington State.⁴ There are now 29 states, and the District of Columbia have legalized use of cannabis either for medical or adult use.⁵ As legalization has become more prevalent and users have become more widespread, there is a need to better understand the systemic effects of cannabis.⁶

Cannabis' effect on sexual arousal and sex steroid hormones has been previously studied.^{7,8} Women who use cannabis have reported increased sexual frequency and increased endocannabinoids have been associated with increased arousal; however, examination of sexual function with regard to cannabis has led to conflicting reports.^{7,9} Prior studies have either examined sexual function using a mix of validated and non-validated instruments with varied results.^{10,11} Although a few studies have found a positive dose-dependent effect on arousal and shown a positive effect with pleasure, these studies have been small and have not examined other domains of female sexual function such as lubrication, pain, and overall satisfaction.¹² Interestingly, a large Australian survey found that men who used cannabis were more likely to report impaired sexual function, whereas women cannabis users did not have higher rates of sexual dysfunction.¹³ To date, no studies have examined female sexual function with a validated survey in a large sample size nor have examined the impact of the cannabis chemovar (categorization of a plant species based on chemical composition, eg, tetrahydrocannabinol [THC] or cannabidiol [CBD] dominant) or the method of consumption. Chemovar may be important as the receptors for THC and CBD are different, which may account for the psychoactive effects of THC compared with CBD.¹⁴ Therefore, we sought to characterize the association between female sexual function and cannabis use by using a validated questionnaire (Female Sexual Function Index [FSFI]) using a U.S. population.

METHODS

Study Population

After institutional review board approval, adults who visited a single-partner cannabis dispensary were invited to participate in an uncompensated, anonymous online survey via a provided hyperlink or QR code upon purchase between October 20, 2019 and March 12, 2020. The partner dispensary was chosen based on a large customer base and willingness to distribute our survey. The survey was distributed throughout all locations of the partner dispensary.

Survey Instruments

All participants were administered the same anonymous survey in the English language via the online survey platform Qualtrics (Provo, UT). Informed consent was waived given the online nature of the survey, and waiver of documentation was provided before proceeding with the survey. The first half of the survey queried participants for demographic information, past medical history, and adult drug use habits. After selection of sex, female participants were directed to the validated FSFI. The FSFI is a validated 19-item survey instrument designed to assess female sexual function over the preceding 4 weeks.¹⁵ It assesses 6 individual domains including desire, arousal, lubrication, orgasm, satisfaction, and pain. Each domain is scored via a Likert scale score from either 0–5 or 1–5 with a cutoff total score of 26.55 to define sexual dysfunction as per previous validation studies to

define female sexual dysfunction.^{15,16} To score, each domain sum is multiplied by a specific factor ratio and then summed to obtain the total FSFI score with a maximum of 36. As the FSFI was developed and validated in sexually active women, sexually inactive participants were excluded from the analysis.

Covariates

Demographics collected included age, race, primary region of residence (international or per U.S. census divisions), and relationship status. Clinical variables were height, weight, number of visits to a primary care provider in the last 3 months, tobacco smoking history, and the presence/absence of 13 common chronic comorbidities within the United States (ie, hypertension, hypercholesterolemia, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, cancer, neurologic disease, liver disease, depression, and anxiety).¹⁷ Responses (yes/no) to these variables were collapsed to a single continuous variable, “total comorbidities” for the purpose of analysis. The complete distribution of these comorbidities can be found in [Supplemental Table 1](#).

Cannabis use variables included frequency of use within the last 4 weeks, method of consumption, primary cannabis chemovar (THC or CBD dominant), and reason for use. Options for frequency of use were never, 1–2 times per week, 3–5 times per week, and 6+ times per week. The frequency-response relationship was assessed in our regression analyses by converting this categorical variable to a continuous variable as follows: never users were assigned a value of 0; 1–2 times per week, a value of 1.5; 3–5 times per week, a value of 4; and 6+ times per week, a value of 6.1. These continuous variable values were chosen as the average weekly use frequency of their respective categorical variables. The options for method of consumption included smoking flower, edibles, smoking concentrates/extracts, tincture/oils, vaping, and other. 9 options were given for reason for use after performing a review of the literature: relax/unwind, improve mood, help with pain, help with sleep, help with stress, help with depression, glaucoma, nausea/loss of appetite, and neurologic condition.¹⁸ The complete distribution of reason for use is illustrated in [Supplemental Table 1](#).

Statistical Methods

Patient characteristics and survey responses were analyzed using descriptive statistics, including proportions, median, and mean \pm SD. Categorical variables were analyzed by the χ^2 test or Fisher's exact test as appropriate. Normally distributed continuous variables were analyzed by Student's t-test, whereas skewed continuous variables were analyzed by the Wilcoxon rank sum test. Multiple linear regression was used to identify factors associated with the overall FSFI score, as well as each FSFI domain. We used multivariable logistic regression to identify factors associated with female sexual dysfunction. In this analysis, female sexual dysfunction was defined as a FSFI score of less than 26.55.¹⁵ All data were analyzed using R v3.5.3 (R Foundation for Statistical Computing, Vienna, Austria). The significance

Table 1. Cohort demographics and stratification by frequency of cannabis use

Characteristic	Overall	Frequency of cannabis use		P value
		≥3 times per wk	≤2 times per wk	
N	452	392	60	
Age, y Overall (range)	42 (20–79)			
<30	67 (14.8)	58 (14.8)	9 (15.0)	.23
30–39	117 (25.9)	101 (25.8)	16 (26.7)	
40–49	130 (28.8)	109 (27.8)	21 (35.0)	
50–59	81 (17.9)	76 (19.4)	5 (8.3)	
60+	55 (12.2)	47 (12.0)	8 (13.3)	
Race (%)				
Caucasian	337 (74.6)	300 (76.5)	37 (61.7)	.02*
Black/African	15 (3.3)	14 (3.6)	1 (1.7)	
Hispanic/Latino	55 (12.2)	45 (11.5)	10 (16.7)	
Other	45 (10.0)	33 (8.4)	12 (20.0)	
Region (%)				
West	159 (35.2)	130 (33.2)	29 (48.3)	.05*
International	96 (21.2)	87 (22.2)	9 (15.0)	
Midwest	34 (7.5)	27 (6.9)	7 (11.7)	
Northeast	81 (17.9)	74 (18.9)	7 (11.7)	
South	75 (16.6)	69 (17.6)	6 (10.0)	
Unknown	7 (1.5)	5 (1.3)	2 (3.3)	
Relationship status (%)				
Married	245 (54.2)	210 (53.6)	35 (58.3)	.59
In a relationship	124 (27.4)	111 (28.3)	13 (21.7)	
Single	79 (17.5)	67 (17.1)	12 (20.0)	
Education (%)				
4-y degree	130 (28.8)	118 (30.1)	12 (20.0)	.01*
2-y degree	67 (14.8)	58 (14.8)	9 (15.0)	
Doctorate	32 (7.1)	27 (6.9)	5 (8.3)	
High school or less	33 (7.3)	33 (8.4)	0 (0.0)	
Professional degree	108 (23.9)	84 (21.4)	24 (40.0)	
Some college	82 (18.1)	72 (18.4)	10 (16.7)	
Weight, lbs (mean [SD])	155.20 (37.44)	154.69 (37.73)	158.48 (35.54)	.47
Height, cm (mean [SD])	165.41 (6.97)	165.43 (6.88)	165.31 (7.54)	.91
PCP visits in last 3 mo (%)				
0	213 (47.1)	181 (46.2)	32 (53.3)	.59
1	170 (37.6)	150 (38.3)	20 (33.3)	
2+	69 (15.3)	61 (15.6)	8 (13.3)	
Cannabis use frequency (%)				
Never	7 (1.5)	0 (0.0)	7 (11.7)	<.001
1–2 times per wk	53 (11.7)	0 (0.0)	53 (88.3)	
3–5 times per wk	63 (13.9)	63 (16.1)	0 (0.0)	
6+ times per wk	329 (72.8)	329 (83.9)	0 (0.0)	
Tobacco use (%)				
Never smoker	203 (44.9)	167 (42.6)	36 (60.0)	.05*
Current smoker	59 (13.1)	56 (14.3)	3 (5.0)	
Former smoker	189 (41.8)	168 (42.9)	21 (35.0)	
Method of consumption (%)				
Smoking flower	211 (46.7)	193 (49.2)	18 (30.0)	<.001*
Edibles	50 (11.1)	38 (9.7)	12 (20.0)	
Other	22 (4.9)	15 (3.8)	7 (11.7)	
Smoking concentrates	24 (5.3)	23 (5.9)	1 (1.7)	

(continued)

Table 1. Continued

Characteristic	Overall	Frequency of cannabis use		P value
		≥3 times per wk	<2 times per wk	
N	452	392	60	
Tincture or oils	69 (15.3)	56 (14.3)	13 (21.7)	
Vaping	73 (16.2)	67 (17.1)	6 (10.0)	
Primary reason for use (%)				
Medical	364 (80.5)	327 (83.4)	37 (61.7)	<.001*
Recreational	88 (19.5)	65 (16.6)	23 (38.3)	
Cannabinoid (%)				
THC dominant	208 (46.0)	189 (48.2)	19 (31.7)	<.001*
Both THC and CBD	192 (42.5)	168 (42.9)	24 (40.0)	
Only CBD dominant	49 (10.8)	35 (8.9)	14 (23.3)	
Total comorbidities (%)				
0	111 (24.6)	87 (22.2)	24 (40.0)	.004*
1	111 (24.6)	94 (24.0)	17 (28.3)	
2	123 (27.2)	110 (28.1)	13 (21.7)	
3+	107 (23.7)	101 (25.8)	6 (10.0)	
FSFI score (mean [SD])				
Total score	28.6 (5.44)	28.9 (5.30)	26.7 (5.98)	.003*
Desire score	3.74 (1.11)	3.8 (1.10)	3.5 (1.12)	.03*
Arousal score	4.7 (1.19)	4.8 (1.17)	4.3 (1.24)	.003*
Lubrication score	5.2 (1.19)	5.2 (1.15)	4.9 (1.43)	.09
Orgasm score	4.9 (1.35)	5.0 (1.32)	4.6 (1.48)	.01*
Satisfaction score	4.74 (1.34)	4.79 (1.32)	4.39 (1.42)	.03*
Pain score	5.27 (1.18)	5.30 (1.12)	5.06 (1.49)	.14

BMI = body mass index; CBD = cannabidiol; FSFI = female sexual function index; OR = odds ratio; PCP = primary care physician; SD = standard deviation; THC = tetrahydrocannabinol.

Comorbidities included hypertension, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, hypercholesterolemia, cancer, neurologic disease, liver disease, depression, and anxiety.

Region represents primary residence.

*Significant ($P < .05$).

level for all statistical tests was set at <0.05 , and all tests were 2 sided.

RESULTS

Survey respondent demographics including age, race, relationship status, education, and cannabis use characteristics are outline in Table 1. In total, 452 women completed the survey with the majority between the ages of 30–49 years (54.7%) and in a relationship or married (81.6%). Most participants were educated with either a 4 year or professional degree (52.7%) and had not seen their primary care physician within the last 3 months (47.1%). Of them, 72.8% reported using cannabis more than 6 times per week in the last 4 weeks, usually through smoking flower (46.7%). Overall, 118 women reported sexual dysfunction with a FSFI score of <26.55 .

When stratified by frequency of use (≥ 3 times per week vs < 3 times per week), those who used more frequently had overall higher FSFI scores (28.9 vs 26.7, $P = .003$) and had higher FSFI subdomain scores except for pain (5.3 vs 5.06, $P = .14$). More

frequent users tended to smoke flower (49.2% vs 30%) and vape (17.1% vs 10%), whereas less frequent users reported using edibles more commonly (20% vs 9.7%; $P < .001$). In addition, the dominant cannabinoid chemovar that more frequent users reported was THC dominant (48.2% vs 31.7%) compared with CBD dominant (8.9% vs 23.3%, $P < .001$). More frequent users had more comorbidities compared with less frequent users with 25.8% with 3 or more compared with 10% ($P = .004$). The most common reason for cannabis use was to relax (81%) followed by relieve stress (74.1%) and help with sleep (73.9%; Supplemental Table 1).

Demographics, health status (eg, body mass index, primary care provider visits, tobacco use), and cannabis use and methods were assessed in relation to total FSFI and FSFI subdomains using linear regression (Table 2). Women older than the age of 50 years were more likely to have lower total FSFI scores (25.04 vs 27.12, $P = .03$) as were those who had more comorbidities (26.68 vs 27.12, $P = .02$). An increase in cannabis use frequency by one additional use per week was associated with an increase in total FSFI ($\beta = 0.61$, $SE = 0.17$, $P = .0004$) and subdomains

Table 2. Linear regression models of female sexual function index scores and demographics, health status, and marijuana use habits

Characteristic	Total FSFI		Desire domain		Arousal domain		Lubrication domain		Orgasm domain		Satisfaction domain		Pain domain	
	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value
Age, y														
<30	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
30–39	–1.32	.12	–0.29	.11	–0.28	.14	–0.08	.69	–0.25	.24	–0.40	.06	–0.02	.91
40–49	–0.32	.71	–0.30	.10	–0.15	.42	–0.09	.62	0.11	.62	–0.08	.73	0.19	.31
50–59	–2.08	.03*	–0.54	.008*	–0.53	.01*	–0.57	.008*	–0.14	.57	–0.16	.51	–0.14	.50
60+	–1.32	.21	–0.48	.03*	–0.22	.34	–0.48	.04	0.29	.27	–0.22	.40	–0.21	.38
Race														
White	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Black	–1.06	.46	0.02	.94	–0.26	.40	–0.03	.93	–0.58	.10	–0.40	.27	0.18	.56
Hispanic	0.69	.42	0.45	.01*	0.22	.25	0.19	.30	–0.09	.68	–0.11	.62	0.02	.90
Other	–2.12	.02*	–0.21	.27	–0.51	.01*	–0.33	.10	–0.70	.002*	–0.22	.33	–0.16	.42
Relationship status														
Married/in a relationship	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Single	0.86	.21	0.23	.12	0.43	.005*	0.24	.12	0.06	.71	–0.19	.28	0.09	.57
Region														
West	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
International	–0.18	.82	0.00	.99	–0.08	.63	0.10	.54	–0.05	.80	–0.11	.57	–0.04	.80
Midwest	1.87	.07	0.16	.46	0.37	.09	0.41	.07	0.48	.06	0.51	.05*	–0.06	.78
Northeast	–0.33	.66	–0.05	.77	–0.10	.53	–0.02	.89	–0.04	.82	–0.19	.31	0.07	.66
South	0.79	.30	0.03	.87	–0.03	.85	0.36	.03*	0.00	.99	0.11	.56	0.32	.05*
BMI														
Normal	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Underweight	–2.91	.11	–0.01	.97	–0.53	.19	–1.14	.01	–0.63	.17	–0.33	.48	–0.28	.49
Overweight	0.34	.59	0.03	.82	0.08	.59	0.08	.55	0.02	.91	–0.05	.73	0.19	.18
Obese	0.16	.85	0.02	.91	0.06	.75	0.12	.52	0.10	.63	–0.21	.33	0.06	.73
Extremely obese	0.43	.65	–0.08	.68	0.06	.76	0.01	.95	0.39	.11	–0.04	.88	0.09	.67
Tobacco use														
Never	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Current	0.92	.27	0.14	.42	0.17	.36	0.17	.37	0.25	.25	0.06	.79	0.14	.45
Former	–0.01	.98	0.12	.31	–0.04	.76	0.09	.46	–0.08	.59	–0.15	.29	0.04	.77
PCP visits in last 3 mo														
0.00	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
1.00	–0.91	.12	–0.23	.07	–0.14	.28	–0.12	.38	–0.11	.47	–0.24	.11	–0.02	.88
2+	–0.62	.43	–0.06	.71	–0.10	.58	–0.17	.32	–0.06	.78	–0.03	.87	–0.10	.57

(continued)

Table 2. Continued

Characteristic	Total FSFI		Desire domain		Arousal domain		Lubrication domain		Orgasm domain		Satisfaction domain		Pain domain	
	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value	β	<i>P</i> value
Cannabis use frequency (continuous)	0.61	.0004*	0.09	.02*	0.14	.0002*	0.07	.08	0.14	.002*	0.13	.003*	0.05	.20
Method of consumption														
Smoking flower	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Edibles	−0.59	.51	−0.11	.55	−0.11	.59	−0.19	.34	−0.08	.73	−0.01	.98	−0.10	.60
Other	−1.22	.36	−0.03	.90	−0.10	.72	0.11	.71	−0.15	.66	−0.36	.27	−0.68	.02*
Smoking concentrates	−1.67	.16	−0.23	.36	−0.06	.82	−0.28	.29	−0.59	.05	−0.30	.32	−0.28	.41
Tincture or oils	−0.09	.91	−0.04	.82	0.19	.30	−0.12	.53	0.09	.67	−0.25	.23	0.04	.85
Vaping	0.04	.96	−0.13	.44	−0.06	.70	0.19	.27	−0.03	.89	−0.11	.58	0.18	.30
Primary reason for use														
Medical	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Recreational	1.03	.15	0.22	.14	0.21	.18	0.01	.93	0.27	.13	0.29	.11	0.03	.83
Cannabinoid														
THC dominant	Ref		Ref		Ref		Ref		Ref		Ref		Ref	
Both THC and CBD	0.32	.57	0.06	.61	0.11	.39	0.15	.24	0.21	.14	0.06	.69	−0.26	.03*
CBD dominant	0.28	.77	0.09	.66	−0.07	.74	0.15	.50	0.21	.40	0.01	.96	−0.10	.64
Total comorbidities (continuous)	−0.44	.04*	−0.03	.44	−0.05	.33	−0.08	.08	−0.11	.04*	−0.09	.09	−0.08	.07

BMI = body mass index; CBD = cannabidiol; FSFI = female sexual function index; OR = odds ratio; PCP = primary care physician; THC = tetrahydrocannabinol.

Comorbidities included hypertension, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, hypercholesterolemia, cancer, neurologic disease, liver disease, depression, and anxiety. Region represents primary residence.

*Significant ($P < .05$)

Table 3. Multivariable logistic regression identifying factors associated with female sexual dysfunction (FSFI total < 26.55)

Characteristic	OR (95% CI)	P value
Age, y		
<30	Ref	
30–39	1.65 (0.73–3.77)	.22
40–49	0.85 (0.37–2.02)	.71
50–59	1.76 (0.73–4.38)	.21
60+	1.28 (0.48–3.42)	.62
Race		
White	Ref	
Black	2.52 (0.69–8.3)	.14
Hispanic	0.51 (0.20–1.19)	.14
Other	1.71 (0.78–3.67)	.17
Relationship status		
Married/relationship	Ref	
Single	0.66 (0.33–1.27)	.23
Unknown	1.01 (0.05–9.08)	1.00
Region		
West	Ref	
International	0.66 (0.32–1.35)	.27
Midwest	0.36 (0.12–0.95)	.05
Northeast	0.63 (0.31–1.24)	.19
South	0.71 (0.36–1.40)	.34
BMI		
Normal	Ref	
Underweight	2.45 (0.43–11.85)	.28
Overweight	1.04 (0.57–1.85)	.91
Obese	0.94 (0.43–1.99)	.87
Extremely obese	1.12 (0.47–2.53)	.79
Tobacco use		
Never	Ref	
Current	0.48 (0.18–1.16)	.12
Former	1.04 (0.63–1.70)	.88
PCP visits in last 3 mo		
0	Ref	
1	1.33 (0.78–2.29)	.30
2+	0.99 (0.47–2.03)	.99
Cannabis use frequency (continuous)	0.79 (0.68–0.92)	.002*
Method of consumption		
Smoking flower	Ref	
Edibles	1.42 (0.65–3.02)	.37
Other	1.06 (0.32–3.22)	.92
Smoking concentrates	1.63 (0.55–4.48)	.35
Tincture or oils	1.2 (0.57–2.52)	.62
Vaping	1.01 (0.48–2.05)	.99
Cannabinoid		
THC dominant	Ref	
Both THC and CBD	0.64 (0.38–1.09)	.10
CBD dominant	1.34 (0.58–3.05)	.49
Total comorbidities (continuous)	1.26 (1.05–1.52)	.02*

BMI = body mass index; CBD = cannabidiol; FSFI = female sexual function index; OR = odds ratio; PCP = primary care physician; THC = tetrahydrocannabinol.

Comorbidities included hypertension, diabetes, heart disease, arthritis, lung disease, kidney disease, thyroid disease, hypercholesterolemia, cancer, neurologic disease, liver disease, depression, and anxiety.

Region represents primary residence.

*Significant ($P < .05$)

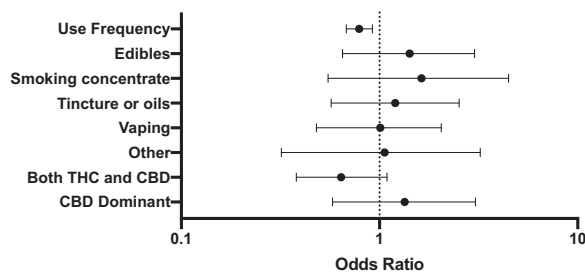


Figure 1. Forest plot demonstrating results of multivariable logistic regression with regard to factors associated with female sexual dysfunction (FSFI total < 26.55). CBD = cannabidiol; FSFI = female sexual function index; THC = tetrahydrocannabinol.

including desire domain ($\beta = 0.09$, $SE = 0.04$, $P = .02$), arousal domain ($\beta = 0.14$, $SE = 0.04$, $P = .0002$), orgasm domain ($\beta = 0.14$, $SE = 0.04$, $P = .002$), and satisfaction domain ($\beta = 0.13$, $SE = 0.04$, $P = .003$). The method of consumption, cannabis chemovar, or primary reason for consumption did not consistently impact FSFI scores.

The odds of female sexual dysfunction, as defined by a FSFI total score less than 26.55, were assessed using logistic regression (Table 3). For each additional step of cannabis use intensity (ie, times per week), the odds of reporting female sexual dysfunction declined by 21% (odds ratio [OR]: 0.79, 95% confidence interval [CI]: 0.68–0.92, $P = .002$). In addition, having more comorbidities was associated with higher odds of sexual dysfunction (OR: 1.26, 95% CI: 1.05–1.52, $P = .02$). The methods of use and chemovar type were not associated with odds of developing sexual dysfunction (Figure 1).

DISCUSSION

To our knowledge, this study is the first to use a validated questionnaire to assess the association between female sexual function and aspects of cannabis use including frequency, chemovar, and indication. In this survey of more than 400 women, we found a dose response relationship between increased frequency of cannabis use and reduced odds of female sexual dysfunction. In addition, while the increase in index scores was small (and possible below clinical significance for some domains), increased cannabis use was associated with improved sexual desire, arousal, orgasm, and overall satisfaction as well as overall improved FSFI scores as compared with less frequent users. Older women and those with more comorbidities tended to have more sexual dysfunction. Importantly, our study did not find an association between cannabis chemovar (eg, THC vs CBD dominant), reason for cannabis use, and female sexual function.

As cannabis use has been shown to be associated with increased sexual frequency in the United States, it is possible this may cause positive effects on sexual experiences.⁷ Much of the research focusing on sexual function and experiences with regard to cannabis began in the 1970s and 1980s. Cannabis' potential positive effect on female sexual function was noted as early as

1970 by Tart¹⁹ who sought to describe the common experiences of cannabis users. He noted in interviews with college students that orgasms are improved, arousal increases, and “sexual feelings are much stronger” leading to more satisfaction. Although this was a small, non-controlled qualitative study without detailed cannabis use characterization, it was suggestive of cannabis' positive effect on female sexual function and is consistent with the current report. In a similar interview-based study with 37 female cannabis, the authors found that frequent users (>5 times per week) reported increased sexual pleasure, orgasms, satisfaction, and intimacy compared with less frequent users (<5 times per week).²⁰ However, this observation did not reach statistical significance. However, in interviews in 84 graduate students, of which 18 were female students, heavy users of cannabis tended to report more positive sexual experiences (ie, pleasure and intensity of orgasm) compared with lower intensity users.²¹ These findings are similar to those by Koff²² who, in a survey of 128 women, found that users of cannabis tended to enjoy sexual activity more than non-users. Interestingly, unlike most studies, he assessed if method of consumption had any impact on sexual experiences (eg, method of smoking and ingestion), and similar to the findings reported here, found no impact. However, the issue with these early studies has been that they represent a small, select sample size, and use non-validated questionnaires in an interview format.

More recently, researchers have used survey instruments to examine the effect of cannabis on female sexual function. However, many of these studies still do not use validated instruments or use sets of individual questions from them resulting in inconsistent findings. Johnson et al²³ surveyed 1,801 women asking specifically about sexual dysfunction and substance use. Although there was no significant increase in sexual dysfunction among cannabis users (10% of the survey respondents), inhibited orgasm (OR: 1.76, 95% CI: 1.12–2.74) and dyspareunia (OR: 1.69, 95% CI: 1.13–2.55) were more common among female cannabis users. This is in contrast to the present study that found orgasm to be improved in more frequent users, whereas pain during sexual activity was unaffected. In contrast, Lynn et al¹⁰ surveyed 373 women (127 users of cannabis) and reported that frequent users had improved orgasms (OR: 2.10, 95% CI: 1.01–4.44). Other realms of sexual function, such as satisfaction, sex drive, lubrication, and dyspareunia, were not impacted by either use vs not or frequency of use. An Australian survey of 8,650 men and women, of which 754 reported cannabis use, found no association between cannabis use and sexual dysfunction in women when comparing users vs non-users as well as frequency of use.¹³ While sexual dysfunction was assessed, a validated questionnaire was not used to obtain composite scores. In contrast to these studies, Johnson et al,²³ who asked questions specifically about female sexual dysfunction, found that cannabis use was associated with inhibited orgasm in a survey of more than 1,500 women.

The exact mechanisms by which cannabis may increase sexual function in women is unknown. The endocannabinoid system

has been postulated to be involved in female sexual function, and prior studies have demonstrated that increased amounts of endogenous cannabinoids such as arachidonoyl ethanolamide and 2-arachidonoylglycerol are associated with increased sexual arousal.⁹ Exogenous use may similarly lead to activation of the endocannabinoid system leading to increased sexual function as we found here. As many patients use cannabis to reduce anxiety, it is possible that a reduction in anxiety associated with a sexual encounter could improve experiences and lead to improved satisfaction, orgasm, and desire.²⁴ Similarly, THC can alter the perception of time which may prolong the feelings of sexual pleasure.²⁵ Finally, CB1, a cannabinoid receptor, has been found in serotonergic neurons that secretes the neurotransmitter serotonin, which plays a role in female sexual function thus activation of CB1 may lead to increased sexual function.¹²

Several limitations of the present study warrant mention. Our cohort of women was derived from a population of cannabis users who made a purchase at a single-partner cannabis dispensary during a specific time period that may represent a unique subset of cannabis users especially as prior reports show lower prevalence of cannabis use in the general population introducing possible selection bias. In addition, while respondents had purchased a product at the partner dispensary, the specific locations from which respondents purchased their product is unknown. However, the population was geographically diverse and was not representative of only 1 region within the United States. Any survey distributed in such a manner is subject to volunteer and recall bias. Although respondents were asked about chemovar, it is possible some respondents did not know the dominant chemovar in the product they purchased thus altering the results. In addition, while frequency was assessed the exact dosage of product (eg, milligrams of THC), duration of use or chronicity is unknown. The impact of frequency of use on sexual function was compared by dichotomizing less frequent and more frequent users with no comparison to a non-user control group. It is possible that inclusion of a non-user population may alter the findings. In addition, we cannot exclude the possibility of causation in that more frequent female cannabis users happen to have higher FSFI scores rather than causal relationship. Although the multi-variable linear regression was adjusted for available factors, residual confounders may exist that were not examined and therefore alter the results. While the FSFI is the most commonly used female sexual function survey, it is not the only one (eg, Sexual Quotient-Female and Golombok Rust Inventory of Sexual Satisfaction), and use of another validated survey may yield differing results. Although the FSFI cutoff of 26.55 for female sexual dysfunction has been validated and was examined here in associated with frequency of cannabis use, the clinical significance in FSFI subdomain scores is unknown. Although other aspects of sexuality were not assessed, such as vaginismus, this would be a potential area for future study.²⁶ Finally, while the survey assessed cannabis use within the last 4 weeks, it did not differentiate between chronic and new users.

Our results demonstrate that increasing frequency of cannabis use is associated with improved sexual function and is associated

with increased satisfaction, orgasm, and sexual desire. Neither, the method of consumption nor the type of cannabis consumed impacted sexual function. The mechanism underlying these findings requires clarification as does whether acute or chronic use of cannabis has an impact on sexual function. Whether the endocannabinoid system represents a viable target of therapy through cannabis for female sexual dysfunction requires future prospective studies though any therapy has to be balanced with the potential negative consequences of cannabis use.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.esxm.2020.06.009>.

WOMEN'S SEXUAL HEALTH

The Relationship between Marijuana Use Prior to Sex and Sexual Function in Women



Becky K. Lynn, MD,¹ Julia D. López, PhD, MPH, LCSW,² Collin Miller, MSW,³ Judy Thompson, RN, CCRC,³ and E. Cristian Campian, MD, PhD⁴

ABSTRACT

Introduction: Scientific research on the effects of marijuana on sexual functioning in women, including libido, arousal, orgasm, and satisfaction, is limited.

Aim: To evaluate women's perceptions of the effect of marijuana use before sexual activity.

Methods: A cross-sectional design, from March 2016–February 2017, within a single, academic, obstetrics and gynecology practice, was performed. Patients were given a questionnaire at their visit and asked to complete it anonymously and place it in a locked box after their visit.

Main Outcome Measures: The primary outcome was satisfaction in the sexual domains of drive, orgasm, lubrication, dyspareunia, and overall sexual experience. The secondary outcome was the effect of the frequency of marijuana use on satisfaction.

Results: Of the 373 participants, 34.0% (n = 127) reported having used marijuana before sexual activity. Most women reported increases in sex drive, improvement in orgasm, decrease in pain, but no change in lubrication. After adjusting for race, women who reported marijuana use before sexual activity had 2.13 higher odds of reporting satisfactory orgasms (adjusted odds ratio = 2.13; 95% CI = 1.05, 4.35) than women who reported no marijuana use. After adjusting for race and age, women with frequent marijuana use, regardless of use before sex or not, had 2.10 times higher odds of reporting satisfactory orgasms than those with infrequent marijuana use (adjusted odds ratio = 2.10; 95% CI = 1.01–4.44).

Conclusion: Marijuana appears to improve satisfaction with orgasm. A better understanding of the role of the endocannabinoid system in women is important, because there is a paucity of literature, and it could help lead to development of treatments for female sexual dysfunction. Lynn BK, López JD, Miller C, et al. *The Relationship between Marijuana Use Prior to Sex and Sexual Function in Women*. *Sex Med* 2019;7:192–197.

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Key Words: Female Sexual Response; Epidemiology; Health Behavior and Attitudes; Women's Sexuality

INTRODUCTION

Over the last decade, marijuana use and the legalization of marijuana, medically and recreationally, has continued to increase in the United States.¹ The internet is rife with claims of the beneficial effects of marijuana on several aspects of sexual function including libido, arousal, and orgasm. However, our scientific research on the effects of marijuana on sexual functioning is limited. Recently Palamar et al² evaluated self-reported sexual effects of marijuana, ecstasy, and alcohol use in a small cohort of men and women aged 18–25. They found that the majority of marijuana users reported an increase in sexual enjoyment and orgasm intensity, as well as either an increase or no change in desire.²

Endocannabinoids, which are structurally similar to marijuana, are known to help regulate sexual function.³ The cannabinoid

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Table 1. Demographics of study population

Characteristics	Non-marijuana users (n = 197)	Marijuana users who don't use before sex (n = 49)	Marijuana users who use before sex (n = 127)	P value*
Age, years	36.3 ± 13.1	37.4 ± 13.1	34.0 ± 11.3	.17
Race [†]				.03
African American/other minorities	79 (40.7)	13 (26.5)	62 (48.8)	
Caucasian	115 (59.3)	36 (73.5)	65 (51.2)	
Sexual orientation [‡]				.02
Heterosexual	180 (91.4)	46 (93.9)	111 (87.4)	
Lesbian	3 (1.5)	0 (0.0)	4 (2.7)	
Bisexual	1 (0.5)	0 (0.0)	7 (5.5)	
Marital status [§]				.18
Married	95 (49.0)	24 (49.0)	46 (36.2)	
Living with a partner	62 (32.0)	18 (36.7)	55 (43.3)	
Single	37 (19.1)	7 (14.3)	25 (19.7)	
Cigarette smoker	17 (8.6)	10 (20.4)	30 (23.6)	<.01

Table values are frequencies (%) or means ± SD.

*χ², Fisher's exact test, and 1-way ANOVA. Significant at the P < .05 level.

[†]3 participants were missing for race and quality of life.

[‡]21 participants were missing for sexual orientation.

[§]4 participants were missing for marital status.

receptor, discovered in the 1990s, has been mapped to several areas of the brain that play a role in sexual function.³ Cannabinoids and endocannabinoids interact with the hormones and neurotransmitters that affect sexual behavior. Although these interactions have not been clearly illuminated, some studies in rodents have helped to clarify the relationship between cannabinoids and the hormones and neurotransmitters that affect sexual behavior.⁴ Although there is less data on human subjects, some studies have measured patient's perceptions of the effects of marijuana on sexual function. Studies have reported an increase in desire and improvement in the quality of orgasm.⁵ Most recently, Klein et al⁶ evaluated the correlation between serum levels of 2 endogenous endocannabinoids and found a significant negative correlation between endocannabinoids and both physiological and subjective arousal in women. Sumnall et al⁷ reported that drugs such as cannabis and ecstasy were more frequently taken to improve the sexual experience than was alcohol.

The primary aim of this study was to determine how women perceive the sexual experience, specifically overall sexual satisfaction, sex drive, orgasm, dyspareunia, and lubrication, when using marijuana before sex. The magnitude of the change was also evaluated. The secondary aim sought to understand the effect of the frequency of marijuana use, regardless of marijuana use before sex, on satisfaction across the different sexual function domains.

MATERIAL AND METHODS

Women were enrolled prospectively from a single, academic, obstetrics and gynecology practice from March 2016–February

2017, and their data were retrospectively reviewed. The protocol was approved by the Institutional Review Board. Eligibility criteria consisted of being a female, ≥18 years of age, and presenting for gynecologic care irrespective of the reason. Each participant completed a confidential survey, including demographic data without unique identifiers after their visit, which was placed in a sealed envelope and dropped in a lock box at the clinic. The Sexual Health Survey was developed for the purpose of this study based on the aims of the study. There are several validated tools for evaluation of sexual function. The Female Sexual Function Index (FSFI)⁸ assesses several domains of sexual function, but it does not address specifically marijuana or other substance usage. The Golombok Rust Inventory of Sexual Satisfaction⁹ specifically relates to vaginal intercourse, but, for purposes of this study, sexual activity was deliberately left open-ended and not restricted to vaginal penetration. In addition, the goal was not to measure whether women had sexual dysfunction, which the FSFI addresses, but to assess basic questions regarding overall sexual activity. To limit bias, the authors embedded the questions about marijuana deeper into the questionnaire. If these specific questions had been added to the standard FSFI, there was concern that the questionnaire would have been too long and that the patients would get questionnaire fatigue and not finish or answer thoughtfully.

Measurement of marijuana use before sex was dichotomized as yes or no. The exact timing of marijuana use in relation to sex was not defined, and the majority of users were smokers of marijuana. For purposes of the study, groups consisted of non-marijuana users, marijuana users before sex, and marijuana users who didn't use before sex. Patients reported their usage as

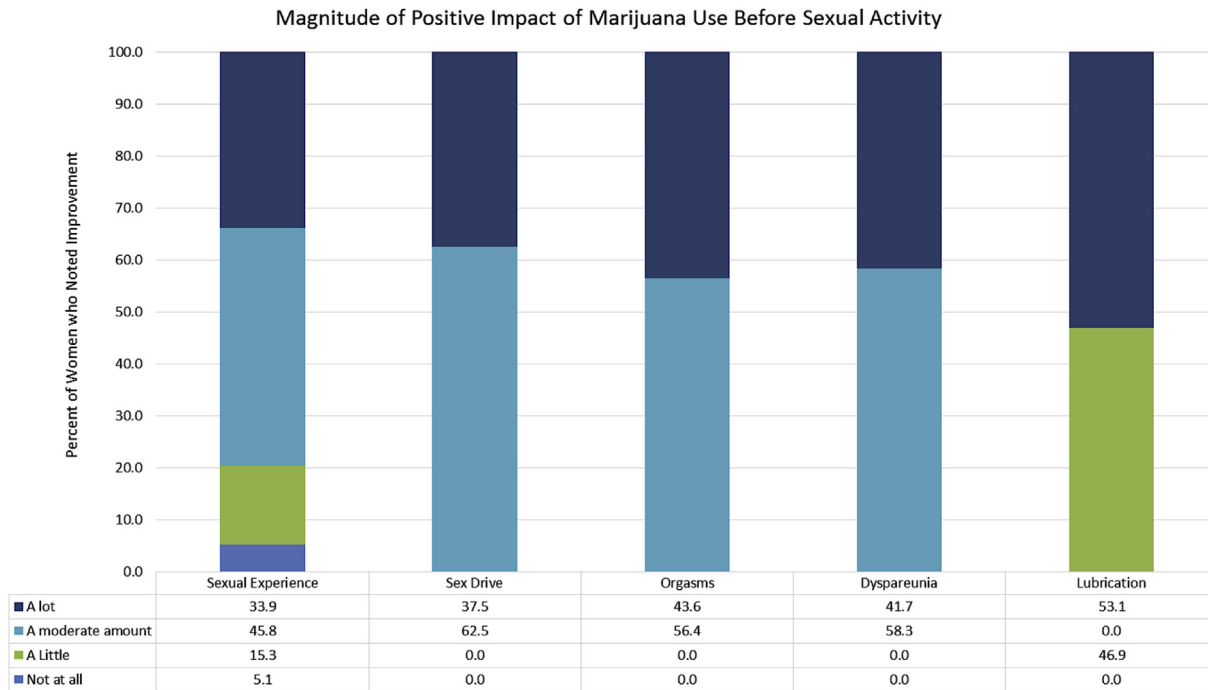


Figure 1. Magnitude of positive impact of marijuana use before sexual activity.

several times a day or week or year, once a day, week or year and less than once a year. For purpose of analysis, frequency of marijuana use was measured by dichotomizing into frequent (once a week—several times a day) and infrequent (several times a year—<once a year).

“Sex” was not specifically defined in the questionnaire, so each respondent used her own definition of sex. Initial questions assessed their perception of their overall sexual health, including satisfaction or dissatisfaction with current sex life, sex drive, orgasms, lubrication, and dyspareunia. An example survey question was, “How satisfied are you with your ability to maintain lubrication during sexual activity or intercourse?” This was followed by questions regarding marijuana usage, the frequency of use, and whether participants perceived any positive or negative effect of this on the above sexual domains. The magnitude of change was measured on a Likert scale of always, sometimes, rarely, or never, and then dichotomized as always—sometimes vs

rarely—never. For example, if patients reported that marijuana use before sex increased their sexual desire, they were then asked, “How often did/does marijuana use before sex increase your sex drive?” If they reported a decrease in sex drive, they then answered the same question within the context of by how much.

Bivariate analyses were conducted to measure the sample characteristics. The Shapiro-Wilk test was conducted to test for normality of the data. 1-way ANOVA, χ and Fisher’s exact tests were used to assess for comparisons among the groups. Multivariate logistic regressions identified the independent predictors in the sample and included all covariates with $P < .05$ established in the bivariate correlations. Then, covariates were retained in the final regression model if they changed the effect size between exposure and outcome by more than 10%, indicating a confounding effect. Final models were adjusted for race and tested using Hosmer-Lemeshow for goodness of fit. Data were analyzed using SAS Version 9.4 for Windows (SAS Institute Inc, Cary, NC, USA).

Table 2. Differences in sexual function domains between those who use before sexual activity and those who do not

Sexual function	Marijuana before sex (n = 127)	Marijuana users don’t use before sex (n = 49)	P value*	aOR (95% CI)
Sexual life satisfaction	89 (70.1)	30 (61.2)	.11	1.85 (0.86, 3.99)
Satisfying sex drive	91 (71.7)	29 (59.2)	.10	1.84 (0.89, 3.82)
Satisfying orgasm	86 (67.7)	26 (53.1)	.04	2.13 (1.05, 4.35)
Increased lubrication	94 (74.0)	34 (69.4)	.50	1.32 (0.58, 3.00)
Reduced dyspareunia	20 (15.7)	10 (20.4)	.40	0.69 (0.30, 1.63)

aOR = adjusted odds ratio.

Table values are frequencies (%). Adjusted for race and age.

* χ^2 , significant at $P < .05$ level.

Table 3. Overall satisfaction of sexual health based on frequency of use

	Frequent marijuana users n = 84	Infrequent marijuana users n = 86	P value*	aOR (95% CI)
Sexual life satisfaction	61 (72.6)	56 (65.1)	0.12	1.50 (0.64, 3.48)
Satisfying sex drive	57 (67.9)	61 (70.9)	0.94	0.77 (0.35, 1.71)
Satisfying orgasm	60 (71.4)	50 (58.1)	0.02	2.10 (1.01, 4.44)
Increased lubrication	63 (75.0)	60 (69.8)	0.23	1.41 (0.60, 3.31)
Reduced dyspareunia	12 (14.3)	18 (20.9)	0.29	0.68 (0.29, 1.59)

aOR = adjusted odds ratio.

Table values are frequencies (%). Adjusted for race and age.

* χ^2 , Significant at $P < .05$ level.

RESULTS

A total of 373 patients completed the sexual health survey during the study period. Non-marijuana users constituted 52.8% ($n = 197$) of the sample. Of the 176 users, 34.1% ($n = 127$) used before sex and 13.1% ($n = 49$) did not. The mean age of the groups was not significantly different. The majority of women were white and identified as heterosexual (Table 1).

Among those who reported using marijuana before sex, 68.5% ($n = 87$) stated that the overall sexual experience was more pleasurable, 60.6% ($n = 77$) noted an increase in sex drive, and 52.8% ($n = 67$) reported an increase in satisfying orgasms. The majority reported no change in lubrication. Participants reported their sexual experiences as “always to sometimes” positive related to all the domains of sexual function, except for lubrication (Figure 1). After adjusting for race, women who reported marijuana use before sex had 2.13 higher odds of reporting satisfactory orgasms during sexual activity (adjusted odds ratio = 2.13; 95% CI = 1.05–4.35) than women who reported no marijuana use before sex (Table 2). There was no statistically significant difference in the other domains between these groups. Women with frequent marijuana use, regardless of use before sex or not, had 2.10 times higher odds of reporting satisfactory orgasms than those with infrequent marijuana use (adjusted odds ratio = 2.10; 95% CI = 1.01–4.44) (Table 3). There was no significant difference in the other domains.

DISCUSSION

In our study, the majority of women who used marijuana before sex reported positive sexual effects in the domains of overall sexual satisfaction, desire, orgasm, and improvement in sexual pain but not in lubrication. Women who used marijuana before sex and those who used more frequently were more than twice as likely to report satisfactory orgasms as those who did not use marijuana before sex or used infrequently.

Our study is consistent with past studies of the effects of marijuana on sexual behavior in women. In the above-mentioned study by Palamar et al,² 38.6% of respondents were women. Participants were asked questions similar to this study’s questions regarding sexual domains, including sexual enjoyment, desire, and orgasm intensity and how these were affected by being under

the influence of marijuana. The majority of respondents noted an increase in sexual enjoyment (53.5%) and orgasm intensity (44.9%), whereas 31.6% noted an increase in desire, and 51.6% noted no difference.² Our data showed a higher percentage of participants reporting improvements in each domain across the board. However, their data included both men’s and women’s responses, and their questions were worded differently.

Dawley et al¹⁰ evaluated a group of marijuana using students (men and women) and found that marijuana smokers reported increased sexual pleasure, increased sensations, and increased intensity of orgasm. Only more-frequent users felt that marijuana was an “aphrodisiac,” a surrogate measure of desire. This study included only 22% women.¹⁰ Finally, Koff¹¹ evaluated sexual desire and sexual enjoyment after marijuana use in women via a questionnaire. The majority of the female respondents reported that sexual desire was increased (57.8% vs 60.6% in our study). Sexual enjoyment increased 42.9% of the time.¹¹ Interestingly, Sun and Eisenberg¹² reported a higher frequency of sexual activity in marijuana users, even when controlling for multiple variables (ie, age, socioeconomic status). The authors surmise from their data that marijuana use does not seem to impair sexual function. However, it is important to note that marijuana use may be harmful.

Our study provides an interesting insight into women’s perceptions of the effect of marijuana on the sexual experience. It differs from other studies in that it is one of the largest series to date and has a wider range of ages. It also differed in that it was a cross-section of healthy women presenting for routine gynecologic care, where most studies target younger patients and include both sexes. For this reason, it is difficult to directly compare the studies, because the sexual activity, frequency, and expectation of these groups may be very different. However, we believe it is important to understand the potential effect in this patient population.

The question of how marijuana leads to these positive changes in sexual function is unknown. It has been postulated that it leads to improvement in sexual function simply by lowering stress and anxiety.¹³ It may slow the temporal perception of time and prolong the feelings of pleasurable sensations.^{5,14} It may lower sexual inhibitions and increase confidence and a willingness to experiment.⁷ Marijuana is also known to heighten

sensations such as touch, smell, sight, taste, and hearing.¹⁵ Although this was not specifically addressed in this article, according to Halikas et al,⁵ the regular female marijuana user reported a heightened sensation of touch and increased physical closeness when using marijuana before sex.

It is postulated that marijuana works through a variety of mechanisms. It is recognized that marijuana and the hypothalamic-pituitary-gonadal axis, which controls the sex hormones, interact with each other. There are cannabinoid receptors in the hypothalamus that regulate gonadotrophin-releasing hormone and oxytocin release, both of which play a role in normal sexual functioning.¹⁶ In addition, marijuana has been shown to affect testosterone levels, which play a role in sex drive, but how and in which direction in women is unclear.^{17,18}

Female sexual function is not only regulated by hormones, but also by centrally acting neurotransmitters, such as dopamine and serotonin. Dopamine is a key pro-sexual modulator in normal excitatory female sexual function.^{19,20} Activation of cannabinoid receptors has been shown to enhance dopamine,¹⁹ which may be another pathway by which marijuana affects sexual function. Cannabinoid receptors have also been localized to other areas of the brain that control sexual function, including the hypothalamus, prefrontal cortex, amygdala, and hippocampus.^{21,22} Serum levels of endocannabinoids have been correlated with both subjective and objective measures of arousal.⁶

The strength and weakness of this study is that it is a single-center study, which allows consistency of patient recruitment but does not allow for assessment of generalizability. It relied on women's memory and perceptions of the sexual experience; however, it is real life, and all questionnaires rely on recall. It did not address the context of the relationship, co-use with other drugs, or the timing and quantity of marijuana use before sex, all of which contribute to the memory of the sexual experience. It does not specifically ask whether the marijuana was taken because the patient had the perception that it would enhance performance, which would be an inherent bias. This may be less likely because women who were frequent users (that is not specifically timed with intercourse) had the same positive relationship with improvement in satisfying orgasm. A further study could address the specific timing of marijuana use on the sexual domains though this would be difficult unless patients were enrolled in a study that required certain timing (a very challenging study to get through the Institutional Review Board).

CONCLUSIONS

This study adds to our knowledge and understanding of the effect of marijuana use on female sexual functioning. Timing appears to be important with those who use before sex reporting a positive effect on orgasm. However, with any use, the majority of women perceived improvement in overall experience, sex drive, orgasm and pain.

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EPIDEMIOLOGY & RISK FACTORS

How Cannabis Alters Sexual Experience: A Survey of Men and Women



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ABSTRACT

Introduction: Cannabis is reported to enhance sexual function; yet, previous studies have shown that physiological and subjective indices of sexual arousal and motivation were associated with decreased availability of circulating endocannabinoid concentrations.

Aim: To explain this contradiction, we evaluated which aspects of sexual experience were enhanced or diminished by cannabis use.

Methods: We used an online questionnaire with a convenience sample of people who had experience with cannabis. We asked questions regarding various aspects of sexual experience and whether they are affected by cannabis. We also asked about sexual dysfunction.

Main Outcome Measure: Aspects of participant sexual experience enhanced by cannabis.

Results: We analyzed results from 216 questionnaires completed by people with experience using cannabis with sex. Of these, 112 (52.3%) said they used cannabis to alter their sexual experience. Eighty-two participants (38.7%) said sex was better, 34 (16.0%) said it was better in some ways and worse in others, 52 (24.5%) said it was sometimes better, and only 10 (4.7%) said it was worse. Of 202 participants, 119 (58.9%) said cannabis increased their desire for sex, 149 of the 202 participants (73.8%) reported increased sexual satisfaction, 144 of 199 participants (74.3%) reported an increased sensitivity to touch, and 132 of 201 participants (65.7%) reported an increased intensity of orgasms. Out of 199 participants, 139 (69.8%) said they could relax more during sex, and 100 of 198 participants (50.5%) said they were better able to focus. Of the 28 participants who reported difficulty reaching orgasm, 14 said it was easier to reach orgasm while using cannabis, but only 10 said that sex was better.

Clinical Implications: The information in this study helps clarify which aspects of sexual function can be improved or interfered with by cannabis use.

Strengths & Limitations: We asked about specific sexual effects of cannabis and were therefore able to understand the paradox of how cannabis can both improve and detract from sexual experience. Limitations of this study include bias that may have been introduced because the sample included only people who responded to the advertisements; it may not represent the general population of people who use cannabis. Moreover, over one-third of our sample said they use cannabis daily and so represent heavier than average users.

Conclusion: Many participants in our study found that cannabis helped them relax, heightened their sensitivity to touch, and increased intensity of feelings, thus enhancing their sexual experience, while others found that cannabis interfered by making them sleepy and less focused or had no effect on their sexual experience. **Wiebe E, Just A. How Cannabis Alters Sexual Experience: A Survey of Men and Women. J Sex Med 2019; 16:1758–1762.**

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Key Words: Cannabis; Sexual Experience; Sexual Dysfunction

INTRODUCTION

Cannabis has a reputation for enhancing sexual function. Several surveys in the 1970s found that both men and women reported that using cannabis enhanced their sexual experience.^{1,2} Women reported greater increases in desire and satisfaction than men.³ Various hypotheses for why people report cannabis-related enhancement of sexual experiences include the effect of cannabis

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Table 1. Participant demographic information

Demographic	Frequency	Percent of respondents
Gender (n = 211)		
Female	133	63
Male	76	36
Transgender	2	1
Education (n = 210)		
Some high school	5	2.4
High school diploma/General Education Development	15	7.1
Some college/university	77	36.7
College/university degree	113	53.8
Ethnic origin (n = 193)		
White/Caucasian	141	73.1
South or East Indian	52	26.9
Born in Canada (n = 209)		
Yes	142	67.9
No	67	32.1

on heightened perceptions, time distortion, relaxation, and decreased inhibition.¹ A large survey of 8,656 Australians found that daily cannabis use was associated with having more sexual partners and sexually transmitted infections. Moreover, daily cannabis use was related to increased reports of difficulty reaching orgasm in men but was unrelated to sexual problems in women.⁴

Conversely, a more recent study showed that increases in both physiological and subjective indices of sexual arousal were significantly associated with decreased endocannabinoid concentrations.⁵ In rodents, studies have shown that sexual motivation is decreased following cannabinoid administration and increased following cannabinoid receptor antagonism.^{6,7}

Cannabis (or marijuana) is commonly used. The 2015 National Survey on Drug Use and Health in the United States reported that 22.2 million Americans had used cannabis in the previous month.⁸ In many jurisdictions, including Canada, where this study was conducted, and in 13 US states, cannabis is legal for recreational use.^{9,10} The leaves and flowering tops of cannabis plants contain at least 489 distinct compounds, distributed among 18 different chemical classes and harboring more than 70 different phytocannabinoids.¹¹ The main cannabinoids are delta-9-tetrahydrocannabinol and cannabidiol. Endogenous cannabinoids (or endocannabinoids) bind to the same receptors as those of tetrahydrocannabinol, the psychoactive component of cannabis. There are cannabinoid receptors in the ovary, endometrium, and myometrium,^{12,13} and this may be relevant to sexual effects.

The purpose of this study was to explore what people experience when using cannabis with sex and whether they specifically use cannabis to enhance sexual experience. We hypothesized that cannabis use has both negative and positive effects on sexual experience and that the positive effects would be greater than the negative ones.

Table 2. Participant responses regarding cannabis use

Participant responses	Frequency	Percent of respondents
Frequency of cannabis use (n = 217)		
Daily	82	37.8
Most weeks	51	23.5
Sometimes	57	26.3
Not any more	27	12.4
Experience using cannabis during sex? (n = 216)		
Yes	209	96.8
No	7	3.2
Have you used cannabis specifically to alter your sexual experience? (n = 217)		
Never	104	47.9
Rarely	27	12.4
Occasionally	64	29.5
Usually	15	6.9
Always or almost always	7	3.2
Do you prefer to be high on cannabis when you have sex? (n = 209)		
Yes	86	41.1
No	123	58.9
How has using cannabis altered your sexual experience? (n = 212)		
Better	82	38.7
No change	34	16.0
Worse	10	4.7
Better in some ways, worse in others	34	16.0
Sometimes better but at other times no change or worse	52	24.5

METHODS

This study consisted of an online questionnaire for people in the community who had experienced using cannabis during sex. The questionnaire included demographic questions plus questions regarding frequency of cannabis use, purposes for cannabis use, whether participants engaged in sexual activity while under the influence of cannabis, and whether cannabis use enhanced, interfered with, or made no difference in their sexual experience. We designed the survey with input from a sexologist colleague and pilot tested it before posting.

Men and women were recruited from various sites using various methods: word of mouth, posters in cannabis retail outlets, cannabis advocacy groups, women's groups, university bulletin boards, and a classified advertisement website (Craigslist). In the cannabis shops, we talked to the vendors (shop managers) and, if permitted, posted the study information with the URL link to the online questionnaire (using SurveyMonkey). When contacting people by e-mail (eg, through word of mouth, advocacy groups) the link was given. No identifying information was collected.

Table 3. Aspects of participant sexual experience that were enhanced by cannabis use

Aspect of sexual experience that was enhanced	Frequency	Percent of respondents
Desire for sex (n = 202)	119	58.9
Sexual satisfaction (n = 202)	149	73.8
Vaginal lubrication (n = 153)	44	28.8
Erectile function/hardness (n = 133)	49	36.8
Sensitivity to touch (n = 199)	144	74.3
Intensity of orgasm (n = 201)	132	65.7
Ability to orgasm (n = 195)	86	44.1
Ability to relax during sex (n = 199)	139	69.8
Ability to focus during sex (n = 198)	100	50.5
Sexual confidence (n = 198)	107	54.0
Emotional closeness to partner (n = 197)	117	59.4

Data from the questionnaires were entered into an SPSS Statistics 25 (IBM Corp; Armonk, NY) database by a research assistant, and descriptive statistics were prepared. We used *t*-tests for continuous variables and chi-square tests for categorical variables to compare men to women. For the open-ended questions on the questionnaire, thematic analysis was used. The 2 investigators began by looking at the whole, then use detailed coding to discover themes.^{14–16} Investigators met several times to discuss and revise themes until a consensus was reached.

RESULTS

Out of the 373 respondents, 350 said they had previously used cannabis, and only responses from these respondents were analyzed (see Table 1 for demographic information). The ages of respondents ranged from 17 to 75 years, with a mean of 29.9 years and a median of 25 years. The majority of participants (96.8%) had experience using cannabis during sex, 52.3% of whom reported using cannabis specifically to alter their sexual experience. When asked how cannabis affected sex, 16.0% of the 212 respondents said sex was better, 16.0% said it was better in some ways and worse in others, 24.5% said it was sometimes better in some ways and worse in others, and 4.7% said it was worse (Table 2).

Participants were asked how specific aspects of their sexual experience were altered by cannabis use during sex (Table 3). Participants reported an increased desire for sex (n = 119 of 202), increased sexual satisfaction (n = 149 of 202), increased vaginal lubrication for women (n = 44 of 153), increased erectile function/hardness for men (n = 49 of 133), increased sensitivity to touch (n = 144 of 199), increased intensity of orgasms (n = 132 of 201), increased ability to orgasm (n = 86 of 195), increased ability to relax during sex (n = 139 of 199), increased ability to focus during sex (n = 100 of 198), increased sexual confidence (n = 107 of 198), and increased emotional closeness to their partner (n = 117 of 197). Only 2 aspects differed significantly between men and women; 62 out of 122 women (50.8%) said that it was easier to reach orgasm when using cannabis, but only 22 out of 70 men (31.4%) did (*P* = .038). Additionally, 37 out of 127 women (29.4%) said it was more

Table 4. Open-ended questions and participant responses

Theme	Participant response
Cannabis increases sensitivity and intensifies the experience.	The occasional night of stoned sex can be incredibly loving, intimate, and intense. More physically intense, emotionally intimate, rhythmic. I am able to last longer and am more interested in giving oral sex and extending foreplay. Be more present. More pleasure.
Relaxation improves the experience.	[I am] more relaxed and engaged in the act, more likely to let go = higher chance of orgasm. It's a lot easier to come, both because I get out of my own head a bit and because physically I'm just more in the moment and more sensitive.
Cannabis improves or worsens focus and that affects sexual pleasure.	It helps the mind focus on the pleasure of touch. Every sense is heightened, you feel light and warm and in the moment of bliss. Sex can be much better, but as a woman who has to focus to reach orgasm, doing so is more difficult. That being said, when it does happen it is more intense.
Cannabis can interfere with sexual pleasure; this interference is often related to using too much.	It depended. Sometimes it enhanced the experience, sometimes I became self-conscious and paranoid and it detracted from the experience. Sometimes when stoned and having sex I lose my concentration and stop for some reason. Too distracted to be completely present. I'm usually too tired from the marijuana to be in the mood. Too much makes it worse, but just a little bit makes it better.

difficult to focus during sex compared to 8 out of 70 men (11.4%) ($P < .03$).

We asked questions regarding sexual dysfunction to determine whether people used cannabis to treat this condition. Eight people (7 women and 1 man) reported that sex was often painful. Of these 8 people, all said they were better able to relax when using cannabis. Seven reported increased sexual satisfaction, 6 reported increased focus, 6 reported increased emotional closeness to their partner, and 5 said it was easier to have an orgasm when using cannabis. Twenty-eight people reported difficulty reaching orgasm; of these, 14 said it was easier to reach orgasm when using cannabis. Ten said that sex was better, 7 said that sex was better in some ways and worse in others, 6 said that sex was better sometimes and not others, 4 reported no changes, and 1 said that sex was worse when using cannabis.

In response to open-ended questions and comments, people expanded on their answers, and we were able to identify several themes (Table 4). The most important theme was that cannabis increased sensitivity and intensified the sexual experience. The next most important theme was about how relaxation improved the sexual experience. Many people commented on how cannabis could improve or worsen focus and how that affected sexual pleasure. The descriptions of how cannabis could interfere with sexual pleasure were varied but appeared to be mostly about using too much.

DISCUSSION

The general impression that sex is better with cannabis does not fit with what we know about the physiological responses to cannabinoids.⁵⁻⁷ The results from this survey shed some light on this contradiction. The reports of increased sensitivity to touch and intensity of feelings, both of orgasms and emotional closeness, would logically improve sexual experience. The relaxation described would likely improve sexual experiences in stressful situations and in anxious people. Reports of enhanced focus or increased distraction may relate to the amount of cannabis used or individual reactions to cannabis. This is also true of reported sleepiness and paranoia. None of these reactions to cannabis is specifically related to physiological sexual response, but they do impact sexual experience. We found only a few differences between men and women, with women having more difficulty with focus and less difficulty achieving orgasm when using cannabis. This may be due to women needing more focus, and, as a result, women may have more difficulty achieving orgasm. This survey is limited by being a convenience sample of people who responded to the advertisements. As such, it may not represent the general population of people who use cannabis. Over one-third of our sample said they used cannabis daily and so represent heavier than average users. Further research is needed to delineate the different effects of cannabis on sexual experience and more specifically on sexual dysfunction.

CONCLUSION

In this survey of people who had used cannabis with sex, the majority found that cannabis helped them relax, heightened sensitivity to touch, and increased intensity of feelings, thus enhancing sexual experience. Others found that cannabis made them sleepy, less focused, and distracted, and some reported no change in their experience.

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- (a) Drafting the Article
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A Qualitative Investigation Comparing Psychosocial and Physical Sexual Experiences Related to Alcohol and Marijuana Use among Adults

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Abstract Alcohol and marijuana are two of the most prevalent psychoactive substances and each may result in distinct psychosocial and physical sexual experiences and different sexual risk behaviors. With marijuana becoming more accepted in the US along with more liberal state-level policies, it is important to examine and compare users' psychosocial and physical sexual experiences and sexual risk behavior associated with these drugs. In this study, we interviewed 24 adults who recently used marijuana before sex. Participants were 50 % female and all self-identified as heterosexual and HIV-negative. Using thematic analysis, we compared self-reported psychosocial and physical sexual experiences of alcohol and marijuana. Participants described differences between drugs with regard to psychosocial (e.g., partner interactions and contexts before sex, partner choice, perceived attractiveness of self and others, disinhibition, and feelings of regret after sex) and physical sexual experiences (e.g., sexual dysfunction, dose effects, sensations of body/sex organs, length and intensity of sex, and orgasm). Alcohol use was commonly associated with social outgoingness and use facilitated connections

with potential sexual partners; however, alcohol was more likely than marijuana to lead to atypical partner choice or post-sex regret. Both alcohol and marijuana had a variety of negative sexual effects, and the illegality of marijuana reportedly facilitated intimate encounters. While sexual experiences tended to be similar across males and females, we did find some variation by gender. Results can inform prevention and harm reduction programming that will allow us to design more realistic programs and to craft interventions, which guide potential users to make safer choices.

Keywords Marijuana · Alcohol · Risk behavior · Orgasm · Sexual dysfunction

Introduction

Cannabis (marijuana) use and approval toward use have recently increased in the US (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2014). The majority of adults in the US now support marijuana legalization (Motel, 2014; Palamar, 2014; Palamar, Ompad, & Petkova, 2014b), four states and the District of Columbia have legalized recreational use, and at least 24 other states have legalized medical marijuana or decriminalized recreational use. Correlational studies have linked marijuana use to risky sexual behavior (e.g., Castilla, Barrio, Belza, & de la Fuente, 1999; Kingree & Betz, 2003; Smith et al., 2010), but richer data are needed to investigate these associations. Since the landscape is changing, and marijuana continues to increase in popularity; research is needed to continue to examine if and how marijuana use may influence risk for unsafe sexual behavior. A novel method is to compare the psychosocial and physical sexual experiences of marijuana to the experiences related to the most prevalent intoxicating substance—alcohol.

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Nationally, two-thirds of 18-year olds have consumed alcohol and half of 18-year olds report ever being drunk (Johnston et al., 2014; Miech, Johnston, O'Malley, Bachman, & Schulenberg, 2015). Risky drinking increases throughout young adulthood (age 19–28) with 64 % of young adults getting drunk in the last year. Likewise, in 2013, nearly half (44 %) of 18-year olds reported using marijuana in their lifetime and 35.1 % reported use in the last year. Roughly two-thirds of adults have used marijuana by age 30 (Johnston et al., 2014; Miech et al., 2015).

A robust literature suggests that drinking—particularly binge drinking—places individuals at risk for engaging in high-risk sexual behaviors (e.g., Pedrelli et al., 2011; Tran, Nehl, Sales, & Berg, 2014). Alcohol has been shown to diminish both social and sexual inhibitions (Coleman & Cater, 2005), and it is also commonly used to boost confidence and to cope with emotions such as fear of rejection by potential sexual partners (Lewis et al., 2008). Coleman and Cater conducted a qualitative study and found that alcohol consumption tends to alter perception of potential partner's attractiveness. They also found that alcohol is often used as an "excuse" for certain sexual behaviors; it impairs judgment (e.g., ability to detect a risky situation), and use can lead to a loss of control (e.g., blacking out). Alcohol consumption is often associated with high-risk sexual behaviors, such as unplanned sex, having casual sex, multiple partners, and a decrease in protective behaviors (e.g., condom use) (Cooper, 2002; Dermen & Cooper, 2000; Mutchler, McDevitt, & Gordon, 2013; Rehm, Shield, Joharchi, & Shuper, 2012; Townshend, Kambouropoulos, Griffin, Hunt, & Milani, 2014). Findings from an older national survey of more than 17,000 college-age students found that heavy drinkers were nearly three times as likely to engage in these types of behaviors (Wechsler, Dowdall, Davenport, & Castillo, 1995). Alarming, about half (46 %) of acquaintance rapes have occurred when one or both parties have been drinking alcohol (Lanutti & Monahan, 2002). Hingson, Zha, and Weitzman (2009) found that every year roughly 97,000 students between the ages of 18 and 24 are victims of alcohol-related assault or date rape.

While extensive research has been conducted on the sexual risks associated with alcohol use, less research has focused on how marijuana use impacts sexual behavior. Many studies link marijuana use to sexual risk behavior, but often in an indirect, correlational manner. For example, many studies suggest that individuals who have used marijuana (e.g., in the last year) tend to report having had more partners (Bedoya et al., 2012; Brodbeck, Matter, & Moggi, 2006; Castilla et al., 1999; Poulin & Graham, 2001; Tyurina et al., 2013), or report engaging in sex without a condom (Castilla et al., 1999). Some studies have even concluded that marijuana use may be riskier, sexually, than alcohol (Kingree & Betz, 2003; Kingree, Braithwaite, & Woodring, 2000). Few studies, however, have examined the psychosocial and physical sexual experiences related to marijuana use, and to our knowledge, no empirical studies have compared alcohol and marijuana with regard to potential psychosocial and physical sexual experiences, which in turn may affect (risky)

sexual behavior. Likewise, to our knowledge, no qualitative studies of marijuana use have focused on the details of sexual effects or sexual interactions, or to the situations prior to sexual encounters, and this information is needed to help inform prevention and harm reduction. Despite increasing use and major policy changes, research on marijuana-related psychosocial and physical sexual experiences is limited. Continued research on the sexual effects of marijuana is warranted because more individuals may become at increased risk for potential adverse sexual outcomes in light of increasing popularity. Here we aim to compare psychosocial and physical sexual experiences (in a qualitative manner) to inform prevention in a time that marijuana use is gaining prevalence and acceptance.

Method

Participants

We interviewed 24 adults who were recruited online via Craigslist in New York City. Eligible participants (1) were ages 18–35, (2) spoke English; (3) must have engaged in sexual intercourse while high on marijuana within the last 3 months, and (4) must have engaged in sexual intercourse within the last 3 months while not high on marijuana. Reporting use of other illicit drugs in the last 3 months was exclusionary. Sex was defined as any sexual activity (involving some form of genital contact) with another individual that can result in orgasm in either individual. HIV serostatus and sexual orientation were not inclusion criteria.

Sample demographics are presented in Table 1. The sample was 50 % female, 10 (42 %) identified as White, 11 (46 %) Black, and 3 (12 %) identified as Hispanic. The mean age was 27.4 years ($SD = 5.8$) and marijuana had been used on average of 10.1 years ($SD = 6.7$). All participants self-reported being HIV-negative and heterosexual.

Measure and Procedure

The sample was stratified by sex and a male research assistant (RA) interviewed male participants and a female RA interviewed female participants. Data for this study were collected via in-depth interviews using a semi-structured interview guide. Following the conventions of Grounded Theory (Strauss & Corbin, 1990), we a priori set a number of predefined core questions, and the interview guided RAs to ask about additional topics that arose. When possible, the trained RAs probed for details and elaboration. This analysis focuses on a series of questions at the end of the structured interview, which focused on comparisons between marijuana- and alcohol-related psychosocial and physical sexual experiences. Specifically, participants were asked open-ended) to compare what sex is like on alcohol compared to sex on marijuana. The interviewers also used a series of probes to follow-up on factors of interest not discussed by the participant

Table 1 Sample characteristics ($N = 24$)

	Full sample n (%)	Males n (%)	Females n (%)
Age, years M (SD)	27.4 (5.8)	27.1 (6.3)	27.8 (5.6)
Gender			
Male	12 (50.0)	12 (100.0)	0 (0.0)
Female	12 (50.0)	0 (0.0)	12 (100.0)
Race/ethnicity			
White	10 (41.7)	5 (41.7)	5 (41.7)
Black	11 (45.8)	7 (58.3)	4 (33.3)
Hispanic	3 (12.5)	0 (0.0)	3 (25.0)
Heterosexual sexual orientation	24 (100.0)	12 (100.0)	12 (100.0)
HIV-negative (self-report)	24 (100.0)	12 (100.0)	12 (100.0)
Years using marijuana M (SD)	10.1 (6.7)	10.9 (7.9)	9.3 (5.4)

There were no significant differences by gender

M mean, SD standard deviation

(probes listed in Table 2). Interviews were recorded and professionally transcribed.

Data Analysis

Analysis of transcripts focused on identifying patterns based on the entire sample using a multilevel process (Miles & Huberman, 1994). Two raters independently coded text into relevant topics/categories, which were largely predetermined by the structured interview questions. Dominant and repeated codes were then categorized into themes. Quotations that fit with specific topics and themes were then cataloged to form a comprehensive picture. After a consensus was reached regarding occurrences and classification of codes and themes, quotations in each domain were summarized. Data were analyzed utilizing Atlas.ti software. Since this was a relatively small sample, results are highly descriptive in nature (Sandelowski, 2000). Despite the relatively small sample size, when possible we examined whether there were potential differences by gender.

Results

We classified our codes into three themes—psychosocial experiences, physical experiences, and behavior. We first present and compare self-reported psychosocial experiences as the majority relate to situations prior to the physical sexual encounter(s).

Psychosocial Experiences

Self-Perception of Attractiveness

Participants often described themselves as feeling more attractive after use of alcohol or marijuana. Many participants—males

and females—reported feeling sexier after use of marijuana, but this was more commonly related to use of alcohol. While many participants noted that they see others as being more attractive while they are on alcohol or marijuana (discussed below in the *Partner Choice* section), some mentioned that feeling more attractive or sexy after use (particularly of alcohol) increased the likelihood of having sex with individuals with whom they would not normally have sex. One female stated: she felt so attractive on alcohol that she feels she is the “diva of the party,” yet another stated: she felt like the “sexiest woman on the planet” while high on marijuana. So both drugs appear to be potentially associated with increased feelings of self-attractiveness, but possibly more so for alcohol.

When I’m drunk, I’m drunk, so I’m like, “I’m hot.” Then with weed, I usually feel more sexy...and happy. You usually feel a little sexier, a little bit more turned on and ready to have sex, instead of being self-conscious. (Female, White, 32)

When I’m drinking...I feel like I’m the prettiest person in the world, like no one has anything on me. I’m just so confident. (Female, Hispanic, 26)

While males also tended to suggest feeling more physically attractive, one male suggested that the confidence he feels from alcohol is what he feels makes him more attractive. Similarly, with regard to marijuana, one male mentioned that smoking marijuana makes him attractive because it makes him more relaxed, nonchalant, and less needy, and another mentioned females tell him he is sexy during the act of smoking marijuana. However, one male mentioned that while drinking helped numb his insecurities, smoking could actually increase his body image issues. Although the same male pointed out that “acting stupid” and blacking out on alcohol could make one appear unattractive, which he compared to the “less-unattractive” characteristic of having squinty eyes on marijuana.

Table 2 Questions and probes used to assess and compare sexual experiences of alcohol and marijuana

Questions and probes

Can you compare what it is like to have sex on marijuana compared to sex on alcohol?

Follow-up probes to initial question:

Do they prefer sex while high on either?

Compare how these drugs affect the kinds of partners they have

Compare how these drugs affect interactions leading to sex (and whether use of either drug is used for sex or to meet someone to have sex)

Compare whether either drug makes them feel more sexually (or socially) attractive

Compare whether they find partners more sexually (or socially) attractive on either drug

Compare how these drugs affect libido/sex drive

Compare how these drugs affect inhibitions (socially or sexually)

Compare how these drugs affect specific sexual acts

Compare potential sexual dysfunction (e.g., penile and vaginal) associated with each drug

Compare sensations (overall body and sexual organ-specific) and emotions experienced related to use of each drug

Compare length and intensity of sex and orgasm related to use of each drug

Compare how dose (amount used) of each drug affects sex

Probe for black-outs, physical effects (e.g., sensations/numbness, impotence, nausea, and dizziness), wakefulness, decision-making ability, superficial effects like smell)

Compare how participants normally feel after sex on these drugs

Probe for satisfaction

Compare potential regret after sexual experiences on these drugs

Probe for regret about partners, specific acts, and protection

Ask whether they feel one drug leads to riskier sexual situations

Probe for unprotected sex and riskier partners

Compare interactions after sex on each drug

Probe for embarrassment, “beer” goggles effect for either drug, attractiveness of partner, post-sex connection, and/or compatibility

Sociability and Loss of Social Inhibitions

When discussing situations that preceded potential sexual encounters, some participants compared the feelings of sociability associated with use of alcohol versus marijuana. For instance, although some participants reported feeling more talkative on marijuana, use was commonly discussed as actually leading users to feel quieter and less social than usual. Alcohol, however, tended to make participants—both males and females—more outgoing and social.

I don't feel as outgoing (on marijuana). I don't want to hold a conversation and stuff like that. Whereas if I'm drunk, I talk to anybody. (Male, Black, 18)

I'm quiet, but it (marijuana) makes me laugh more, and I guess when you laugh, it makes people want to socialize with you. I feel like when you're drunk, you're down for everything. (Female, White, 19)

Thus, in some respects, alcohol—particularly in larger doses—may serve as a more effective social lubricant than marijuana. Not only did some participants high on marijuana report not talking because they were “staring at the clouds” or not feeling social, but some noted being more selective in group situations.

When I'm high I'm a people person, but I'm selective. When I drink, I don't mind being in a crowd of people. There's times I'd be high, and I go to a party, and I'll pick this guy or this girl. But when I'm drunk, I'm just going to mingle with everybody. (Male, Black, 35)

Most participants felt that alcohol made them more socially disinhibited than marijuana. In fact one male participant referred to alcohol as “liquid courage.” A clear difference between alcohol and marijuana was that many participants stated that alcohol use can lead to more “aggressive” social behavior than marijuana, which reportedly tends to make users feel more laid-back, “chill,” relaxed, mellow, and/or that they and everyone else feels happy. The “aggressive” behavior associated with alcohol use seems to apply more to males, however.

When there's drinking involved, guys seem to get more belligerent and crazy, and get this weird aggressive energy...—Maybe I'm looking for it (sex) more if I were drunk, whereas when I'm high, I'm happy doing other things. Sex is great. Watching a movie is great. Resting's great. But when I'm drunk, fucking would be great. (Female, White, 31)

Some participants reported that on alcohol they have a willingness to “do anything,” say things they normally would not say (“without a filter”), or “say yes to people” (regarding

sexual behavior). However, females were more likely to discuss this in terms of being more “adventurous,” as compared to the boldness or confidence described by some males. Others reportedly feel rowdy and “all over the place” on alcohol, but this was often discussed with a negative connotation. But despite the confidence commonly associated with alcohol use, some participants implied that marijuana use is accompanied with a sense of wariness in unfamiliar situations that participants did not generally seem to experience after using alcohol. For example, one male user reported that while he felt “loose” on marijuana, he noted that users maintained a sense of intuition on it that they did not experience on alcohol.

It feels like you get a lot more primal (on alcohol)...maybe you get horny or something. Like “I need this,” and I’m just going to do whatever. But being high—it’s not something like you’re like, “Oh, I need to go out and get some girls.” (Male, White, 27)

When I’m drinking, I want to do anything. I’m up for anything. Not thinking, all right, this is probably not going to be good the next day. But at that moment, you’re not worried about any of that stuff. (Female, Hispanic, 26)

Facilitation of Social Connection with Others

While these two substances reportedly affected social inhibitions, some participants also discussed how alcohol or marijuana were often used in different social situations in order to promote or facilitate sociability. In fact, both marijuana and alcohol were often reportedly available at gatherings and/or provided by others. In general, alcohol use was often provided in social situations to facilitate sociability, and some reportedly drank alcohol in order to loosen up to meet new people. Marijuana, however, was often discussed as being limited to more familiar situations or crowds—not gatherings full of strangers. In addition, not only do many attendees at gatherings drink alcohol to facilitate socialization, but there are also common social rituals or methods or social bonding involving the serving or consumption of alcohol such as buying someone a drink, toasting, and taking shots with others.

Although often used at different types of gatherings, some participants reported that sharing marijuana with someone who asked for a “hit” also tended to facilitate connections between users; thus, sharing the substance appears to influence the social effects associated with actual use of the substance. For example, some males reported smoking at concerts or parties and having women approach them asking to blow smoke in their faces. An intimate form of doing this is via “shot-gunning” in which someone places his or her mouth on another person’s mouth and blows smoke in. Thus, both substances are sometimes used to facilitate social connections—with users taking advantage of direct pharmacological effects as well as social rituals—and results suggest that for both alcohol and marijuana—males appear to be more likely to initiate the sharing ritual with women.

When you’re drinking, and you know the other person is drinking, you can always be like, “Let’s get another drink.” There is always that connection. (Male, White, 23)

Usually the way I meet people is I’m smoking, and they ask for a hit. There have been countless numbers of people that I have met just by, “Can I get a hit of that?” I think marijuana creates a common interest. (Male, Black, 23)

However, while some participants reported that marijuana was an effective “ice-breaker” for meeting others at certain parties, using with others in private (e.g., at a residence) was more common (as it is an illegal substance with a strong odor). In fact, the “taboo” or “forbiddenness” of use being illegal appeared to have facilitated sexual interactions when using marijuana with another individual in private—and both males and females reported asking someone of the opposite sex to come smoke marijuana in order to help facilitate a potential intimate encounter.

When I’d go on a date, if it went well, I’d be like, “Want to come back to my place and smoke weed?” That’s a great transition into the intimacy of being at my house. “Let’s do something a little bit taboo together.” And then it’s like you’re sharing a sensation that’s a little bit forbidden. Also, maybe just the fact of it being illegal and you have to do it privately...it seems kind of exclusive. It feels more intimate. (Female, White, 31)

I was probably thinking that this (marijuana) might increase the chances that we are going to have sex. This would be fun, and we’re already sort of in this intimate experience anyway...in my room in college smoking weed. (Male, White, 27)

However, this method does not appear to be successful unless both individuals are users. For example, two participants (one male and one female) alluded to experiencing stigma when the other (non-using) individual found out that he or she was a marijuana user. So disclosing that one is a user may place one at risk of a stigmatizing situation, although if the other individual is a user it may facilitate a more intimate social encounter.

Partner Choice

While both substances were often noted to affect the types of potential partners participants approached, they overwhelmingly reported that alcohol use was more likely to (negatively) affect the partners they chose. Seeing partners “in the daylight” for the first time and waking up next to a “different person” was a common complaint of both males and females—for example, they felt attracted to the individual the night before, but not the morning after sex. Alcohol use commonly lowered participants’ standards, possibly because as one male participant pointed out—he becomes more desperate or “less picky” on alcohol. Males were more likely than females to discuss lowered standards of partner choice in

terms of appearance, although some females also implied that they were not physically attracted to their partner the following day.

There have been times where I've had alcohol and have hooked up with girls who I wouldn't normally have when I was sober. I think alcohol makes me give less of a fuck than marijuana, but marijuana—it makes me selective in who I choose to have sex with, or, pursue. (Male, Black, 20)

Whoever comes your way...when I'm drinking, everybody looks fine to me. Everybody looks good, and then if you wake up with somebody in the morning, then you'll be like, "Am I bugging out?" With weed I know who I'm waking up with. With drinking, you don't know. Once you start drinking, everybody looks good. (Female, Black, 34)

When you're drunk, you might be like, "Damn, he looks mad good." Then you wake up, you're like, "What the hell did I do? Why are we naked in my bed?" I think if it was weed only I would've been, "Maybe this is a good stopping point." (Female, White, 31)

In many cases, females' "bad" decisions seemed to transcend appearance. Females in particular were more likely to report false interpretations not only about appearance or attractiveness, but also about the partner's character (e.g., career choices). One female mentioned that she continued to perceive a connection with someone (after meeting while inebriated on alcohol); however, on their first (sober) date, she experienced feelings of awkwardness and lack of compatibility. Social awkwardness (e.g., the next day after meeting while inebriated) sometimes resulted from other social issues not experienced or acknowledged while drunk. For example, lack of more meaningful (e.g., sober) conversation during an initial meeting may not lead individuals to discuss (or perhaps recall) potentially sensitive topics such as political affiliation or plans to start a family. One female said she was not attracted to her partner in the morning—not because she found him unattractive—but because he did not remember a long conversation they had about her career. Another female reported that while she felt complimented by "cheesy pickup lines" when drunk, she did not appreciate them the following day when she was sober.

Although generally most participants did not report lowering their standards on marijuana (compared to alcohol), some did explain that they found their partners more attractive while high. A couple of participants articulated differences—for example, one male stated that marijuana can enhance a potential partner's attractiveness (e.g., highlighted facial features) as well as one's surroundings, but on alcohol, they felt one was more likely to settle for someone he or she was not normally attracted to. Another participant mentioned that he became more emotionally attracted to his girlfriend on marijuana and no participants reported such an "emotional" attraction with regard to alcohol. In addition, many

participants discussed attraction or sex on marijuana as being with someone they already knew—or were dating (adding to the point discussed above that marijuana is most often used with familiar individuals). Alcohol was commonly discussed in terms of having sex with strangers (or someone new); thus, situations involving sex on marijuana tend to be much different than situations involving alcohol in which individuals commonly meet strangers in social settings such as bars. However, some marijuana users—male and female—were also more likely to lower their sexual standards when high on marijuana.

I've come to realize that somebody that I wouldn't normally fuck while I was sober, I probably would fuck them while I was high. (Male, Black, 35)

When I'm high...the people I'm attracted to, I'm not at all attracted to sober. My partners are hotter if I've been drinking [laughs]. [They] should be called "weed goggles" because it's much worse on marijuana than on alcohol. (Female, White, 22)

Although reports of lowering sexual standards varied, one participant noted a hierarchy—that marijuana lowers one's standards more than being sober, and alcohol lowers one's standards more than marijuana. In sum, it appears that many individuals were likely to be more attracted to certain potential partners on either drug, but this appeared to be more of a "risk" with alcohol.

Feelings After Sex

Many participants reportedly experienced impaired memory regarding sexual interactions when alcohol was involved, or having sex with partners they did not previously know. This often led to reclusiveness and some participants even reported being "cold" to their partner in the morning. One female noted awkwardness upon accidentally bumping into that partner in the future. However, some participants mentioned that they were more satisfied after interactions on marijuana compared to interactions on alcohol, and this could largely be due to different social interactions beforehand.

I feel like when you're drunk you can't remember what happened the next day. But when I'm high, I remember everything. (Female, White, 19)

I want to cook the person something to eat (after sex) when I'm high. When I'm drunk, it's like, "I'm out of here." Or get away from me. (Male, White, 33)

A male and a female both reported desire for more sex after the first sexual episode on marijuana—a desire that does not reportedly return as often after sex on alcohol. Some participants reported feeling more satisfied after their encounters high on marijuana (compared to alcohol), and more relaxed, "chill," emotionally at ease, and able to fall asleep.

Regret

The most commonly reported feeling after sex on alcohol was regret. Both male and female participants reported regret resulting from a range of behaviors including one-night stands, “hooking up with drunk chicks,” the lowering of sexual standards, and specific risky sexual interactions such as using the withdrawal method instead of a condom. Participants discussed worry about pregnancy, and one participant mentioned disappointment that he could not remember a particular sexual episode. Both males and females commonly reported that regret, shame, and embarrassment were associated with alcohol use, but this was rarely reported for marijuana. One female added that she is more likely to regret the partners she chooses on marijuana; however, she said she is more likely to regret specific sexual acts on alcohol. For example:

When you’re drunk, it’s more regrets or I-wish-I-didn’t-do-that type of thing. Definitely had times where I didn’t use a condom. Pulling-out method, one-night stands... Just didn’t feel good about that at all. (Female, White, 32)

In addition, we found that females tended to report regret in the form of shame for allowing themselves to have sex with someone they feel they would not have had sex with while sober:

You might wake up next to someone you never intended on doing anything with them, just because you didn’t have control and you were drinking so much. I was actually, the next day, thinking, what did I do? (Female, Hispanic, 26)

When you’re drunk, you might see somebody and be like, damn, he looks mad good. Then you wake up, you’re like, oh, what the hell did I just do? (Female, Black, 25)

However, males tended to report regretting the women they pursued and then had sex with:

It’s almost like a shameful experience (from alcohol). I don’t think I’ve had that same kind of experience with marijuana. It’s doesn’t really lower inhibitions the same way, so I don’t think I’m as likely to do something that I know I’m going to regret (Male, White, 27)

Oh, so much regret for alcohol. Sometimes I hook up with girls I wouldn’t normally have while sober. I feel like weed only enhances the attraction and the connection, but with alcohol, there’s lots of regret. Lots of embarrassment. (Male, Black, 20)

I never had no regret on marijuana. Yeah, sometimes alcohol. You like, “Why the fuck I even touch this bitch?” I mean, sometimes I wake up, and I’m just like, “Wow, I could’ve done better than that.” With weed, I never had that experience. (Male, Black, 30)

So both males and females tended to report regret after having sex on alcohol. But as previously noted, some participants feel they remember more (or everything) from sex on marijuana, and adding to this point—one participant made an interesting comparison saying that you are more likely to want to remember sex on marijuana, unlike alcohol where you hope to forget if you have not forgotten already.

Physical Experiences

General Adverse Effects

Nausea, dizziness, feeling sick (and vomiting), and blacking out were commonly reported to be associated with alcohol use. One male reported accidentally falling asleep during intercourse and another male reported having to urinate due to alcohol consumption as interfering with sex (in part because it can be difficult for a male to urinate with an erection). It appears that reported adverse alcohol experiences tend to be more physical, but adverse marijuana experiences reported tend to be more psychosocial—one participant summarized: “I feel like weed affects your motivation, and alcohol just affects your ability.”

I’ve had a couple of times in the middle of intercourse (on alcohol) where I’ve had to stop and go hurl. But I came back and whatever. Maybe it’s taking a little while longer for me to get my erection again, but five times stronger than before I threw up. (Male, White, 33)

However, adverse non-sexual experiences were certainly not limited to alcohol. For example, one male noted feeling sluggish, lazy, and sleepy after smoking marijuana. Yet this depressant effect may be more extreme with alcohol. For example, one female stated that if she drinks too much she may fall asleep instead of having sex.

Dose Effects

Sexual experiences—especially adverse experiences—appear to depend on the dose used. Many adverse experiences reported thus far have been discussed in the context of somewhat high doses (e.g., being drunk). Low doses of alcohol (e.g., 1–2 drinks) reportedly allowed some participants to be able to function rather adequately. A few participants reported that higher alcohol consumption often led to erectile dysfunction and vaginal dryness.

Or if you drink too much, it’s like your body just shuts down. I don’t get any lubrication. Then I think it might even affect guys more, because I’ve been in situations where they’ve drunk too much and they can’t stay hard, or they can’t get hard. (Female, White, 22)

Higher levels of alcohol consumption also reportedly led to more aggressive sex (e.g., regarding initiation), or “reckless”

or unprotected sex. In comparison, many participants—male and female—reported that using too much marijuana was associated with anxiety. While “sexual laziness,” reluctance to change sex positions, and even “passing out” were mentioned, many males and females reported that marijuana has an adverse effect on their mindset during sex. Specifically, females were more likely to describe anxiety in the form of paranoia, yet males were more likely to discuss these effects in terms of having their minds drift and having an experience with less-paranoid intrusive thoughts or distraction.

You’re so high (on marijuana)...you start thinking sex is weird. “What is sex?” Sometimes you’re so high that you get the smallest thing in your head, and you get lost in that...I’ve definitely blacked out (on alcohol), probably during sex. (Female, White, 32)

I guess there maybe is a drop-off where you get too high (on marijuana), and things are a little too intense. Being really high can sort of interfere because then you just get a little too trapped in your head; you tend to get a little more anxious. (Male, White, 27)

However, the mental effects associated with higher doses or marijuana were not always described in a negative manner; for example, one male reported “spacing out” after smoking too much marijuana, but he stated he felt it ultimately led him to last longer during sex.

Sensations of Body and Sex Organs

Participants commonly described sexual experiences with these substances in terms of sensations. Generally, participants described their bodies as more sensitive on marijuana and numb or desensitized on alcohol. A few females noted that increased sensitivity (or being more “tuned-into” their sensations) on marijuana added to the sexual experience as touch felt better or they felt more (physically—which is why some said they preferred being carressed while high). Others mentioned that they felt more comfortable, mellow or at ease on marijuana, which may have allowed sensations to feel more intense.

Alcohol tends to be a lot more numb. Everything is sort of blunted and muted, whereas with marijuana it’s intensified. Any little touch is more arousing. The body sensations, particularly on sexual organs—it’s more of an intense sensation. I’d say everything just feels more sensitive...it’s more intense. Even just foreplay and touching and holding each other is more pleasurable. So they are opposites. (Male, White, 27)

Other females explained that they experienced a tingly sensation on marijuana, goose bumps, or warm sensations. One male also mentioned feeling tingly “on the inside” during sex on marijuana. While most participants discussed increased body sensitivity as a positive aspect of use, one female noted that increased

sensations were not always comfortable. Regardless, alcohol tended to numb sensations and marijuana tended to enhance sensations, and the sensations described above appear to be related to length and intensity of intercourse, which is described below.

Length and Intensity of Sex

In many cases, the desensitization associated with alcohol reportedly resulted in prolonged intercourse—in both males and females, and this was often described in a positive manner. Some participants reportedly enjoyed aggressive and intense sex associated with alcohol use; however, one female (below) describes how lengthy sex on alcohol can become painful.

When you’re drinking, it’s like the guy won’t reach his climax. It was great because it lasted like an hour and a half. He wants to keep going, [but] to the point where I’m all swollen and sore. You’re going to have to switch it up, or do some oral...it begins to get painful. I like the fact that he lasts longer, but he sometimes lasts too long. Compared to when you’re high—it feels so great and it might be a little shorter. (Female, Hispanic, 26)

Likewise, it was mentioned that the feeling of time can slow down on marijuana, so sex feels as if it lasts longer. For example, one female noted that intercourse might feel like an hour on alcohol, but may only be 15 min. Regardless, some males said sex lasts longer on marijuana—possibly due to increased sensitivity, pleasure, and/or emotional intensity. On the other hand, however, a few participants also noted that since sex on marijuana can feel so intense, they orgasm much quicker (than on alcohol).

It’s better being high—the sex, but it’s less time. I like it to be longer, but still feel great about it. (Female, Hispanic, 26)

Another added that the overall sex act did last longer on marijuana, but due to increased foreplay—not actual intercourse.

Sexual Dysfunction

Some participants compared alcohol and marijuana in terms of sexual dysfunction. The most common dysfunction discussed was that males commonly become impotent or “less erect” after too much alcohol (“whiskey-dick;” a complaint by both sexes).

It’s harder to get hard when I’m drunk. So, alcohol, too much, definitely makes you dysfunctional. Weed, I don’t think so. It only affects your motivation. (Male, Black, 20)

Some females, on the other hand, reported that they sometimes experience lack of vaginal lubrication after using marijuana, and this dysfunction was also mentioned by a male in the sample.

I think I don’t get as naturally lubricated when I smoke...and I don’t think I’ve ever orgasmed after smoking weed and having sex. (Female, White, 22)

Sometimes when we've been smoking more marijuana, it's harder for her to get wet. It's like the same thing as getting dry mouth, but down there. (Male, White, 19)

Beyond dysfunction of sex organs, some participants (both male and female) mentioned that alcohol or marijuana use prevented orgasm (discussed more below).

Orgasm

As discussed above, alcohol and marijuana use were often perceived to affect the intensity of sex. Likewise, using these substances could also impact orgasm. Some males and females reported that their orgasms were "magnified," longer, or more intense (with one female noting hot and cold flashes) on marijuana.

The orgasm's more intense (on marijuana). I can feel it more. I'm also not in my head thinking about anything else. So I'm able to be mindful of everything that's happening and nothing intrudes. (Female, White, 32)

When I'm high, it seems like my orgasms are magnified at least by five times. Much more intense. Hot and cold flashes. (Female, Black, 34)

With alcohol, it's more like, "Alright, let's do this. Let's get my orgasm." With marijuana it's like, "Okay, let's enjoy the moment. Let's live in the moment." (Male, Black, 20)

As aforementioned, some participants mentioned sexual dysfunction with regard to orgasm. While some male participants mentioned they may have delayed orgasms on alcohol, others said they could orgasm or orgasm even more frequently on alcohol. On the other hand, some participants mentioned that the drug affected orgasm in a negative manner.

I feel like a lot of the things that can help lead to female orgasm are forgotten when you're high on marijuana. I feel like it requires a degree of focus for me to have an orgasm...I'm never going to have that focus on marijuana. Everything feels better, but I just can't orgasm. [But] it can be harder for me to orgasm when I've been drinking. And my boyfriend, too. Like, he can still get hard, but then it's harder for both of us to finish. (Female, White, 22)

Some females also reportedly could not orgasm on marijuana due to lack of focus. For others (of both sexes), it reportedly took longer to achieve an orgasm on marijuana, again, possibly due to mindset.

Sexual Behaviors

The last theme with respect to "physical" experiences is sexual behaviors. With regard to marijuana use, some participants mentioned that there was often more foreplay and that it tended

to be more euphoric (although sometimes "silly"). Some noted that they tended to explore more, sexually, while high on marijuana, and try new behaviors, as they often felt more creative and/or felt more emotion. This led some participants to engage in more self-described "freaky" behavior (such as sucking toes or "licking ass") or "loss of control," while others simply preferred to just "lay on the bottom."

I think the more you smoke, the more lazier you might be, too. Okay, let's just keep it in one position, because we're so high and we don't want to do so much work. (Female, Hispanic, 26)

Generally, marijuana use tended to be described as leading to more tender, slow, and compassionate sexual acts, and to involve more sensation and sensuality than alcohol.

When I'm a seductress (on marijuana), I kiss. I stroke. I rub. I'm very sensual, as opposed to when I'm drunk—I'm just like, give it to me. Ripping close off. (Female, Black, 34)

While both drugs reportedly facilitated changes in specific sexual behaviors, alcohol was often more commonly cited in terms of loss of control or acting out of the ordinary, and one participant said alcohol use leads to more experimental or "kinkier" behavior than marijuana, sometimes described as "crossing the line" (e.g., one male says he is more likely to tell women to "sit on his face"). Sex on alcohol was often described as being more casual and less emotional than sex on marijuana. Likewise, many described sex on alcohol as being more primal, "sloppy," aggressive and "uncontrollable savage" compared to marijuana. One male compared and said that sex on alcohol was more "straight to the point" to achieve quick ejaculation.

When I'm high off of marijuana, it's more about pleasing my partner and me. You want more out of it, but you also want to give the person more. You want to satisfy the person even more. I guess it's more gentle. Sex being drunk—it's more aggressive. Sex on alcohol is more like savage sex. I go in with the mind frame of I'm going to hurt this woman. She's going to go home and she's going to tell all her friends. Sex with marijuana, it's like you want to please the person more so you want to bring more to table. (Male, White, 33)

When I'm high, I feel more like a seductress. But when I'm drunk, I feel slutty. When I'm a seductress...I'm very sensual, as opposed to when I'm drunk, I'm just like, give it to me. Ripping clothes off. You know when you're drunk, you're saying all kinds of things you wouldn't normally say? You're willing to try much more new things. (Female, Black, 34)

It also appears that type of alcohol or marijuana used can lead to different sexual experiences and behaviors. For example, when discussing alcohol-related sexual experiences some participants mentioned specific brands of alcohol and some discussed certain

strains of marijuana as having unique sexual effects. This participant discusses sexual experiences related to a particular strain of marijuana:

I smoked some Blue Cheese, and... I was licking ass, doing all kinds of crazy stuff I had never even thought of—sucking toes... then I smoke some regular and I just do the regular. (Male, Black, 35)

With regard to sexual risk behavior, the majority of participants felt that alcohol was riskier, sexually, than marijuana. Participants noted that sometimes “anything goes” (sexually) when they drink and are not worried about potential consequences while in the moment. Perceived riskiness of sex was largely due to reported perception of impaired judgment and lack of control of decisions and actions. Use was reportedly often associated with hasty decisions; for example, not using a condom. One male participant said that when he was drunk he sometimes thought, “Who cares about protection?” However, unprotected interactions were not always intentional. One female mentioned that she was too drunk to notice that her partner removed the condom during sex. In some situations, drinking appears to have left participants more vulnerable; for example, one female discussed being subject to sexual assault (unwanted choking) that she described as being too drunk to prevent.

I don’t think being high has ever made me more likely to do anything I consider risky. Being drunk probably affected my experience with risky sexual behavior far more. I’d be more likely to forego using protection with someone I really didn’t know all that well for gratifying that immediate impulse. With weed, I don’t think it’s really had much of a bearing on my choice of using protection. (Male, White, 27)

Even when I smoke weed, if I’m high on weed, I’m still able to make good decisions. It doesn’t impair my judgment. Alcohol impairs your judgment, so that’s the difference. (Female, Black, 30)

(Sex is) more riskier with the alcohol. “Who cares about protection” or whatever. You don’t think about safety a lot when you’re drunk. You just don’t think about it sometimes until the next day. And then you’re like, “Oh shit, did I have unprotected sex?” (Male, White, 33)

Blacking out was also commonly reported by both sexes, or memories of the interaction were jumbled or unclear, with participants unsure whether they used birth control. One female noted that she resorted to taking Plan B the next day due to what she felt was a poor sexual decision. One participant mentioned that she does not always have the autonomy to resist or speak out against a particular sexual act when high on marijuana. Although others reported delayed reactions and noted that reactions (e.g., to potentially unwelcome behaviors) were not as delayed on alcohol. However, participants often explained that they still felt in

control of the situation. A false sense of perceived control, though, could in fact leave a user more vulnerable to unwanted sexual acts. But numerous participants felt that they were still able to make good decisions on marijuana and maintain self-control, more so than when intoxicated with alcohol. Additionally, some participants reported that marijuana did not adversely affect memory of the interaction compared to alcohol. One participant felt that marijuana use was no riskier—sexually—than when sober, and one participant interestingly pointed out that marijuana use decreased his likelihood of engaging in risk behavior because while high he was too paranoid to give in.

Discussion

With the popularity of marijuana increasing in the US, and with marijuana becoming legal in some jurisdictions, it is important to investigate the potential sexual effects associated with use, in order to inform prevention and safer choices among users and potential users. Correlational studies have linked marijuana use to risky sexual behavior, but richer data were needed to investigate these associations. Few studies have examined the psychosocial and physical sexual experiences related to marijuana use, and to our knowledge, no empirical studies have compared alcohol and marijuana with regard to potential psychosocial and physical sexual experiences, which in turn may affect sexual risk behavior. We compared psychosocial and physical sexual experiences to inform prevention in an era where prevalence of use and acceptance of marijuana are increasing. We categorized topics into two overall themes—psychosocial sexual experiences and physical sexual experiences. We were able to uncover differences between alcohol and marijuana through in-depth interviews that can inform future studies as well as prevention and harm reduction efforts.

With regard to psychosocial experiences, participants commonly reported self-perception of attractiveness or sexiness associated with use of alcohol and marijuana, but more so for alcohol. Parsons et al. (2004) also found that men who have sex with men tend to feel sexier after consuming alcohol and this may facilitate sexual expressiveness, but to our knowledge, this had not yet been investigated in a heterosexual population or with regard to marijuana use. It appears that both substances facilitate feelings of self-attractiveness, but more research is needed to examine whether this directly affects risky sexual behavior. Quantitative studies tend to examine odds or risk for sexual risk behaviors in relation to substance use (e.g., Kerr, Washburn, Morris, Lewis, & Tiberio 2015), but do not examine how psychosocial variables, such as feeling sexy or attractive, may mediate or moderate these associations. Such data could help guide messaging for harm reduction interventions.

While we discovered some variations with regard to gender, both alcohol and marijuana were generally associated with sociability, loss of inhibitions, and feelings of boldness. However,

alcohol use was more commonly used for pursuing potential sex partners. Participants often reported feeling a loss of control with alcohol, whereas with marijuana, they tended to feel they maintained control, but were reportedly often quieter and less social than usual. Alcohol is commonly used to boost confidence, decrease social inhibitions, and to cope with emotions such as fear of rejection by potential sexual partners (Lewis et al., 2008; Parsons et al., 2004); however, participants did not report these reasons with regard to marijuana use. Participants also tended to discuss disinhibition on alcohol in terms of being “sloppy,” yet they felt more controlled while high on marijuana. Our results confirm that alcohol is an effective social lubricant and past research has found that it diminishes anxieties about how potential sexual partners might respond (Livingston, Bay-Cheng, Hequembourg, Testa, & Downs, 2013; Parsons et al., 2004). This disinhibition on alcohol helped facilitate a social connection with others, but again, alcohol reportedly served as a more effective social lubricant than marijuana in social settings. Participants—especially males—on alcohol reportedly felt more social, outgoing, and courageous in approaching others—facilitating a potential sexual encounter.

Although males were more likely to pursue women on alcohol, females were more likely to report “accepting” potential sexual partners when inebriated on alcohol. On marijuana, participants tended to feel quieter and less social; however, a major finding of this study was that the illegality of marijuana sometimes facilitated sexual interactions as participants felt they were engaging in “forbidden” or “taboo” behavior—among both males and females. While consumption of alcohol in public is legal (but regulated) with individuals able to drink in public or in private, marijuana is generally used in more private situations (due to illegality in most states). So since marijuana cannot generally be used in public, potential partners are often limited to more intimate settings, thus facilitating potential sexual encounters (while individuals who are drinking do not have to limit themselves to private places). More research will be needed to examine such associations in light of changing legality of marijuana throughout the US.

Participants also discussed alcohol and marijuana in terms of partner choice. While some participants reported that marijuana use made them more selective in choosing a partner, many participants—both male and female—felt that their standards for choosing a partner were lowered while under the influence of alcohol. Parsons et al. (2004) also found that alcohol often plays a large role in spontaneous sexual encounters as it reportedly lowers partner selection criteria. While we found that participants on alcohol often were no longer attracted to their partner following the encounter, this adds to previous research that has found that alcohol use is related to riskier partner choice (Cooper, 2002; Dunn, Bartee, & Perko, 2003).

Interestingly, some participants reported that marijuana use actually made them more selective in choosing partners. While some reported that they felt more attracted to their partner(s) on marijuana, this effect appears to be different from the alcohol “beer

goggle” effect, but possibly because individuals who use marijuana together often already know each other and are in a more private setting together. Partner choice on alcohol appears to largely depend on the social context in which individuals initially meet one another; for example, on alcohol, individuals appear to be more likely to connect with unknown casual partners (Walsh, Fielder, Carey, & Carey, 2014). So if marijuana was legal and used and shared openly in public it is unknown whether there would be a “marijuana goggle” phenomenon associated with use.

Related to partner choice, it was not surprising that marijuana use reportedly led to more post-sex satisfaction than alcohol. Users generally did not feel they experienced memory impairment or poor judgment after using marijuana, but they did feel they commonly experienced this from alcohol. The most common reported feeling after sex on alcohol was regret and regret after sexual interactions on alcohol has been reported in other studies (Livingston et al., 2013). A recent epidemiology study of a nationally representative sample of adolescents found that compared to marijuana, alcohol was much more likely to lead to regretful behavior (e.g., having sex with someone they would not normally be attracted to), especially among females (Palamar et al., 2014a). Our results add to these findings in that compared to marijuana, alcohol use reportedly leads to more regret.

With regard to physical sexual experiences, participants reported adverse effects related to both alcohol and marijuana use. Participants reported nausea, dizziness, and falling asleep during sex on alcohol, but adverse experiences on marijuana were reportedly often more mental (e.g., paranoia and lack of motivation). We must keep in mind that drug dose is likely an important factor relevant to all findings. For example, many experiences on alcohol were discussed in terms of being drunk, so it is unknown whether participants would have had similar experiences on smaller doses. Drug dose likely played a role in other physical experiences participants discussed including body sensations, length and intensity of sex, sexual dysfunction, and specific sexual behaviors.

Alcohol and marijuana reportedly led to different sensations of the body and sexual organs. Participants commonly reported increased sensitivity on marijuana and numbness while on alcohol. These changes in sensation appear to have influenced length and intensity of sex as well as orgasm. While we must keep in mind that both drugs can affect one’s perception of time, participants commonly reported that the numbness associated with alcohol was associated with more extended sexual activity. However, more aggressive sex on alcohol sometimes reportedly led to sex of shorter duration. Participants reported more intense sexual activity on marijuana and sometimes an increase in duration.

Sexual dysfunction was reportedly associated with use of both alcohol and marijuana. Alcohol use was sometimes associated with an inability to achieve or maintain an erection, and alcohol reportedly made it harder to achieve orgasm in both

sexes. Previous studies have found that chronic alcohol abuse leads to higher rates of sexual dysfunction in females including inability to orgasm, lack of vaginal lubrication, and painful intercourse (Covington & Kohen, 1984). While alcohol may increase libido, it does not necessarily increase or allow for optimal performance (Parsons et al., 2004). In fact, alcohol use reportedly made it more difficult to achieve an orgasm in both sexes (which relates to length of sexual encounters previously discussed). Marijuana appeared to have a (negative) effect more on motivation than orgasm; however, use was sometimes reported to lead to vaginal dryness. Consistent with previous studies, participants did not discuss instances of impotence related to marijuana use although some discussed inhibited sexual excitement possibly due to lack of motivation (Johnson, Phelps, & Cottler, 2004; Smith et al., 2010). Ability to achieve orgasm appears to be related to participants' described sexual dysfunction. As aforementioned, length of sex is often extended on alcohol (e.g., due to numbness), and length is often extended because orgasm is delayed. Orgasms were reportedly more intense on marijuana than on alcohol; however, some females reported an inability to achieve orgasm on marijuana due to lack of proper focus.

With regard to sexual behaviors, sex on alcohol was commonly reported as being more casual and less emotional. However, many participants also described sex on alcohol as being more "out of the ordinary" or even "freaky" or "kinky." On the contrary, sex while high on marijuana was commonly described as being more compassionate and it tended to include more foreplay, with many participants experiencing increased sensuality and sensation reportedly related to sex while high on marijuana. Although we were not able to acquire enough data to determine whether participants on marijuana were less likely to use condoms, condomless sex on alcohol was reported as being a somewhat common experience, consistent with Kerr et al.'s (2015) study among college students.

One female also discussed sexual assault (unwanted choking) during an encounter involving alcohol. Alarming, 2 % of college students in the US report being victims of alcohol-related sexual assault or date rape (Hingson et al., 2009). Although few studies document marijuana use in cases of sexual assault, alcohol appears to be particularly problematic (Hall & Moore, 2008; Kerrigan, 2010). Research on both alcohol and marijuana needs to continue in order to inform prevention of sexual assault.

We must also keep in mind that many of the sexual situations related to use of each of these drugs likely depends on contexts of use. For example, a lot of risky or "regretful" behavior occurred with strangers or new partners while participants were inebriated on alcohol, but sex on marijuana was more common with individuals participants already knew.

Limitations

This was a small study so not enough interviews were conducted to formally compare by race/ethnicity, age, or amount used. This study's inclusion criteria were based only on marijuana use so participants were not required to have had sex on alcohol in the last 12 months. Likewise, since sex while high on marijuana while engaging in any sexual activity (not strictly vaginal or anal sex) that could result in orgasm was an inclusion criterion, eligible participants in this sample may have engaged in varying sexual acts and different acts may have varying degrees of sexual risk. Different inclusion criteria might have led to a different sample with different experience. While participants all identified as heterosexual, it is important to keep in mind that sexual orientation does not in fact limit one's sexual behaviors to the opposite sex. A larger, more systematic study should consider multiple other factors including relationship status, and as findings suggests, dose appears to be an important factor, so amount used needs to be examined in relation to specific sexual experiences in more detail. For example, adverse sexual experiences on alcohol tended to be described in terms of drunkenness, but research needs to further examine and compare dose-responses. Likewise, larger studies would benefit from directly comparing "critical incidents" involving marijuana and alcohol to truly compare drug effects as well as specific risk behavior (e.g., whether a condom is used) within the same individuals. Many participants were experienced users and extensive experience could have affected sexual effects or expectations of sexual effects. This study is also limited because type or brand of alcohol and strain and strength of marijuana may also lead to different perceived sexual effects. Finally, we realize that this is a relatively small sample, but we hope that this rich data inform large-scale future studies.

Conclusions

As marijuana use continues to become more normalized in the US, research is needed to inform prevention to ensure that users and potential users of these substances are aware of sexual experiences associated with use. Marijuana and alcohol are associated with unique psychosocial and physical experiences. While alcohol reportedly led to risker sexual behavior, both drugs appear to potentially increase risk for unsafe sex. Research is needed continue to study sexual effects and to inform prevention to ensure that users and potential users of these drugs are aware of sexual effects associated with use. Results can inform prevention and harm reduction programming that will allow us to design more realistic programs and to craft interventions, which guide users to make safer choices.

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Male–female differences in the effects of cannabinoids on sexual behavior and gonadal hormone function

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ABSTRACT

The putative role of the endocannabinoid system and the effects of cannabis use in male and female sexual functioning are summarized. **The influence of cannabis intake on sexual behavior and arousability appear to be dose-dependent in both men and women, although women are far more consistent in reporting facilitatory effects.** Furthermore, evidence from nonhuman species indicate somewhat more beneficial than debilitating effects of cannabinoids on female sexual proceptivity and receptivity while suggesting predominantly detrimental effects on male sexual motivation and erectile functioning. Data from human and nonhuman species converge on the ephemeral nature of THC-induced testosterone decline. However, it is clear that cannabinoid-induced inhibition of male sexual behavior is independent of concurrent declines in testosterone levels. Investigations also reveal a suppression of gonadotropin release by cannabinoids across various species. Historical milestones and promising future directions in the area of cannabinoid and sexuality research are also outlined in this review.

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The use of cannabis for recreational and medicinal purposes has been documented worldwide for centuries. During this time, a large body of contradictory claims regarding the effects of cannabis on sexual functioning and behavior has accumulated. Some suggest that cannabis acts as an effective aphrodisiac, whereas the [Indian Hemp Drugs Commission \(1894\)](#) believed that it was toxic to sexual health. These conflicting accounts have sparked many empirical studies since the 1970s. In this review, the works of neuroscientists, endocrinologists, pharmacologists, psychologists and clinicians are integrated in an attempt to produce a comprehensive picture of the relationship between cannabis use and sexuality in males and females.

Cannabis

Despite the long history of cannabis use, serious research on cannabinoids did not begin until the last few decades of the twentieth century ([Vettor et al., 2008](#)). In the late 1960s, Δ^9 -tetrahydrocannabinol (THC) was identified as the main psychoactive component of cannabis, whereas other constituents such as cannabidiol (CBD) and cannabinol (CBN) were noted to elicit other physiological effects ([Isbell et al., 1967](#)). The identification of THC became a major impetus for further cannabinoid research, evident by

a notable increase of publications in this area after its discovery ([Vettor et al., 2008](#)). This boost of interest in cannabis waned as researchers were repeatedly unsuccessful in their attempt to pinpoint cannabis' mechanism of action. Initially, nonspecific pathways, such as alterations in cell membrane fluidity, were proposed as the likely mechanism, but these speculations soon led to a dead end, along with comparatively fewer publications on cannabinoids in the ensuing decade. In the late 1980s, however, a landmark study found cannabinoids displayed binding properties indicative of their interaction with a specific receptor ([Devane et al., 1988](#)) and with this finding, there was a resurgence of cannabinoid research.

The endocannabinoid system

Cannabinoid receptors

In the early 1990s, a cannabinoid receptor was genetically determined and its distribution was then mapped in the brain using in situ hybridization and radioligand binding analysis ([Herkenham et al., 1991](#); [Matsuda et al., 1990](#)). This receptor, termed CB₁, generally exists as a presynaptic receptor and its activation inhibits neurotransmitter release from the axon terminal (reviewed in [Schlicker and Kathmann, 2001](#)). Its distribution is widespread in the brain with high densities in several brain regions, such as the striatum, hippocampus, and cerebellum, as well as moderate to low densities

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in the amygdala, midbrain, and cerebral cortex (Herkenham et al., 1991; Tsou et al., 1998). Within these brain regions, pharmacological and electrophysiological studies revealed that the CB₁ receptor is situated on terminals that release gamma-aminobutyric acid (GABA), glutamate, serotonin, dopamine, and acetylcholine, and is inferred to be regulating these types of neurotransmitters in the central nervous system (reviewed in Schlicker and Kathmann, 2001).

The distribution of CB₁ receptors throughout these brain structures positions this system to modulate sexual behavior through multiple potential mechanisms. Specifically, there are four major pathways through which cannabinoids could modulate sexual behavior given their pattern of distribution. First, CB₁ receptors within the striatum and cerebellum produce reductions in motor activity and motor incoordination (DeSanty and Dar, 2001; Patel and Hillard, 2001; Lichtman et al., 1996; Egashira et al., 2002), indicating that any effects cannabinoid exert on sexual function may in part be mediated by changes in motor function elicited by this subpopulation of receptors. Second, CB₁ receptors within corticolimbic structures (particularly the prefrontal cortex, amygdala and hippocampus) regulate stress responsivity and emotional behavior (Rubino et al., 2008; Hill et al., 2009; McLaughlin et al., 2007), indicating that cannabinoids may be able to exert effects on sexual behavior indirectly through their ability to modulate the expression of stress and anxiety. Third, CB₁ receptors are located within the dorsal raphe and ventral tegmental area, which are the nuclei containing the cell bodies for the serotonergic and dopaminergic input to the forebrain, respectively (Haring et al., 2007; Matyas et al., 2008). Activation of CB₁ receptors is capable of modulating the synaptic release of both dopamine and serotonin, two neurotransmitters which are intricately involved in the regulation of genital reflexes, sexual motivation and inhibition (Hull et al., 2004; Giraldo et al., 2004). Thus, cannabinoids may modulate sexual function through direct regulation of the synaptic release of serotonin and dopamine. Fourth, CB₁ receptors are distributed throughout neuropeptide populations within the hypothalamus and are known to regulate the release of several peptides important for sexual activity, physiology and reproductive neuroendocrinology, such as oxytocin (Sabatier and Leng, 2006) and gonadotropin releasing hormone (Gammon et al., 2005). Thus, cannabinoids may exert their effects on sexual activity through direct effects within the hypothalamus on the network of peptidergic neurons which regulate the physiological and endocrinological underpinnings of sexual activity. The possible involvement of these systems will be discussed at greater length in this review with respect to documented changes in sexual activity and reproductive neuroendocrinology.

Several years after the discovery of the CB₁ receptor, evidence for a second cannabinoid receptor, CB₂, materialized when the receptor was successfully cloned from a promyelocytic cell line by Munro and colleagues (1993). CB₁ and CB₂ receptors are among the most abundant G protein-coupled receptors (GPCRs) and mainly couple to inhibitory G_i and G_o proteins (reviewed in Mackie, 2008). Despite these similarities, the two receptors diverge in important ways. Specifically, compared to CB₁, the CB₂ receptor has a more limited distribution and is primarily located in peripheral tissue, such as thymus, spleen, and immune cells (Munro et al., 1993). Although both utilize similar signal transduction pathways, their differential localization suggests that they regulate separate physiological functions.

Endogenous cannabinoid receptor ligands

The presence of endogenous receptors for THC suggested the existence of an endogenous substance that naturally binds to these receptors. The search for the first endocannabinoid ended in the 1990's when it was discovered and named "anandamide" (AEA), after the Sanskrit word, *ananda*, for bliss (Devane et al., 1992). A second endocannabinoid, 2-arachidonoylglycerol (2-AG) was found shortly after (Sugiura et al., 1995). Several other ligands have been posited as

potential endocannabinoids, such as *N*-dihomo- γ -linolenylethanolamine, *N*-docosatetraenylethanolamine, *O*-arachidonylethanolamine (virodhamine), oleamide, *N*-arachidonoyl dopamine and *N*-oleoyl dopamine (reviewed in Pertwee, 2005). However, the full characterization of these ligands as endocannabinoids is still not conclusive and thus, in this review, only AEA and 2-AG will be discussed as endocannabinoids.

The synthesis, transport, and metabolism of endocannabinoids are highly regulated processes (for review see Bisogno, 2008 and Ahn, et al., 2008). The synthesis of endocannabinoids is 'on demand' following post-synaptic depolarization, increases of intracellular calcium and/or activation of various phospholipase enzymes. This is a unique synthesis process given that neuromodulators are normally produced in advance and stored in vesicles (reviewed in Mackie, 2008; Pertwee, 2008).

Furthermore, following their synthesis, AEA and 2-AG do not behave like classical neurotransmitters. They are believed to be discharged into the synapse by the post-synaptic cell to activate cannabinoid receptors on the axon terminals of the pre-synapse and inhibit neurotransmitter release. Upon receptor activation, endocannabinoids are removed by cellular uptake, possibly through the actions of a specific transporter. They are then metabolized by intracellular enzymes. Anandamide is mainly metabolized by fatty acid amide hydrolase (FAAH) and to a lesser extent by cyclooxygenase-2, lipoxygenases and cytochrome P450 (reviewed in Pertwee, 2008). 2-AG is metabolized primarily by monoacylglycerol lipase (MAGL), but also by FAAH (Dinh et al., 2002).

In addition to activating CB₁ and CB₂ receptors, endocannabinoids can also interact with other GPCRs and ion channels. They can interact with several types of potassium channels, serotonergic 5-HT₃ receptors, alpha7 nicotinic receptors and vanilloid receptor-type 1 (TRPV1) channels (Oz, 2006).

Collectively, endocannabinoids, the enzymes involved in their synthesis and metabolism, along with the cannabinoid receptors are known as the endocannabinoid system. Since the effects of cannabis are mediated via the activation of cannabinoid receptors, findings on the relationship between cannabis and sexuality can shed light on the relationship between endocannabinoids and sexuality, and vice versa. In this review, we will consider evidence involving both cannabinoids and endocannabinoids and their impact on sexual functioning and behavior in an array of species ranging from rodents to humans.

Human sexuality and cannabinoids

Women

Sexual functioning

So far, there are only a handful of scientific studies that have investigated the effects of cannabis on women's sexual behavior and they have exclusively used self-report data. Despite this shortcoming, these studies show a fairly consistent trend of beneficial effects of cannabis use on female sexual functioning. In a survey conducted by the National Commission on Marijuana and Drugs (1972), women were found to be more likely than men to report an increase in sexual desire following cannabis use. An ensuing survey conducted by Kolodny et al. (1979) which included 500 female participants found that cannabis consumption led to increased sensitivity to touch and relaxation, and as a result, sexual responsiveness, while having no concurrent effect on vaginal lubrication, orgasm frequency, or orgasm intensity. Furthermore, in contrast to data from the National Commission on Marijuana and Drugs, this study did not find increased desire in conjunction with cannabis use. A study by Koff (1974) of 345 undergraduate students seemed to reconcile these discrepant findings on sexual desire, as it found a dose-dependent effect of cannabis intake. Specifically, 71% of female participants reported increased sexual motivation after smoking one cannabis joint, but reported

decreases after larger consumption. Moreover, 43% of female participants recounted heightened sexual pleasure after cannabis intake. This positive impact of cannabis on sexual pleasure was replicated in a later interview-based study carried out by Halikas et al. (1982). In this study, 90% of women reported that cannabis use amplified sexual pleasure and satisfaction to various extents. Likewise, 40% of women also reported that cannabis improved to some degree the quality of their orgasm. One recent study that did report a negative effect of cannabis use on female sexual functioning found that it was associated with painful sex and inhibited orgasm, even after participants' sociodemographics and psychiatric diagnoses were controlled for (Johnson et al., 2004).

Nonetheless, this collection of surveys, although limited by the subjective nature of their method of data collection, overall converges on the positive effect of moderate cannabis consumption on female sexuality in two areas: sexual desire and sexual functioning, the latter including sexual satisfaction, pleasure and orgasmic quality.

Men

Sexual functioning

Unlike the studies on cannabis use and female sexuality, there is far less consistency in regards to research on cannabis use and male sexuality. With respect to positive outcomes, Tart (1970) noted that cannabis use intensified sexual arousal, increased sexual thoughts, and prolonged sexual performance. Furthermore, in an interview study conducted with 800 males between the ages of 18 and 30, Kolodny and colleagues (1979) found that 83% of men reported that cannabis consumption enhanced sexual pleasure. To follow up on this finding, Halikas and colleagues (1982) also surveyed male cannabis users. In this sample, 75% reported cannabis consumption enhanced sexual pleasure and satisfaction, 68% reported that it elevated the quality of their orgasm, and 39% reported that the duration of sexual intercourse was extended. Weller and Halikas (1978) in a later survey replicated similar results with 70% of users reporting increased sexual pleasure and satisfaction, 58% reporting enhanced orgasmic equality, and 27% reporting prolonged sexual intercourse. As these are self-report data, they are subject to multiple potential interpretations.

While these findings seem to depict cannabis as an aid to male sexuality, results on the effect of cannabis on erectile functioning are not nearly as positive. Anecdotal evidence suggesting a positive correlation between erectile dysfunction and cannabis use emerged early and from diverse locations, including North America, North Africa, and India (Chopra and Chopra, 1957; Scher, 1970). For example, Kolodny et al. (1974) noted that of the two men with erectile dysfunction in their study, one regained erectile functioning after terminating his cannabis use. Furthermore, when Cohen (1982) compared the prevalence of erectile dysfunction between daily cannabis users and a control group of men, a sizeable difference emerged, 19% and 8%, respectively. A recent study, using veno-occlusive plethysmography, documented a relationship between cannabis use and vascular erectile dysfunction in young men, which is marked by the presence of early endothelial dysfunction. This suggests that chronic cannabis use may cause early endothelial damage (Aversa et al., 2008), one possible pathway linking cannabis consumption to erectile dysfunction.

The effects of cannabis use on male sexuality appear to be dose-dependent. Abel (1981) noted this in his review published a quarter of a century ago. He concluded that a small amount of cannabis can enhance sexual activity, but larger quantities may inhibit sexual motivation. Koff (1974) provided additional evidence for this dose effect. Respondents in Koff's (1974) survey reported that one joint was more effective than two or more in increasing sexual desire and pleasure. A large sample of Indian men who were chronic cannabis users reported similar dose effects (Chopra and Jandu, 1976). Koff (1974) suggested that the noxious effect of large cannabis doses

arises through a general depression of behavior rather than sex-specific effects.

Collectively, studies on male sexuality and cannabis use appear to document that cannabis intake facilitates sexual desire while simultaneously hindering erectile functioning. This is in contrast with the current literature on female sexuality and cannabis use which suggests cannabis use has positive effects on both sexual desire and functioning. These two bodies of research do share one similar finding: the effect of cannabis on both female and male sexual desire may only be positive in a moderate amount, above which the influence becomes detrimental.

Although the actual direct and indirect effects of marijuana on male and female sexual functioning are not fully understood, many speculations have been put forth in explaining the cannabinoid effects on human sexual functioning. Several researchers (e.g., Halikas et al., 1982) have proposed that cannabis exerts its positive effect on sexual functioning by increasing tactile sensitivity. However, this explanation seems unlikely, as marijuana has been reported to produce either a negative or no effect on touch sensitivity in nonsexual situations (Reese, 1977). Another possible means through which cannabis achieves its facilitatory effects may be the slowing of temporal perception, which causes enjoyable activities, such as sexual intercourse, to appear to last longer (Jarvik and Brecher, 1977; Melges et al., 1971). This perceptual manipulation may occur along with increased concentration on the present, which may also enhance the sexual experience (Melges et al., 1971). Such cannabis-induced experiential changes are also believed to promote sensate focus, bringing forth an erotic experience of the entire body, rather than specific erogenous zones (Gawin, 1978). Accordingly, some individuals reported that cannabis intake allowed them to expand their sensuality beyond the genital to the entire body during sexual intercourse, thereby enhancing their sexual pleasure (Lewis, 1970).

Other researchers believe that the positive effects of cannabis are independent of its psychoactive properties but may be merely a placebo effect, given cannabis' reputation of being an aphrodisiac. Indeed, there is evidence to suggest that the sexual experiences of cannabis users may be influenced by their expectations of the drug (Crenshaw and Goldberg, 1996). Alternatively, it is also possible that cannabis is eliciting its effects by directly stimulating regions of the brain that control sexual activity (Weller and Halikas, 1978). A more popular posited mechanism behind cannabis' influence on sexual functioning is disinhibition and relaxation (Kolodny et al., 1979; Dawley et al., 1979; McKay, 2005). This is believed to allow more focus and attention to be directed towards sexual pleasure, rendering the experience more enjoyable. Related to this explanation, Kolansky and Moore (1972) reported that cannabis consumption led to a period of sexual disinhibition in some women.

Furthermore, given the convincing body of research demonstrating a link between sexual arousal and androgens in women (e.g., reviewed in Motofei and Rowland, 2005), as well as evidence revealing an enhancement of sexual desire following androgen administration (e.g., van Anders et al., 2005), a possible mechanism behind cannabis and elevated female sexual functioning may be increased androgen levels. For example, it is possible that androstenedione, the major androgen produced by the adrenal cortex, is secreted in greater quantities following cannabis use. Previous studies found that THC increased the levels of adrenocorticotrophic hormone (ACTH) as well as the adrenal steroid corticosterone in rats (Jackson and Murphy, 1997; Manzanares et al., 1999) and cortisol in humans (D'Souza et al., 2004). Together, these findings point to the strong possibility that adrenal androgens may also be boosted by THC. Existing data on testosterone levels and cannabis consumption in women are conflicting. Earlier studies reported that women who use cannabis frequently and for extended periods of time had significantly higher levels of plasma testosterone (Kolodny et al., 1977, 1979) and higher scores on specific measures of sexual activity,

such as orgasmic frequency, compared to age-matched women who had never consumed cannabis (Kolodny et al., 1977). However, a more recent study using a cross-sectional design found no difference in testosterone levels between habitual marijuana users and non-users (Block et al., 1991). It remains to be determined whether dose and temporal parameters account for the conflicting data.

There is currently insufficient evidence to characterize the relative strength of the various explanations of marijuana's influence on sexual functioning. It is possible and indeed likely that several of these mechanisms may be possible in different cannabis users or in the same individual at different times. The specific effects of cannabis use in a given person can also be influenced by the user's immediate environment, expectations, personality type, age and relationship status (Tart, 1970; Crenshaw and Goldberg, 1996). The possibility that different mechanisms are at work behind the effect of cannabis and that the effect of cannabis depends on the user's various characteristics may account for the diversity of individual differences in reported marijuana responsiveness.

Testosterone

Ho and colleagues (1970) found that radiolabeled THC accumulated in the testes of rats, suggesting that cannabinoids may affect reproductive processes. This led to a flurry of investigations on the effect of cannabis intake on testosterone levels, conducted utilizing either acute or chronic cannabinoid administration. Acute studies involved measuring participant testosterone level before and after their single cannabinoid intake. Chronic studies either compared the testosterone values of participants with different levels of personal cannabis usage or subjected participants to an extended period of cannabis administration after which their testosterone quantities were compared with their baseline levels. It is important to note that results from chronic studies involving heavy cannabis users are likely to be confounded by other types of recreational drug use. Both chronic and acute studies are summarized below in a chronological fashion.

Kolodny and colleagues (1974) first followed up on the findings from Ho and colleagues (1970) using human participants and found that chronic consumption of cannabis significantly lowered plasma testosterone levels. Moreover, when Kolodny and colleagues (1974) separated the cannabis users by intake concentration, the testosterone reduction was found to be significantly greater in heavy users (more than 10 cannabis joints per week) than moderate users (5–9 joints per week).

This discovery quickly triggered a series of subsequent studies. First, Mendelson and colleagues (1974) decided to study this effect with a different research design. They utilized a within-subjects design instead of the between-subjects design used by Kolodny and colleagues (1974). Mendelson and colleagues (1974) first subjected 27 cannabis users to a 5-day cessation period to obtain a baseline. Subsequently, his group recorded the participants' daily plasma testosterone levels during a 21-day period of cannabis use and an ensuing 4-day cessation period. Employing this design, they found no significant differences in plasma testosterone level between heavy and casual users or at any period of the study. However, they did note a trend of lower testosterone levels in heavy users. Nonetheless, all subjects, including the heavy users, exhibited plasma testosterone quantities that were well within the normal range.

Motivated by these conflicting results, Schaefer and colleagues (1975) performed another within-subject study. They recruited 12 casual cannabis users and led them through a 1-day washout, followed by placebo and either 10 mg or 20 mg THC cannabis joints in the subsequent three days. On the fifth day, each participant received a 20 mg THC joint and after 90 min of smoking, plasma was collected. Although testosterone values for all the participants were found to be within the normal range and, in fact, on the high end, the researchers did find a small (8%) but significant reduction in

testosterone levels 90 min following the intake of the 20 mg THC joint (Schaefer et al., 1975).

Cushman (1975) decided to use a between-subject design similar to the initial Kolodny and colleagues (1974) study, but like the previous within-subject studies, no differences were observed between cannabis smokers and nonsmokers. In Cushman's (1975) study, the male student participants who smoked an average of five cannabis joints per week, thus comparable to the moderate users in the Kolodny and colleagues (1974) study, had similar plasma testosterone values as the non-smoking controls. Again, all testosterone levels were within the normal range.

One study that may explain the discrepant findings was conducted by Kolodny and colleagues (1976). Kolodny's group measured plasma testosterone levels at 15, 30, 60, 120 and 180 min after acute cannabis exposure and compared these values to those obtained in the same individuals during a nonsmoking period. They discovered a significant plasma testosterone reduction at 30 min that continued to the 180-min time point and concluded that cannabis use may temporarily decrease testosterone production. This seems to suggest that the absence of a testosterone decline in some studies may be the consequence of an insufficient or excessive temporal lag between the last exposure to cannabis and testosterone measurement.

Taking into account the findings of Kolodny and colleagues (1976), Wall and colleagues (1978) measured plasma testosterone in eight casual cannabis users at numerous time points for 6 h following their single bolus infusion of either 10 mg THC or placebo. They observed a depression of plasma testosterone from 3.5 h to 6 h post-infusion, which seemed to resonate with findings of Kolodny and colleagues (1976). The ephemeral nature of testosterone reduction after cannabis intake was further buttressed by Cohen's (1976) study where testosterone levels were found to decrease 2–3 h after cannabis consumption. Also, Cohen (1976) documented that testosterone levels progressively dropped to 60% of baseline values after 4 weeks of cannabis smoking and returned to 84% of baseline after a 1-week cessation period, highlighting the reversible nature of the inhibitory effect of cannabis consumption on testosterone levels. Collectively, these three studies demonstrate that cannabis use does temporarily reduce testosterone levels, notwithstanding other evidence of non-significant effects.

This general consensus was challenged by a later study performed by Mendelson's group, using similar methods to their previous investigation with the important addition of an hourly measurement of plasma testosterone over a 24-h period on the last day of baseline, the twenty-first day of cannabis use and the third day of cessation. Mendelson and colleagues (1978) found, for the second time, no correlation between cannabis use and plasma testosterone fluctuations. All subjects, surprisingly, also possessed plasma testosterone levels in the higher range of normalcy. One likely explanation for this finding is that 21 days of cannabis intake is inadequate for producing a robust inhibition.

Kolodny and colleagues (1975) responded with a follow-up study, employing a similar within-subjects design to Mendelson and colleagues (1978) that entailed daily marijuana consumption of standardized potency for 8 weeks. Significant declines in testosterone levels were observed only after 5 weeks and an even greater decline was observed in subsequent weeks.

Nevertheless, two later studies did not detect an effect of cannabis use on plasma testosterone values with either acute (Cone et al., 1986) or chronic consumption (Block et al., 1991). The acute consumption study did demonstrate, however, that intake of cannabis in the form of one or two joints did produce a nonsignificant trend towards a decrease in testosterone levels (Cone et al., 1986).

Despite the lack of coherence among findings on the effect of cannabis on testosterone levels, there is one consistent finding. Specifically, all studies that have documented a statistically significant testosterone decrease after cannabis consumption have also

found that the measured testosterone levels in these users are still within the normal range, suggesting that this effect is not likely of behavioral significance.

Animal models of sexuality, cannabinoids and endocannabinoids

Females

Sexual functioning

Unlike the research on the effects of cannabinoids in women, findings in females of other species are conflicting. The first controlled study on cannabinoids and female sexual behavior in rats was conducted by [Gordon and colleagues \(1978\)](#) prior to the discovery of the endocannabinoid system. [Gordon and colleagues \(1978\)](#) demonstrated that THC failed to elicit sexual receptivity in the absence of ovarian hormones and in estrogen-treated rats, THC did not mimic progesterone. These findings indicated that THC was not exerting its influence on rodent sexual behavior by acting like an estrogen or progesterone-like substance, both of which are not critical to the endocrine mediation of human sexual behavior.

With regards to THC and sexual behavior, [Gordon and colleagues \(1978\)](#) found a biphasic effect: a low dose of THC facilitated lordosis and a high dose interfered with sexual receptivity in estradiol-primed female rats. This dose-dependent effect echoes the findings on women's sexuality and cannabinoids, where low levels of cannabis consumption were found to be facilitatory while heavy intake was detrimental ([Koff, 1974](#)). Furthermore, when the adrenal steroids in the female rats were removed via adrenalectomy, the facilitatory effect of THC persisted, indicating that THC was acting centrally rather than behaving like an ovarian steroid or enhancing those adrenal secretions which tend to facilitate lordosis.

Another early study also found positive effects of THC on rodent sexual behavior. [Turley and Floody \(1981\)](#) chose to investigate not only sexual receptivity but also proceptivity, the active sexual solicitation of a male, since this may be more relevant to women's sexual behavior. By measuring ultrasonic vocalizations and observing lordosis in estradiol-primed female hamsters, these researchers concluded that THC stimulated both sexual receptivity and proceptivity. Moreover, [Turley and Floody \(1981\)](#) also came to the same conclusion as [Gordon and colleagues \(1978\)](#), i.e. that the effects of THC were centrally instead of hormonally mediated.

A more recent study by [Mani and colleagues \(2001\)](#) revived the discussion of cannabinoid mediation of behavioral estrus. This research group examined in detail the mechanisms underlying the influence of cannabinoids on sexual behavior. In the first of a series of experiments, they found that intracerebroventricular administration of THC enhanced lordosis in estrogen-treated female rats to levels comparable to female rats primed with both estrogen and progesterone. Moreover, [Mani and colleagues \(2001\)](#) observed that the enhancing effect of THC was attenuated by blocking both progesterone receptors and dopamine D_{1/5} receptors. Pharmacologically antagonizing the CB₁ receptor blocked both dopamine- and progesterone-induced sexual facilitation. These results suggest that CB₁ receptors, and not CB₂ receptors, are involved in a cross-talk circuit with dopamine and progesterone which regulates female rodents' sexual behavior. Evidence that the CB₁ receptor is found within the ventromedial hypothalamus and the medial basal hypothalamus further buttress this hypothesis as both brain regions express progesterone and dopamine receptors and are critical for sexual behavior regulation in the female rat.

Altogether these studies indicate that cannabinoids may serve as a proxy for progesterone and facilitate sexual receptivity and proceptivity in female rats. Nonetheless, two more recent studies document

opposing results. [Ferrari and colleagues \(2000\)](#) found that a powerful cannabinoid agonist, HU210, decreased both lordosis and proceptive behaviors in estrous female rats. In a more recent study, [Lopez and colleagues \(2009\)](#), in addition to recording lordosis and proceptive displays, utilized a runway methodology that they deemed to be more representative of women's sexual desire. Using this methodology, [Lopez and colleagues \(2009\)](#) reported that the administration of AM251, a CB₁ antagonist/inverse agonist significantly stimulated sexual motivation in receptive female rats primed with both estradiol and progesterone. The same antagonist/inverse agonist also elevated lordosis and proceptivity in females given low doses of estradiol. These results are in stark contrast to those of [Mani and colleagues \(2001\)](#), who found that the cannabinoid antagonist, SR141716A, diminished receptivity. This discrepancy may partially be the result of several methodological differences. First, the rats in the study of [Mani and colleagues \(2001\)](#) were administered 2 µg of estradiol benzoate and 2 µg of progesterone (intracerebroventricularly, 30 min prior to testing), whereas those in the study of [Lopez and colleagues \(2009\)](#) were administered higher doses of estradiol benzoate and progesterone systemically. Perhaps more importantly, Lopez's team delivered the cannabinoid antagonist AM251 in their study whereas [Mani and colleagues \(2001\)](#) administered SR141716A. This is an especially notable methodological difference given that some physiological effects have been shown to be elicited by SR141716A and not AM251, such as the blocking of negative ionotropic responses to anandamide ([Ford et al., 2002](#)). Finally, [Lopez and colleagues \(2009\)](#) chose to assess female receptivity by using a paced mating paradigm, while [Mani and colleagues \(2001\)](#) utilized a non-paced mating procedure and ended their tests after the male had mounted the female ten times.

The current state of findings on the effects of cannabinoids on non-human female sexual functioning is far from reaching consensus. Previous results widely fluctuated and demonstrated both deleterious and beneficial effects of THC. Future studies in this area are certainly needed to produce a more coherent picture. Prospective studies may need to pay especially close attention to its methodological details as past conflicting results may be partially attributable to methodological differences, such as the specific antagonist used.

Gonadotropins

Studies across nonhuman species suggest that cannabinoids suppress gonadotropin release through hypothalamic blockade of gonadotropin releasing hormone (GnRH). Treatment with THC produces a reduction in LH levels in rats ([Marks, 1973](#); [Tyrey, 1978](#)), mice ([Dalterio et al., 1983](#)), and monkeys ([Smith et al., 1979](#)). In rhesus monkeys the effect lasted up to 12 h, but could be reversed by the administration of GnRH ([Smith et al., 1979](#)). Therefore endocannabinoids may act at the hypothalamus to suppress GnRH secretion. [Murphy and colleagues \(1990\)](#) found that cannabinoids did not block basal GnRH secretion from hypothalami *in vitro*. This suggests that cannabinoids suppress GnRH secretion by modulating the activity of neurotransmitters involved in regulating GnRH secretion.

As a result of its effect on GnRH levels, THC has disruptive effects on cyclicity. In rats, THC was shown to block ovulation and the LH surge ([Nir et al., 1973](#)) and decrease progesterone levels during the luteal phase ([Kostellow et al., 1980](#)). In rhesus monkeys, THC administration in the follicular phase blocked ovulation and decreased levels of estrogens and gonadotropins, but co-administration of exogenous gonadotropins preserved ovulation ([Asch et al., 1981](#)). This supports the hypothesis that cannabinoids are acting at the hypothalamus to suppress GnRH. [Sassenrath and Chapman \(1975\)](#) found that monkeys treated with THC for 1 year had normal menstrual cycles, suggesting tolerance can develop to the disruptive effects of THC on menstruation.

Males

Sexual functioning

While some human studies have described aphrodisiac-like properties of marijuana, animal studies have typically reported inhibitory effects of cannabinoids on male sexual behavior. This discrepancy may arise because most of the human data is based on subjective self-reports rather than objective measures. Alternatively, inhibition of male sexual behavior in other species may be the result of the relatively high drug doses commonly administered to nonhuman subjects. Consistent with the dosage hypothesis, [Martinez-Gonzalez and colleagues \(2004\)](#) gave male rats high and low dose intraperitoneal injections of the endocannabinoid, AEA, and found that the high dose of AEA increased mount, intromission, and ejaculation latencies, but the relatively low dose of AEA had the opposite effect, slightly increasing ejaculation frequency. Although there is currently no evidence for exogenous cannabinoids facilitating male sexual behavior in nonhuman species, this study suggests that the endocannabinoid system may have both facilitatory and inhibitory functions in regulating sexual behavior.

In an early study of the effects of cannabis on sexual behavior, [Merari and colleagues \(1973\)](#) monitored male rats presented with receptive females and found that an intraperitoneal injection of THC interfered with copulatory behavior, increasing latency to first mount, latency to ejaculation, and latency to mount following ejaculation. This study used THC doses of 2 and 3 mg/kg. A dose as low as 0.5 mg/kg was shown to inhibit the sexual behavior of male rats, with a significant reduction in mounting and ejaculation frequency compared to vehicle-treated animals ([Uyeno, 1976](#)). Cannabinoids have also been shown to decrease the sexual behavior of mice ([Cutler and Mackintosh, 1984](#)). Male mice receiving a high dose of THC or CBN 3 times a week for 3 or 7 weeks exhibited impaired sexual motivation, with treated males taking longer to initiate sexual intercourse with receptive females ([Dalterio, 1979](#)). Although high doses of THC also suppress motor activity in mice, [Frischknecht and colleagues \(1982\)](#) found that repeated exposure induced tolerance to motor impairment, but not sexual impairment. This suggests that the cannabinoid-induced reduction in male sexual behavior was a result of reduced motivation for sex rather than a nonspecific effect of impaired motor function. In rats, [Dhawan and Sharma \(2003\)](#) showed that a high dose of THC (10 mg/kg) impaired sexual motivation and no tolerance developed following repeated administration. Thus, unlike many of the behavioral effects of cannabis, tolerance does not develop to the inhibitory effects of exogenous cannabinoids on male sexual behavior.

Studies utilizing cannabinoid receptor agonists and antagonists support an inhibitory role for cannabinoids in male sexual behavior. [Ferrari and colleagues \(2000\)](#) found that treatment with the potent CB1 receptor agonist, HU-210, led to a dose-dependent reduction in male rat copulation at doses that did not affect motor function. Furthermore, chronic treatment with HU-210 impaired sexual behavior at doses that had no effect when administered acutely. In line with this, [Gorzalka et al., \(2008b\)](#) found that administration of the CB1 receptor antagonist, AM251, led to a dose-dependent facilitation of ejaculation in male rats. Male rats given a single intraperitoneal injection of AM251 required less time and fewer intromissions to achieve ejaculation. Utilizing both agonists and antagonists, these data suggest that the endocannabinoid system negatively regulates male sexual behavior at a range of doses.

The mechanism through which cannabinoids impair male rat, mouse, or human motivation for copulation has yet to be determined. There is evidence that cannabis can decrease testosterone levels in men ([Kolodny et al., 1974](#)), but this is likely not mediating the cannabinoid-induced decreases in sexual response, as [Shrenker and Bartke \(1985\)](#) found that THC still led to deficits of copulation in testosterone-treated castrated mice. It is known that male rats exposed to sexually receptive females exhibit a rapid increase in

noradrenergic activity in the medial basal hypothalamus and median eminence, as well as in dopaminergic activity in the medial basal hypothalamus. [Murphy and colleagues \(1994\)](#) showed that oral administration of THC blocked both of these responses. This suggests that reductions in hypothalamic noradrenergic and dopaminergic levels may mediate the inhibitory effects of cannabinoids on male sexual behavior, but further research is needed before solid conclusions can be drawn.

The presence of the endocannabinoid system in stress-responsive neural circuits suggests that it may play a critical role in regulating neuroendocrine and behavioral responses to stress ([Gorzalka et al., 2008a](#)). There is mounting evidence that the endocannabinoid system is involved in the stress-induced suppression of sexual behavior. Perhaps cannabinoid effects on sexual behavior and reward arise from activation of the stress system, which subsequently interferes with sexual motivation, performance, and/or arousal. Although researchers have found ways to deal with the motor-inhibitory effects of cannabinoids, it is much more difficult, but may be equally important to control for the effects of cannabinoids on anxiety and stress. [Coddington and colleagues \(2007\)](#) showed that blockade of the CB1 receptor blocked stress-induced suppression of male sexual behavior in *Taricha granulose*, a rough-skinned newt. Normally, exposure to acute stress or injection of corticosterone suppresses courtship clasping behaviors of male *Taricha*, but administration of the CB1 receptor antagonist, AM281, was shown to block this suppression by blocking the inhibition of spontaneous neuronal activity and sensory responsiveness in the neural circuit for clasping. In rats, chronic stress or chronic treatment with corticosterone inhibits male sexual behavior, an effect likely mediated by increased serotonergic 5-HT_{2A} receptor activity ([Gorzalka et al., 1990, 1998, 2001](#)). [Hill and colleagues \(2006\)](#) showed that chronic treatment with the CB1 receptor agonist, HU-210, increased 5-HT_{2A} receptor activity. This suggests that stress and subsequent corticosterone release leads to activation of endocannabinoid signaling, which results in increased 5-HT_{2A} receptor activity and a suppression of male sexual activity. Involvement of 5-HT receptors may explain some of the sex differences in the effects of THC on sexual functioning, as activation of 5-HT receptor subtypes has been shown to have differential effects on the sexual behavior of male and female rats.

There are considerable data on the role of the endocannabinoid system in the inhibition of penile erections. It is well established that a group of oxytocinergic neurons in the paraventricular nucleus of the hypothalamus (PVN) regulate erectile function and copulatory behavior of males ([Argiolas and Melis, 1995, 2004, 2005; Giuliano and Rampin, 2000; McKenna, 2000; Andersson, 2001; Melis and Argiolas, 2003](#)). CB1 receptors are known to be expressed here ([Herkenham et al., 1991](#)) and [Melis and colleagues \(2004\)](#) demonstrated that erections could be induced in male rats by injecting the cannabinoid CB1 receptor antagonist, SR 141716A, into the PVN. Although PVN injection of CB1 receptor agonists, WIN 55,212-2 or CP 55,940, had no effect on erection, they were capable of reducing the erection-inducing effect of SR 141716A. Recently, [Castelli and colleagues \(2007\)](#) demonstrated that chronic intraperitoneal injection of SR 141716A actually increased the density of CB1 receptors in the PVN and that this increase correlated with an increase in the pro-erectile effect of SR 141716A injected into the PVN. Blockade of CB1 in the PVN is thought to increase penile erection by decreasing GABA release ([Castelli, et al., 2007](#)). This would increase glutamatergic neurotransmission in the PVN, signaling the oxytocinergic neurons to produce more nitric oxide (NO) via NO synthase. Increased NO would facilitate the release of oxytocin, which leads to penile erection. Consistent with this hypothesis, intra-cerebral microdialysis revealed that the pro-erectile effect of SR 141716A in the PVN occurred concomitantly with an increase in the concentration of glutamic acid, NO²⁻ and NO³⁻ in the paraventricular dialysate ([Succu et al., 2006; Melis et al., 2006](#)) and PVN injection of the glutamate receptor

antagonist, MK-801, or the NO synthase inhibitor, L-NAME, reduced the erection-inducing effect of SR 141716A. Furthermore, injection of the oxytocin receptor antagonist, $d(\text{CH}_2)_5\text{Tyr}(\text{Me})^2\text{-Orn}^8\text{-vasotocin}$, into the lateral ventricles almost completely eliminated SR 141716A-induced penile erections (Melis et al., 2004). In summary, CB1 receptors appear to influence erectile function and sexual activity centrally by modulating paraventricular oxytocinergic neurons. There is also emerging evidence for peripheral effects of cannabinoids on penile erection.

Relaxation of cavernous smooth muscle in the corpus cavernosum is critical for inducing and maintaining penile erections. CB1 receptors have been shown to be expressed in the corpus cavernosum of the rat (Ghasemi et al., 2006) and CB1 and CB2 receptors have been shown to be expressed in the corpus cavernosum of rhesus monkeys and humans (Gratzke et al., 2009). *In vitro* studies utilizing rat and rabbit preparations reveal that relaxation of corpus cavernosum tissue is enhanced in the presence of the endocannabinoid AEA (Ghasemi et al., 2006; Vural et al., 2009). In rat tissue, CB1 and not CB2 receptor antagonists inhibited relaxation (Ghasemi et al., 2006), but in rabbits both CB1 and CB2 receptor antagonists inhibited relaxation (Vural et al., 2009). In tissue isolated from rhesus monkeys, AEA actually had the opposite effect—antagonizing relaxations of the corpus cavernosum (Gratzke et al., 2009). These *in vitro* studies suggest a peripheral role for cannabinoid signalling in sexual behavior, but highlight potential species differences in the functioning of the endocannabinoid system.

The majority of animal evidence points to an inhibitory role for the endocannabinoid system in the regulation of male sexual behavior. The aphrodisiac-like properties of cannabis described by some users is likely the result of altered perceptual processing of the sexual encounter. This effect is not readily measurable in animal models, but the role of the endocannabinoid system in physiological processes involved in the sexual response, such as erection and ejaculation, is a prospect for drug development for sexual dysfunctions.

Testosterone

Unlike human data, data from other species reveal a reduction in testosterone following cannabis exposure. In the first such study, Dalterio and colleagues (1977a) demonstrated *in vitro* that application of an exogenous cannabinoid, THC or CBN, led to a dose-dependent suppression of gonadotropin-stimulated testicular production of testosterone in tissue from mature and immature mice. Burstein and colleagues (1979) showed that THC did not interfere with the binding of gonadotropins to their receptors in the testes, but affected testosterone biosynthesis by inhibiting cholesterol esterase. Cholesterol is the precursor to all steroids and as one might expect, THC was also shown to inhibit the production of progesterone in mouse testis (Dalterio et al., 1977b). In a rat preparation, administration of CBN, CBD, and THC were all shown to inhibit testosterone production in Leydig cells, but CBN and CBD were more potent inhibitors than THC (Jakubovic et al., 1979). In addition to reducing testosterone biosynthesis, cannabinoids have also been shown to accelerate its hydroxylation by liver microsomes (List et al., 1977). These studies suggest that cannabinoids act peripherally to decrease testosterone levels by inhibiting its biosynthesis and accelerating its metabolism. Furthermore, there is evidence that cannabinoids can inhibit testosterone activity by impairing androgen binding to receptors (Dixit and Lohiya, 1975; Ghosh et al., 1981; Purohit et al., 1980).

Evidence from early *in vivo* studies suggested that THC also acts centrally to affect testosterone levels. Acute or chronic treatment of THC in male rats not only resulted in reduced levels of testosterone, but also reduced levels of luteinizing hormone (Symons et al., 1976; Kumar and Chen, 1983). More recently, Wenger and colleagues (2001) showed that AEA suppressed LH and testosterone levels in wild-type, but not CB1 knockout mice, providing evidence that the

endocannabinoid system acts to suppress testosterone levels. Cannabinoid-induced reductions in testosterone are also observed in non-human primates. Rosencrantz and Esber (1980) observed reduced serum testosterone in male monkeys following either inhalation of cannabis smoke or oral ingestion of THC. Following THC injections in rhesus monkeys, Smith and colleagues (1976) observed a 65% reduction in testosterone levels that returned to baseline in only 3-days. Fujimoto and colleagues (1982) found that chronic oral administration of either THC or a crude marijuana extract (CME) to rats for 71–78 days resulted in reduced serum testosterone levels for 2–6 h after drug cessation, but this effect was gone 24 h later. Inconsistencies in the human data on testosterone and cannabis likely arise because of the relatively short time-course of the effect.

Conclusions and future directions

Findings on the effects of cannabinoids on sexuality have been accumulating for more than three decades and many aspects of this relationship have been clarified by the discovery of endocannabinoids and their receptors. In terms of women's sexual function, cannabis use has generally been reported to facilitate various aspects of sexual functioning, such as arousal and desire. Furthermore, this influence may be dose-dependent, as there is evidence suggesting that cannabis is beneficial to sexual functioning only at low doses, beyond which it can become debilitating. A similar dose-dependent relationship has also been found in the literature on cannabis consumption and male functioning. Moreover, there appears to be more conflict among the results in this research area as men report both facilitatory and incapacitating effects of their cannabis use, ranging from accounts of increased sexual desire to erectile dysfunction. Results on the influence of cannabis intake on testosterone levels in men are also mixed, revealing either a statistically significant decrease or no change in testosterone levels after cannabis consumption. A likely explanation for this inconsistency is that the reduction in testosterone levels from cannabis use is transient and too fleeting to be detected in studies that have a long temporal lag between cannabis intake and testosterone measurement. Overall, these studies do converge on one conclusion: if cannabis intake does lower testosterone levels, the magnitude of its influence is not likely to be of behavioral significance, as documented testosterone decreases still fall within the normal range in all studies to date.

Given the inherent flaws of self-report data, studies using model organisms are an important complement to findings on humans. Data using non-human species suggest that cannabinoids affect sexual behavior by acting centrally, specifically in the hypothalamus. In the area of female sexuality and THC, rodent studies have revealed both detrimental and beneficial effects on sexual receptivity and proceptivity. On the other hand, the majority of findings on male sexuality have found an inhibitory effect on sexual motivation and erectile functioning. Animal studies are also fairly consistent in reporting reductions in hormonal levels as a result of THC administration. Moreover, parallel to the human data, the THC-induced testosterone decrease was also observed to be temporary in model organisms.

Collectively, the current body of research on cannabinoids and sexual functioning has resulted in a clearer picture of their relationship. At the same time, it also points out what is missing from this picture. To date, objective measurement of the effects of cannabis on human sexual functioning has not been reported. In view of this, our laboratory is currently using the vaginal photoplethysmograph to examine empirically the relationship between marijuana use and sexual arousal, as well as the relationship between endocannabinoid levels and sexual functioning in women. Our techniques are described in Brotto and colleagues (2009).

There is practical value in understanding the endocannabinoid system's role in the sexual psychophysiology of men and women. This knowledge can lead to further advances in developing drugs for

treating sexual dysfunctions, such as arousal and desire disorders. It is also crucial for recognizing potential sexual side-effects of pharmaceutical agents that induce their effects by facilitating or antagonizing the endocannabinoid system. Given that such drugs are already being developed for treating various nonsexual disorders, insight into the endocannabinoid system is imperative.

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ORIGINAL RESEARCH—SEXUAL DYSFUNCTION

Cannabis Use and Sexual Health

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ABSTRACT

Introduction. Cannabis is the most commonly used illicit substance worldwide. Despite this, its impact on sexual health is largely unknown.

Aim. The aim of this article is to examine the association between cannabis use and a range of sexual health outcomes.

Main Outcome Measures. The main outcome measures include the number of sexual partners in the past year, condom use at most recent vaginal or anal intercourse, diagnosis with a sexually transmissible infection in the previous year, and the occurrence of sexual problems.

Methods. Method used in this article includes a computer-assisted telephone survey of 8,656 Australians aged 16–64 years resident in Australian households with a fixed telephone line.

Results. Of the 8,650 who answered the questions about cannabis use, 754 (8.7%) reported cannabis use in the previous year with 126 (1.5%) reporting daily use, 126 reported (1.5%) weekly use, and 502 (5.8%) reported use less often than weekly. After adjusting for demographic factors, daily cannabis use compared with no use was associated with an increased likelihood of reporting two or more sexual partners in the previous year in both men (adjusted odds ratio 2.08, 95% confidence interval 1.11–3.89; $P = 0.02$) and women (2.58, 1.08–6.18; $P = 0.03$). Daily cannabis use was associated with reporting a diagnosis of a sexually transmissible infection in women but not men (7.19, 1.28–40.31; $P = 0.02$ and 1.45, 0.17–12.42; $P = 0.74$, respectively). Frequency of cannabis use was unrelated to sexual problems in women but daily use vs. no use was associated with increased reporting among men of an inability to reach orgasm (3.94, 1.71–9.07; $P < 0.01$), reaching orgasm too quickly (2.68, 1.41–5.08; $P < 0.01$), and too slowly (2.05, 1.02–4.12; $P = 0.04$).

Conclusions. Frequent cannabis use is associated with higher numbers of sexual partners for both men and women, and difficulties in men's ability to orgasm as desired. **Smith AMA, Ferris JA, Simpson JM, Shelley J, Pitts M, and Richters J. Cannabis use and sexual health. J Sex Med 2010;7:787–793.**

Key Words. Cannabis; Sexual Behavior; Sexual Health; Sexual Dysfunction

Introduction

Cannabis is the most widely cultivated and used illicit drug with an estimated 147 million people or 2.5% of the world population using it annually [1]. Its use has been linked to earlier and more frequent sexual activity, having multiple sexual partners, having casual sexual partners while traveling, inconsistent contraceptive use, and being diagnosed with a sexually transmissible infection [2–7].

Despite the prevalence of cannabis use and its apparent association with adverse sexual health outcomes, the link between cannabis use and sexual health has been the subject of remarkably few population-based studies. Those studies that have been done have focused on adolescents and young adults [8–15]. It is a criminal offence to possess, cultivate or sell cannabis in all states of Australia. However, possessors of small amounts of cannabis for personal use are generally issued an infringement fine rather than being prosecuted.

The person may also be required to attend a cannabis education session. One in three Australians has ever used cannabis [16], and in many social circles it is little stigmatized [17]. As it grows easily in Australian conditions, it can be obtained cheaply and without recourse to dealers of other illicit drugs, though many users do buy from dealers [18]. Its use widened from a small counter-culture minority in the 1970s to broader but not completely mainstream social groups in the 2000s. Many of the correlations found between cannabis use (lifetime or recent) and health outcomes are related to socio-demographic factors or social location (rates of use are higher among gay men and lesbians [19,20], prisoners [21], injecting drug users [18], and young people attending music festivals [19]), and to psychological factors among users such as risk-taking and psychological distress [16].

Public perception of the risks associated with cannabis use is not well understood. In one study, 27% of people aged 14 and older indicated that they were uncertain about whether there was any health problems associated with cannabis use. The health risks identified included respiratory problems, addiction and the escalation of drug use, and the risk of driving accidents [22]. Sexual health was not identified as being among the domains of cannabis-related health risk.

The present study examines the socio-demographic correlates of cannabis use in a large, population-based study of adults aged 16–64 years, and the relationship between the frequency of cannabis use and the number of sexual partners in the past year, condom use at the most recent sexual encounter, and the reporting of sexually transmissible infection and sexual difficulties.

Methods

Data came from the 2005 intake interview of the Australian Longitudinal Study of Health and Relationships [23]. This is a computer-assisted telephone interview study of Australians aged 16–64 years.

The interview covered a broad range of socio-demographic and health topics with a focus on sexual and reproductive health issues. Cannabis use was assessed with three questions: whether the participant had used cannabis at least 10 times in their life; whether they had used it in the 12 months prior to interview; and if so, whether they had used it daily, weekly, or less often.

Outcomes of interest were the number of sexual partners in the year prior to interview (none, one, two, or more), condom use at most recent vaginal intercourse (no, yes), or anal intercourse (no, yes; asked only of men who had reported having sex with other men), diagnosis with a sexually transmissible infection in the year prior to interview (no or yes to any of: chlamydia, syphilis, gonorrhoea, and genital herpes), and the presence for 1 month or more of the following sexual problems: lacking interest in sex, inability to orgasm, reaching orgasm too quickly, reaching orgasm too slowly, experiencing pain during intercourse, not finding sex pleasurable, anxiety about one's ability to perform sexually, vaginal dryness (women), and trouble keeping an erection (men) [24]. Where a sexual problem was reported, the extent to which it was experienced as problematic was ascertained: not a problem, a minor problem, somewhat of a problem, or a major problem [25].

Socio-demographic factors controlled for included: age group (16–25, 26–35, 36–45, 46–55, 56–64), language spoken at home (English, other), sexual identity (heterosexual, homosexual, bisexual), educational attainment (lower secondary, secondary, post-secondary), occupation (professional, associate professional, trades, unskilled), and legal marital status (married, never married, separated, divorced, or widowed). All these factors have been identified as associated with one or more of the outcomes of interest, and analyses were conducted separately of men and women [26–30].

Statistical analysis included contingency table analysis and logistic and multinomial logistic regression and was conducted using Stata [31]. Given the survey design methodology, design-based *F* statistics are reported. The study was approved by the Human Ethics Committees of La Trobe University, Deakin University, and the University of New South Wales.

Results

A total of 8,656 people completed the interview with an overall response rate of 56% [23]. Of the 8,650 who answered the questions about cannabis use, 754 (8.7%) reported cannabis use in the previous year with 126 (1.5%) reporting daily use, 126 (1.5%) reporting weekly use, and 502 (5.8%) reporting use less often than weekly. Cannabis use was more commonly reported by men than by women (11.2% vs. 6.1%, $P < 0.001$), and in both men and women was more commonly reported by participants younger than 36 years (Table 1).

Table 1 Demographic correlates of the frequency of cannabis use (N)

	Women's frequency of cannabis use						
	None	Less than weekly		Weekly	Daily		
	%	%	OR*	%	OR†	%	OR‡
Age (4,299)							
16–25 (721)	89.71	7.05	1.35 (0.86, 2.11)	2.43	2.29 (1.03, 5.07)	0.81	0.71 (0.25, 2.01)
26–35 (829)	90.44	7.55	1.43 (0.99, 2.07)	0.70	0.66 (0.26, 1.67)	1.31	1.14 (0.50, 2.58)
36–45 (1,068)	92.35	5.39	1.00	1.09	1.00	1.17	1.00
46–55 (1,050)	97.78	1.67	0.29 (0.18, 0.48)	0.48	0.41 (0.14, 1.22)	0.08	0.06 (0.01, 0.50)
56–64 (631)	99.08	0.92	0.16 (0.07, 0.35)	0.00	—	0.00	—
Language (4,300)							
Other (183)	97.72	1.37	0.28 (0.06, 1.24)	0.91	0.94 (0.13, 6.92)	0.00	—
English (4,117)	93.68	4.66	1.00	0.93	1.00	0.73	1.00
Sexual identity (4,298)							
Heterosexual (4,192)	94.27	4.14	1.00	0.93	1.00	0.66	1.00
Homosexual (43)	82.69	17.31	4.77 (1.76, 12.94)	0.00	—	0.00	—
Bisexual (63)	73.33	21.33	6.63 (3.25, 13.53)	1.33	1.83 (0.24, 13.83)	4.00	7.83 (1.67, 36.85)
Education (4,298)							
Lower secondary (1,193)	94.48	3.35	0.75 (0.50, 1.12)	0.84	0.76 (0.35, 1.65)	1.33	2.32 (1.08, 4.99)
Secondary (2,052)	93.86	4.47	1.00	1.10	1.00	0.57	1.00
Post-secondary (1,053)	93.11	5.94	1.34 (0.94, 1.90)	0.71	0.65 (0.29, 1.48)	0.24	0.42 (0.12, 1.49)
Occupation (4,188)							
Professional (1,432)	95.40	3.67	1.00	0.52	1.00	0.41	1.00
Assoc. professional (1,630)	93.09	5.12	1.43 (0.99, 2.05)	0.97	1.90 (0.82, 4.38)	0.82	2.06 (0.83, 5.10)
Tradesperson (179)	91.63	6.51	1.85 (0.97, 3.51)	0.93	1.85 (0.40, 8.64)	0.93	2.38 (0.29, 19.46)
Unskilled (947)	92.86	4.67	1.31 (0.85, 2.01)	1.59	3.11 (1.28, 7.57)	0.88	2.22 (0.78, 6.32)
Marital status (4,300)							
Married (2,414)	97.03	2.31	1.00	0.35	1.00	0.31	1.00
Never married (1,198)	87.60	8.84	4.23 (3.00, 5.96)	2.09	6.70 (3.11, 14.42)	1.46	5.21 (2.20, 12.37)
Other (688)	93.58	4.73	2.12 (1.38, 3.25)	0.97	2.91 (1.07, 7.89)	0.73	2.43 (0.75, 7.87)
Current tobacco use (4,300)							
None (3,336)	96.93	2.48	1.00	0.35	1.00	0.25	1.00
Less than weekly (63)	73.33	26.67	14.24 (7.42, 27.32)	—	—	—	—
Weekly (65)	74.36	20.51	10.80 (5.19, 22.49)	3.85	14.32 (3.84, 53.41)	1.28	6.68 (0.79, 56.51)
Daily (836)	84.65	9.77	4.52 (3.24, 6.31)	3.09	10.11 (4.85, 21.09)	2.49	11.42 (4.70, 27.75)
Current alcohol use (4,300)							
None (1,118)	96.42	1.94	1.00	0.82	1.00	0.82	1.00
Less than weekly (1,487)	94.90	3.93	2.06 (1.23, 3.44)	0.67	0.83 (0.31, 2.26)	0.50	0.62 (0.24, 1.65)
Weekly (1,171)	90.46	7.62	4.19 (2.56, 6.85)	1.14	1.48 (0.55, 3.97)	0.78	1.02 (0.39, 2.62)
Daily (524)	92.99	4.78	2.55 (1.43, 4.57)	1.43	1.81 (0.58, 5.65)	0.80	1.01 (0.34, 3.00)
	Men's frequency of cannabis use						
	None	Less than weekly		Weekly	Daily		
	%	%	OR*	%	OR†	%	OR‡
Age (4,350)							
16–25 (844)	84.19	9.39	1.04 (0.72, 1.48)	3.36	2.33 (1.18, 4.62)	3.06	1.10 (0.58, 2.07)
26–35 (737)	80.88	13.01	1.49 (1.09, 2.05)	3.73	2.70 (1.43, 5.09)	2.38	0.88 (0.47, 1.66)
36–45 (960)	86.36	9.30	1.00	1.48	1.00	2.87	1.00
46–55 (1,082)	93.60	3.47	0.34 (0.23, 0.51)	1.08	0.67 (0.33, 1.38)	1.85	0.60 (0.32, 1.10)
56–64 (727)	97.94	0.80	0.08 (0.04, 0.17)	0.57	0.34 (0.13, 0.93)	0.69	0.21 (0.09, 0.52)
Language (4,351)							
Other (244)	97.26	2.74	0.34 (0.15, 0.75)	0.00	—	0.00	—
English (4,107)	88.24	7.33	1.00	2.09	1.00	2.34	1.00
Sexual identity (4,345)							
Heterosexual (4,248)	89.04	6.91	1.00	1.83	1.00	2.22	1.00
Homosexual (46)	72.73	18.18	3.22 (1.33, 7.79)	7.27	4.88 (1.65, 14.39)	1.82	1.00 (0.13, 7.50)
Bisexual (51)	77.05	11.48	1.92 (0.85, 4.36)	9.84	6.23 (1.72, 22.59)	1.64	0.85 (0.12, 6.31)
Education (4,349)							
Lower secondary (1,072)	87.78	6.30	0.83 (0.61, 1.13)	2.88	1.49 (0.88, 2.52)	3.04	1.24 (0.76, 2.00)
Secondary (2,235)	87.99	7.61	1.00	1.94	1.00	2.46	1.00
Post-secondary (1,042)	91.36	6.72	0.85 (0.62, 1.16)	1.12	0.56 (0.28, 1.10)	0.80	0.31 (0.16, 0.63)
Occupation (4,262)							
Professional (1,615)	91.48	6.66	1.00	0.88	1.00	0.98	1.00
Assoc. professional (835)	86.11	8.59	1.37 (0.96, 1.94)	2.80	3.38 (1.68, 6.82)	2.50	2.70 (1.37, 5.34)
Tradesperson (1,168)	87.01	6.92	1.09 (0.80, 1.49)	2.71	3.25 (1.77, 5.95)	3.35	3.59 (2.01, 6.44)
Unskilled (644)	86.92	7.38	1.17 (0.80, 1.70)	2.59	3.11 (1.48, 6.51)	3.11	3.33 (1.73, 6.42)
Marital status (4,348)							
Married (2,409)	93.98	4.29	1.00	0.83	1.00	0.90	1.00
Never married (1,457)	80.02	12.36	3.38 (2.60, 4.41)	3.72	5.26 (3.13, 8.84)	3.89	5.08 (2.92, 8.85)
Other (482)	88.93	5.02	1.24 (0.79, 1.92)	2.42	3.08 (1.58, 6.01)	3.63	4.27 (2.16, 8.42)
Current tobacco use (4,350)							
None (3,272)	93.30	4.97	1.00	0.97	1.00	0.76	1.00
Less than weekly (73)	75.00	20.45	5.12 (2.61, 10.05)	1.14	1.46 (0.20, 10.89)	3.41	5.55 (1.63, 18.84)
Weekly (93)	67.57	17.12	4.75 (2.66, 8.50)	13.51	19.26 (8.31, 44.67)	1.80	3.25 (0.43, 24.49)
Daily (912)	75.69	12.52	3.11 (2.38, 4.06)	4.48	5.70 (3.45, 9.42)	7.31	11.79 (7.31, 19.02)
Current alcohol use (4,351)							
None (639)	95.30	3.00	1.00	0.26	1.00	1.44	1.00
Less than weekly (1,166)	90.99	4.72	1.65 (0.92, 2.95)	1.72	6.89 (1.57, 30.24)	2.58	1.88 (0.91, 3.87)
Weekly (1,640)	85.55	9.82	3.64 (2.11, 6.28)	2.59	11.07 (2.64, 46.44)	2.03	1.58 (0.76, 3.26)
Daily (906)	87.02	8.01	2.92 (1.66, 5.14)	2.39	10.04 (2.36, 42.70)	2.58	1.97 (0.95, 4.07)

*Unadjusted odds ratio (OR) and 95% confidence interval of less than weekly use vs. no use.

†Unadjusted odds ratio and 95% confidence interval of weekly use vs. no use.

‡Unadjusted odds ratio and 95% confidence interval of daily use vs. no use.

Table 2 Adjusted odds ratios for the relationship between frequency of cannabis use and the number of sexual partners in the past year

	No partners vs. one OR* (95% CI)*	Two or more partners vs. one OR* (95% CI)*
Cannabis use		
Women		
None	1.00	1.00
Less often than weekly	0.56 (0.31, 1.03)	2.05 (1.20, 3.49)
Weekly	0.06 (0.01, 0.47)	1.00 (0.41, 2.41)
Daily	—	2.58 (1.08, 6.18)
	$F(2, 4,269) = 5.30;$ $P = 0.005$	$F(3, 4,268) = 3.47;$ $P = 0.015$
Men		
None	1.00	1.00
Less often than weekly	0.53 (0.31, 0.90)	1.95 (1.36, 2.81)
Weekly	1.04 (0.46, 2.32)	1.83 (1.01, 3.31)
Daily	1.26 (0.60, 2.65)	2.08 (1.11, 3.89)
	$F(3, 4,223) = 2.07;$ $P = 0.102$	$F(3, 4,223) = 5.98;$ $P < 0.001$

*Odds ratio adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, current tobacco use, and current alcohol use.

CI = confidence interval; OR = odds ratio.

However, cannabis use was reported in all age groups with daily use reported by all age groups of men and all but the oldest age group among women. There was a strong association between frequency of cannabis use and frequency of tobacco use in both men and women (Table 1). Among male daily cannabis users, 70% were daily tobacco users compared with 18% for male cannabis non-users. Among female daily cannabis users, 69% were daily tobacco users compared with 18% for female cannabis non-users. Cannabis use was also associated with a non-heterosexual identity, lower educational attainment, lower status occupation, and not being married (Table 1).

The number of sexual partners in the year prior to interview was strongly associated with the frequency of cannabis use (Table 2). Adjusted odds ratios (OR) indicate that frequent cannabis use by women was associated with an increased likelihood of reporting more than two sexual partners and a markedly reduced likelihood of reporting no partners rather than one. Among men, the relationship between frequency of cannabis use and reporting no partners rather than one was less clear, although any cannabis use was associated with a doubling of the likelihood of reporting two or more partners in the previous year compared with one partner. Among both men and women, the adjusted OR indicated no association between frequency of cannabis use and the likelihood of

Table 3 Adjusted odds ratio for the association between frequency of cannabis use and condom use at the most recent experience of vaginal or anal intercourse*

	Women OR (95% CI)†	Men OR (95% CI)†
Cannabis use		
None	1.00	1.00
Less often than weekly	1.11 (0.69, 1.79)	0.85 (0.58, 1.25)
Weekly	0.53 (0.19, 1.46)	0.90 (0.45, 1.78)
Daily	0.80 (0.23, 2.72)	0.48 (0.21, 1.11)
	$F(3, 3,994) = 0.64;$ $P = 0.592$	$F(3, 4,045) = 1.14;$ $P = 0.330$

*Only asked of men who reported having sex with men.

†Odds ratio and 95% confidence interval adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, number of sexual partners in the previous year (one vs. two or more), relationship to sexual partner (cohabiting regular partner, no-cohabiting regular partner, casual partner), current tobacco use, and current alcohol use. CI = confidence interval; OR = odds ratio.

condom use at their most recent intercourse (Table 3). Frequency of cannabis use among men was not associated with reporting a diagnosis of a sexually transmissible infection in the previous year, but daily cannabis use among women was associated with a marked increase in the likelihood of reporting such a diagnosis (Table 4).

Among women, there was no association between any of the sexual problems and frequency of cannabis use in the adjusted analyses (Table 5). For men, however, there were significant associations between daily cannabis use and reporting an inability to reach orgasm (OR 3.94, confidence interval [CI] 1.71–9.07; $P < 0.01$), reaching orgasm too quickly (OR 2.68, CI 1.41–5.08; $P < 0.01$), and reaching orgasm too slowly (OR 2.05, CI 1.02–4.12; $P = 0.04$). Among the 144 men who reported an inability to orgasm,

Table 4 Adjusted odds ratio for the association between frequency of cannabis use and the diagnosis of a sexually transmissible infection in the previous year

	Women OR (95% CI)*	Men OR (95% CI)*
Cannabis use		
None	1.00	1.00
Less often than weekly	1.61 (0.33, 7.96)	1.49 (0.37, 6.00)
Weekly	—	0.83 (0.07, 9.84)
Daily	7.19 (1.28, 40.31)	1.45 (0.17, 12.42)
	$F(2, 3,005) = 2.55;$ $P = 0.078$	$F(3, 3,618) = 0.15;$ $P = 0.930$

*Odds ratio and 95% confidence interval adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, number of sexual partners in the previous year (one vs. two or more), current tobacco use, and current alcohol use.

CI = confidence interval; OR = odds ratio.

Table 5 Adjusted odds ratio for the association between frequency of cannabis use and sexual problems for one month or more in the previous year

	Women OR (95% CI)*	Men OR (95% CI)*
Lacked interest in sex		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.18 (0.84, 1.66)	0.95 (0.68, 1.34)
Weekly	0.64 (0.32, 1.25)	1.99 (1.14, 3.47)
Daily	1.03 (0.48, 2.19)	1.05 (0.60, 1.85)
	$F(3, 4,251) = 0.94$; $P = 0.420$	$F(3, 4,248) = 2.06$; $P = 0.104$
Inability to reach orgasm		
Cannabis use		
None	1.00	1.00
Less often than weekly	0.97 (0.62, 1.53)	1.13 (0.51, 2.51)
Weekly	0.82 (0.37, 1.85)	0.70 (0.17, 2.85)
Daily	1.50 (0.63, 3.61)	3.94 (1.71, 9.07)
	$F(3, 4,240) = 0.38$; $P = 0.770$	$F(3, 4,242) = 3.69$; $P = 0.011$
Reached orgasm too quickly		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.21 (0.59, 2.47)	0.87 (0.57, 1.34)
Weekly	0.33 (0.04, 2.60)	1.53 (0.67, 3.48)
Daily	1.37 (0.28, 6.68)	2.68 (1.41, 5.08)
	$F(3, 4,133) = 0.54$; $P = 0.653$	$F(3, 4,230) = 3.62$; $P = 0.012$
Reached orgasm too slowly		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.30 (0.88, 1.92)	1.20 (0.71, 2.04)
Weekly	0.74 (0.32, 1.70)	1.10 (0.46, 2.65)
Daily	1.55 (0.70, 3.45)	2.05 (1.02, 4.12)
	$F(3, 4,183) = 1.16$; $P = 0.324$	$F(3, 4,229) = 1.41$; $P = 0.239$
Pain during intercourse		
Cannabis use		
None	1.00	1.00
Less often than weekly	0.93 (0.51, 1.69)	1.66 (0.70, 3.94)
Weekly	0.58 (0.12, 2.88)	3.86 (1.15, 12.98)
Daily	2.14 (0.90, 5.09)	2.17 (0.63, 7.48)
	$F(3, 4,246) = 1.20$; $P = 0.309$	$F(3, 4,089) = 2.28$; $P = 0.077$
Not finding sex pleasurable		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.21 (0.77, 1.89)	0.65 (0.29, 1.45)
Weekly	0.73 (0.30, 1.81)	0.74 (0.18, 3.16)
Daily	1.79 (0.68, 4.68)	1.50 (0.61, 3.69)
	$F(3, 4,221) = 0.87$; $P = 0.456$	$F(3, 4,242) = 0.81$; $P = 0.489$
Anxiety about ability to perform		
Cannabis use		
None	1.00	1.00
Less often than weekly	1.01 (0.61, 1.68)	1.08 (0.69, 1.69)
Weekly	0.39 (0.11, 1.34)	1.45 (0.71, 2.97)
Daily	1.81 (0.73, 4.49)	1.48 (0.74, 2.96)
	$F(3, 4,248) = 1.37$; $P = 0.251$	$F(3, 4,241) = 0.71$; $P = 0.548$
Vaginal dryness		
Cannabis use		
None	1.00	
Less often than weekly	1.57 (0.96, 2.58)	
Weekly	0.61 (0.18, 2.09)	
Daily	0.85 (0.25, 2.86)	
	$F(3, 4,255) = 1.35$; $P = 0.258$	
Trouble keeping an erection		
Cannabis use		
None		1.00
Less often than weekly		1.00 (0.55, 1.83)
Weekly		1.34 (0.59, 3.06)
Daily		1.64 (0.77, 3.48)
		$F(3, 4,240) = 0.67$; $P = 0.571$

*Odds ratio and 95% confidence interval adjusted for age group, language spoken at home, sexual identity, educational attainment, occupation, marital status, number of sexual partners in the previous year (one vs. two or more), current tobacco use, and current alcohol use.
CI = confidence interval; OR = odds ratio.

there was no association between frequency of cannabis use and the extent to which inability to orgasm was experienced as problematic ($F[8.78, 1,299.10] = 1.65, P = 0.10$). However, among the 424 men who reported reaching orgasm too quickly, there was an association between frequency of cannabis use and the extent to which reaching orgasm too quickly was experienced as problematic such that more frequent cannabis use was associated with experiencing reaching orgasm too quickly as more problematic ($F[8.45, 3,692.91] = 2.85, P < 0.01$).

Discussion

Frequent cannabis use, particularly daily use, is associated with a range of health and behavioral outcomes. For example, frequent users are more likely than others to report two or more sexual partners in the previous year, as has been found in other studies [9].

Female daily cannabis users are significantly more likely than non-users to report the diagnosis of a sexually transmissible infection in the previous year. Although frequent cannabis use appears unrelated to sexual problems in women, it clearly interferes with orgasm in men and its use is associated with the delay or prevention of orgasm in some men and with orgasm too soon in others. That there is an association between frequency of cannabis use and the extent to which reaching orgasm too quickly is problematic raises the possibility that men are self-medicating with cannabis to delay orgasm.

We failed to find any association between frequency of cannabis use and trouble keeping an erection. This is consistent with the finding of Johnson and colleagues who also failed to find an association between lifetime cannabis use and "inhibited sexual excitement (i.e., lack of erection in men, lack of arousal for women)" [7] (p. 57). However, there have been reports that very high doses of cannabis have been associated with an "inability to perform" [32] (p. 23), and that this may be related to changes in plasma testosterone such that modest doses increase plasma testosterone but that high doses lower testosterone below baseline [32].

Consistent with the present article, Johnson and colleagues found an association between cannabis use and inhibited orgasm, such that a history of cannabis use was associated with being more likely to report a recent history of an inability to orgasm [7]. Halikas and colleagues also found that

cannabis use was associated with an increased duration of intercourse and a decreased number of orgasms [33].

The present study has a number of strengths and weaknesses. Its strengths include the large sample, wide age range of participants, and high response rate. Weaknesses include a reliance on self-report and the attendant possibility of a social desirability bias.

Given the high prevalence of cannabis use and the associations reported between frequent cannabis use and a range of sexual health issues, clinicians should routinely enquire about patients' cannabis use and, if frequent use is reported, take a detailed sexual history and manage the patient accordingly.

These findings could also provide useful input to health promotion and/or health education campaigns aiming to reduce frequent cannabis use.

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BRIEF REPORTS

MARIJUANA USE AND SEXUAL BEHAVIOR

Ronald A. Weller and James A. Halikas

In several anonymous questionnaire studies of college students, marijuana use has been reported to affect sexual behavior. In general, these studies show that marijuana smoking enhances sexual pleasure and increases sexual desire. Marijuana use has also been associated with more frequent sexual activity and an increased number of sexual partners. The purpose of this study was to determine the perceived effects of marijuana use on the sexual behavior and sexual practices of a sample of regular marijuana users. In contrast to other studies, subjects were not drawn exclusively from college student populations and were interviewed rather than given a questionnaire. Results, in general, confirm results of previous studies. Subjects were primarily heterosexual and sexually active. Men were more likely than women to have had multiple sexual partners. Over two thirds reported increased sexual pleasure and satisfaction with marijuana. Increased desire for a familiar sexual partner was reported by about one half. The sensations of touch and taste were particularly enhanced by marijuana. Many felt marijuana was an aphrodisiac. Marijuana use in relation to initiation of sexual activity was also assessed. Although drug use occurred prior to first intercourse for about one third of the men and women, alcohol, not marijuana, was most frequently used in this context. Most had used marijuana as a preparation for intercourse on occasion, and 20% did this on a regular basis. Possible explanations for these effects are briefly discussed.

Marijuana has the reputation of being an aphrodisiac. Jarvik and Brecher (1977) identified several possible explanations for marijuana's aphrodisiac-like effect: it (a) loosens inhibition, (b) enhances sensate focus, (c) causes a generalized increase in enjoyment (hedonism), (d) slows perception of time thus causing an enjoyable activity seemingly to last longer, (e) has a reputation for sexual enhancement (placebo effect), and (f) its use occurs under relaxed circumstances conducive to sexual activity.

Results of many studies tend to support the belief that marijuana has aphrodisiac-like effects. In one experiment, cannabis administration caused

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sexual arousal of subjects (Mayor's Committee, 1944). In another study, THC (delta-9-tetrahydrocannabinol) given under experimental conditions caused sexual thoughts to occur (Hollister, Richards, & Gillespie, 1968). North Africans believed marijuana stimulates the sexual faculties (Bouquet, 1951) and, of 1200 Indian marijuana users studied, 10% believed cannabis increases sexual excitement during intercourse (Chopra, 1969).

More recent survey studies of U.S. college students also reported a positive relationship between marijuana use and sexual behavior. For example, Robbins and Tanck (1973) found sexual desire to be more frequent among a sample of graduate psychology students on days when they used marijuana than on days they did not. Goode (1972) reported marijuana users were more likely than nonusers to engage in intercourse, engage in it earlier in life, engage in it more regularly, and have a greater variety of partners. Sensations were intensified and sex was desired more during marijuana intoxication (Tart, 1971). Sex was more pleasurable when smoking marijuana (Traub, 1977). Sexual desire and sexual enjoyment or pleasure with marijuana use were also reported by Arafat and Yorburg (1973); Dawley, Winstead, Baxter, and Kay (1974); and Koff (1974). Other researchers reporting similar findings include Brill and Christie (1974), Chopra and Jandu (1976), and Fisher and Steckler (1974).

However, most of these studies have used samples drawn only from college student populations. Moreover, respondents were not interviewed but filled out questionnaires anonymously, making the reliability and validity of responses difficult to assess. These factors limit the ability to generalize to larger populations. This investigation was conducted in an attempt to replicate the results of previous studies, with a sample not drawn exclusively from college students. In addition an interview format was used instead of an anonymous questionnaire. Different aspects of sexual behavior were also studied to give a more complete picture of sexual functioning. Effects of marijuana use on sexual performance, sexual pleasure, and sensations during sexual activity were assessed in detail. More general areas such as sexual preference, sexual practices, and sexual partners were also evaluated.

Method

Subjects

Subjects were 97 of an original sample of 100 adults from a large mid-western city, initially interviewed in 1969-1970 and reinterviewed in 1976-1977 as a part of clinical study of marijuana use. These individuals were "regular" marijuana users by self-report, not experimenters or casual users, had averaged over 2 years of marijuana use, and had used marijuana at least 50 times in a 6-month period preceding the initial study. All subjects were white and came mainly from middle-class backgrounds. Sixty (62%) were male; 37 (38%) were female. At follow-up, average age was 27.5 years. Virtually all had completed high school, and many had attended college. Over 80% were working full-time in occupations ranging from physicians to ditch-diggers. All but one (who had had discontinued use after joining a religious group that forbade its use) continued to regard themselves as marijuana users.

During the 12 months prior to follow-up, 86% had used marijuana. All but one had intentions of using it in the future. Although 14% had not used it in the past year, all had used it extensively in the past and were knowledgeable about marijuana's effect on their sexual activity. Since the responses of this group of 14% showed no significant differences from remaining subjects, they were included in the analysis. None of the subjects had gone longer than 24 months without using marijuana. Overall, these 97 users averaged 6-8 years of use. Marijuana use for the most part continued to be frequent—23% were daily users and about half were using marijuana weekly.

At the time of the original data collection, marijuana use was less common than now, and laws restricting its use were more strictly enforced. As a result some effort was required to locate subjects who were willing to be interviewed. To obtain as broad-based a sample as possible, three source individuals with access to different groups of marijuana users were asked to refer subjects. When interviewed, subjects were asked to refer additional subjects. Although not ideal, this sample was broader-based than a sample consisting only of college students. Results and detailed description of the methodology of this initial study have been published (Halikas, Goodwin, & Guze, 1971, 1972).

Interview Schedule

A structured interview was used, composed of closed-ended questions. Some answers required a yes or no response, whereas others required the subject to quantify or rate a particular phenomenon which was coded by the interviewer. Thus, interviewer interpretation was minimized, resulting in more standardized responses. The interview contained questions to allow cross-validation and to assess the reliability of the interview. Questions addressed the effect of marijuana on sexual performance, sexual enjoyment, and the senses; sexual orientation, sexual practice, and sexual partners; the role of marijuana, alcohol, and other drugs in initiation of sexual activity and in preparation for sexual activity. After the study was about one third completed, additional questions on sexual matters were added. Thus, for these variables, information was available from only 65 subjects. In addition to information on marijuana use and sexuality, general demographic information was elicited from all subjects. Preliminary work indicated interview questions were understandable to subjects. Response consistency was excellent in trial interviews.¹

Procedure

All subjects gave informed consent and were paid \$20.00 for participation. Interviews were conducted using the interview schedule described above. Interview format allowed for the establishment of rapport, clarification of study objectives, and explanation of questions as they arose, thus minimizing ambiguous or invalid results. In general rapport was good, and subjects cooperated well with the interviewer. Cross-validation of certain interview items indicated that reliable responses were obtained. Responses corresponded well with information obtained in a previous interview study of these

¹A copy of the interview schedule is available from the first author.

subjects. These facts also indicate that the information obtained in this study was valid.

Results

A summary of marital and several sexual behavior characteristics is contained in Table 1. These marijuana users were sexually active, with 70% reporting more than one sexual partner in the past year. Sexual orientation was primarily heterosexual. A number of users reported postpubertal homosexual experiences, but most did not consider these of consequence. Only 12% considered themselves homosexual or bisexual. There was only one significant difference between males and females: Men were significantly more likely to have had more than five sexual partners in the past year (49% vs. 25%).

Table 1

Sexual Background of Subjects

	User Males (n = 60) %	User Females (n = 37) %	Users Total (N = 97) %
Ever married	48	56	52
Currently married	32	35	33
Extramarital sexual experience	11	23	17
First heterosexual intercourse prior to age 18	50	46	49
More than one sexual partner in past year	78	75	77
Five or more sexual partners in past year	49	25 ^a	40
Partner swapping or group sex ever	5	5	5
Post-pubertal homosexual experience	22	32	26
Bisexual or homosexual preference	12	13	12

^a $\chi^2(1 N = 97) = 4.4, p < .05.$

In Table 2 marijuana's reported enhancement of sexual activities is summarized. Over two thirds reported increased sexual pleasure and satisfaction with marijuana use. Other parameters of sexual enjoyment, such as emotional closeness, physical closeness, and increased enjoyment of snuggling were all enhanced. Quality of orgasm and duration of intercourse were also enhanced by marijuana, with men significantly more likely than women to report this. Increased number of orgasms and ability to repeat orgasms were reported, but not frequently. Approximately one half felt marijuana had an aphrodisiac effect on them.

About half of both sexes reported increased desire for sexual relations with a familiar partner while using marijuana. However, 43% of the men reported an increased desire for an unfamiliar partner, whereas only 13% of the women reported such a desire while using marijuana, $p < .001$. Desire for multiple partners or homosexual partners as an effect of marijuana was not reported by most users. All those reporting a desire for partners of the same sex while using marijuana were homosexuals or bisexuals. Marijuana also affected the

Table 2

Reported Marijuana Enhancement of Sexual Activities

	Men (n = 60) %	Women (n = 37) %
Physiologic		
Quality of orgasm	58	32 ^a
Duration of intercourse	27	8 ^b
Number of orgasms	12	16
Ability to repeat	14	3
Partner Preference		
Desire for familiar partner	50	60
Desire for unfamiliar partner	43	13 ^c
Desire for multiple partners	12	3
Desire for homosexual partner ^d	7	3
Sexual Enjoyment		
	(n = 40)	(n = 25)
Sexual pleasure and satisfaction	70	76
Emotional closeness and intimacy	46	63
Feeling of physical closeness	51	56
More snuggling	34	56
Marijuana is an aphrodisiac	44	50
Sensual Effects		
Touching	59	57
Taste	23	33
Smell	23	7
Hearing	17	11
Sight	11	7

^a $\chi^2(1 N = 97) = 6.1; p .025.$

^b $\chi^2(1 N = 97) = 5.0; p .05.$

^c $\chi^2(1 N = 97) = 9.4; p .001.$

^dAll those reporting increased desire for partner of same sex were either homosexual or bisexual.

senses during sexual activity, with touch and taste being most often reported as enhanced.

The effects of alcohol, marijuana, and other drugs (a category that combined stimulants, sedatives, hallucinogens, and narcotics) on the initiation of sexual activity were compared and are summarized in Table 3. One third had used some drug immediately prior to their first sexual experience. Alcohol was more frequently used than both marijuana and other drugs. One half felt drug use had made them more willing to have intercourse the first time. About one half of both men and women had had unwanted intercourse (intercourse they did not seek and later regretted) at some time following drug use. Other drugs—not alcohol or marijuana—preceded unwanted intercourse most frequently. Many (32%) had never used drugs prior to intercourse other than alcohol and marijuana. Currently, they were more likely to use marijuana before intercourse than alcohol or other drugs. In fact, 76% had used marijuana as a preparation for intercourse, and 20% used it regularly for this purpose.

Table 3

Reported Effect of Marijuana, Alcohol, and Other Drugs on Initiation of Sexual Activity

	Male Users (n = 60) %	Female Users (n = 37) %	Total Users (N = 97) %
Marijuana prior to first intercourse	7	8	7
Alcohol prior to first intercourse	22	24	23
Other drugs prior to first intercourse	3	3	3
Any drug prior to first intercourse	32	35	33
Intoxicant made more willing on first intercourse ^a	50	50	50
Marijuana led to unwanted intercourse	11	5	9
Alcohol led to unwanted intercourse	13	16	14
Other drugs led to unwanted intercourse	22	27	24
Unwanted intercourse secondary to drugs	46	48	47
Never marijuana prior to intercourse	3	0	2
Never alcohol prior to intercourse	7	3	5
Never other drugs prior to intercourse	29	38	32
Alcohol prior to intercourse > 25%	9	17	12
Marijuana prior to intercourse > 25%	24	24	24
Other drugs prior to intercourse > 25%	0	3	1
Marijuana part of preparation for intercourse ever ^b	80	71	76
Marijuana as part of preparation for intercourse > 25% ^b	20	21	20

^aIncludes only those using intoxicants before first intercourse, n = 32.

^bIncludes reduced number of users answering question, n = 65.

Discussion

In general, these regular marijuana users report that marijuana use enhanced their sexual lives. Almost all had used marijuana prior to intercourse, and many had incorporated marijuana use into part of their preparation for intercourse on a routine basis. There were some significant sex-related differences in the extent various parameters were enhanced. This may correspond to underlying male/female differences in sexual response or differences in sexual expectations between the sexes. There was not a significant increase in the reported number of orgasms experienced or ability to repeat intercourse. Despite reported enhancement of sexual experience and early use of marijuana by many of these subjects, marijuana did not play a large role in initiating first sexual activity.

Explanations for the apparent aphrodisiac-like effects of marijuana have been previously discussed. However, there may be other explanations as well. For example, some constituent of marijuana may have a direct stimulating effect on centers in the brain that control sexual activity. Marijuana has been shown to alter plasma testosterone in mice (Dalterio, Bartke, & Mayfield, 1981) and men (Kolodny, Masters, Kolodner, & Toro, 1974). Further research

is needed to determine what effects such altered testosterone levels may have on sexual pleasure and behavior in humans.

The sample for this study consisted of young, white, middle-class adults who had used marijuana regularly. Results should be generalizable to similar groups. This study is not directly comparable to previous studies because of design differences. In this study, subjects were not exclusively college students. Also an interview format was used instead of anonymous questionnaires. However, results of questionnaire studies of college students are compatible with the current study; that is, individuals who use marijuana report a positive effect on sexual activity. However, to date there has been little work studying marijuana's effect on the sexual behavior of other groups, such as older marijuana users, lower-class marijuana users, or marijuana users in various minority groups. The results of this study may not be generalizable to such groups. Further work is needed to determine if the effects of marijuana on sexual behavior reported here are seen in broader populations.

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Issue Consultants

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Editor's Comment

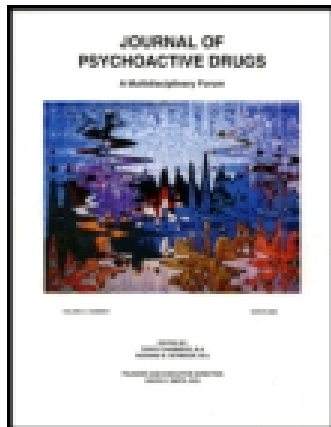
I also want to thank Rebecca L. Sargent for her many contributions to the *Journal* during the past 4 years. She was hired as a part-time typist at the beginning of her freshman year at Syracuse University. Although her title never changed (and the remuneration improved very little), she became an errand runner, proofreader, copy editor, editorial assistant, co-worker, and friend, not to mention a student member of SSSS. Her independence, initiative, and sense of responsibility have been of inestimable value to me over the years. I shall miss her greatly as she moves on to graduate school next year. I, personally and on behalf of SSSS, wish her happiness and success in her endeavors.

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Effects of Regular Marijuana Use on Sexual Performance

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Effects of Regular Marijuana Use on Sexual Performance

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During the last 15 years, the use of marijuana as a social intoxicant has become almost as commonplace as the use of alcohol among individuals under the age of 35. Throughout this era of marijuana use, it has been alleged that marijuana is a sexual stimulant; an aphrodisiac, an enhancer of sexual performance (Lewis 1970). Yet, virtually no systematic work has explored this reported effect of marijuana. Eric Goode (1972) found that for most of his surveyed group of marijuana users, marijuana indeed enhanced sexual desire and performance, and was subjectively perceived as a sexual stimulant. In response, Peterson (1972) maintained that these effects were dose- and setting-dependent. Koff (1974) also found that mood, expectation and setting were the sexually stimulating elements.

In 1975, Robert Kolodny and his colleagues presented the results of two endocrinologic studies of adult male marijuana users (Kolodny et al. 1975, 1974). They found that after more than six months of regular marijuana use, serum testosterone levels were significantly lower. Although these levels were not lowered beyond the range of normal, the uniformity of the trend was worrisome. In addition, at least one of the subjects noted potency problems, which disappeared after cessa-

tion of marijuana use, and 35% of the subjects were noted to have had lower sperm counts during the course of the study. Thus, although the current folklore indicates that marijuana is a sexual stimulant, there is at least some evidence that this may not be a universally achieved effect.

METHODOLOGY

In 1969-70, 100 regular marijuana users and 50 nonusers were systematically interviewed as part of a large descriptive study of marijuana use and its effects (Halikas 1974; Halikas & Rimmer 1974; Halikas, Goodwin & Guze 1972a, 1972b, 1971). As part of the criteria for admission to that study, all subjects were at least 18 years of age and White. The user group viewed themselves as regular marijuana users, and had used marijuana on more than 50 separate occasions during a time period lasting more than six months. In fact, the average duration of marijuana use at that time was more than two years, with an average frequency of two to three times per week. All subjects were paid volunteers. In addition to a thorough review of marijuana use and its effects on subjects' lives, the original interview collected descriptive information in a wide variety of psychosocial areas for each subject, including growth and development, education, a systematic psychiatric symptom review, developmental landmarks, family history and rearing practices, and current and past drug and alcohol use patterns.

Between 1975 and 1977, a study was undertaken to find and reinterview all of the subjects. Of the 150 index

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TABLE I
SEXUAL DEMOGRAPHIC CHARACTERISTICS

	Population		User Gender		Recent Usage		Abuse Status	
	Users (N = 97) %	Nonusers (N = 35) %	Males (N = 60) %	Females (N = 37) %	Less Frequent (N = 75) %	Frequent Users (N = 22) %	Male Nonabusers (N = 52) %	Male Abusers (N = 8) %
Ever married	52	74	48	56	52	50	54	13
	p = .057		Not significant		Not significant		p = .08	
Currently married	33	60	32	35	36	23	35	13
	p = .006		Not significant		Not significant		Not significant	
Age of first heterosexual intercourse less than 18	49	14	50	46	41	73	44	88
	p = .0008		Not significant		p = .02		p = .057	
More than one meaningful sexual relationship ever	68	49	68	69	67	73	63	100
	p = .07		Not significant		Not significant		Not significant	
Currently married, subjects unfaithful	17	19	11	23	19	0	6	100
	Not significant		Not significant		Not significant		No chi-square	
Unmarried subjects, number of sex partners in prior 12 months								
None	3	0	2	4	4	0	3	0
One	20	36	20	21	19	24	21	14
Two-Four	37	36	29	50	42	24	32	14
Five +	40	29	49	25	35	53	44	71
	Not significant		Not significant		Not significant		Not significant	
Partner swapping or group sex (all subjects)	5	6	5	5	4	9	4	13
	Not significant		Not significant		Not significant		Not significant	
Sexual orientation								
Heterosexual	88	97	88	87	87	91	86	100
Bisexual	6	0	5	8	8	0	6	0
Homosexual	6	3	7	5	5	9	8	0
	Not significant		Not significant		Not significant		Not significant	
Postpubertal homosexual experiences	26	6	22	32	24	32	23	13
	p = .02		Not significant		Not significant		Not significant	

subjects, one was known to have died. Of the 149 living subjects, 148 were found and 147 agreed to be reinterviewed. The subjects were found in 40 cities, in 25 states and three foreign countries. With the exception of the three subjects overseas, all subjects were interviewed in person by a social science professional, specially trained in the administration of the follow-up interview. Again, all the subjects were paid.

The follow-up interview collected descriptive information concerning the time interval between the index interview and the follow-up interview (approximately six years), in the areas of educational progress, legal problems, vocational experiences, social relationships, family events, intercurrent psychiatric problems and psychosocial adjustment, and a complete drug- and alcohol-interval history. Patterns of marijuana use during the interval and consequences in their lives, in a variety of areas, were canvassed.

One of the areas explored with the subjects was the effect of marijuana intoxication and regular marijuana use on sexual interest and performance. In this regard, eight global questions were asked of all the subjects interviewed, regarding the effect of marijuana intoxication on various aspects of intercourse, duration, ability to repeat, and interest in familiar partner. Approximately one-third of the way through the data collection phase of the project, an additional set of questions was added to the interview regarding the specific effects of marijuana intoxication on various sensory or sensual modalities involved in sexual activity. These included sight, hearing, tasting, snuggling and intimacy. Thus, information was obtained on these questions from about two-thirds of the total user population. All questions were asked for the time interval of the 12 months prior to the follow-up interview or for the most recent 12 months of marijuana use.

This report will present data dealing with the effects of marijuana use on sexual activity among the users with respect to gender differences, differences associated with differential frequency of use, and abuse-nonabuse characteristics of these users. Comparisons between the user group and the control group will be made relating to their patterns of sexual activity.

The mean age of the users at follow-up was 27.5, with a range of 23-38; mean age of the index nonusers was 28.3, ranging from 23-39. The population was well-educated: by the time of follow-up, 95% of the users and all of the nonusers had had some college experience. Also at the time of follow-up, 80% of both groups were employed in occupations that ranged from physician to ditch digger. The index users had now been using marijuana for approximately eight years. During

the 12 months prior to the follow-up interview, 86% of the users had used marijuana. Nearly one-quarter were using marijuana five or more times per week during the prior 12 months. Another 30% were using marijuana one to four times per week.

Between the index and follow-up interviews, the distinction between the user and nonuser groups had blurred somewhat. At follow-up, 30% of the index nonusers reported that they either had been or were currently marijuana users. Sixty-two percent had used marijuana at some time in the preceding year, but only four percent had used it five or more times a week during that year. It seems that both groups could now be better described as user groups differing mainly in the length and frequency of their marijuana use, but both having marijuana use rates considerably above the national norm. This is not surprising, considering that the controls were originally obtained by word-of-mouth referral as nondrug using friends of the users. The nonusing peers of the users would naturally be expected to have had a greater opportunity to try marijuana and to develop more liberal attitudes toward the drug than a control group drawn from a different social milieu. That the users and controls exhibit considerable interchange and overlap in their marijuana usage patterns illustrates the comparability of the groups. Nevertheless, in order to maximize the contrast between users and nonusers, the "nonusers" who reported having been regular users (30%) at some time were excluded from the analyses reported here.

RESULTS

Sexual Demographics

A series of chi-square analyses were performed to compare subjects on a number of areas relevant to their sex lives, including marital status, living arrangements, infidelity rates and homosexual experiences (see Table I). The users were compared with the nonusers in one series of analyses. Differences among users were pursued by partitioning them according to gender, frequency of recent usage, and abuse-nonabuse characteristics in subsequent analyses.

Comparisons of users with comparison group: Among the users, 52% had been married at some time, compared with 74% of the nonusers ($p = .057$). Sixty percent of the nonusers and 33% of the users were currently married ($p = .006$). At the time of the follow-up interview, 30% of the users versus 63% of the nonusers were living with their spouse; 22% of the users were living with lovers compared with six percent of the nonusers; and 49% of the users were living alone, with friends or family versus 32% of the nonusers. Thus at

follow-up, approximately 52% of the users versus 69% of the nonusers were living with a sexual partner.

The two groups did not differ significantly in the number of divorces or separations, the age they were first married or the age they were first divorced. Of those currently married, 80% of both groups described their marriage as good, and over 80% of both groups had never been unfaithful. About five percent of each group had engaged in partner swapping, group sex or both. The currently unmarried users did not differ significantly from the unmarried nonusers in the number of sexual partners they had had in the year preceding follow-up.

Forty nine percent of the users and 14% of the nonusers had experienced their first heterosexual intercourse before the age of 18 ($p = .0008$). Since puberty, 26% of the users had had homosexual relations compared with only six percent of the nonusers ($p = .02$). About six percent of the users reported they were bisexual and another six percent claimed homosexuality as their primary sexual orientation. This compares with three percent homosexuality and no bisexuality among nonusers. This difference between groups was not statistically significant.

The users did not differ from the nonusers in the number of sexual problems reported or the number of times they sought treatment for such problems. About 10% of each group reported problems and/or treatment.

Comparisons of selected groupings of users:

1. Males and females: There were no significant differences between males and females on sexual demographic characteristics.
2. Frequent and less frequent users: Subjects ($N = 22$) who reported using marijuana at least five times per week in the year preceding follow-up were compared to those reporting less frequent usage ($N = 75$). More of the frequent users had had their first heterosexual intercourse before age 18 than had the less frequent users ($p = .02$). No other significant differences between the groups were found.
3. Male abusers and nonabusers: Nine percent of the user group were classified as marijuana abusers according to criteria established by Weller and Halikas (1980). Abusers manifested problems in three or four of the following areas: (a) adverse physiological and psychological drug effects; (b) control problems; (c) social and interpersonal problems; and (d) adverse subjective opinions of others. All but one of the abusers identified were male, so only the eight male abusers and 52 male nonabusers were included in these comparisons. Only one abuser

had been married (13%) compared with 54% of the nonabusers ($p = .08$). The abusers had experienced heterosexual intercourse at an earlier age, with 88% before 18 years of age compared with 44% of the nonabusers ($p = .057$). These were the only sexual demographic variables that approached significance in this breakdown of subjects.

Summary of sexual demographics: The users differed from the controls in three main respects: (1) more users remained single; (2) the users first sexual relations occurred earlier; and (3) more users had engaged in homosexual activity. Among the users, females and males shared very similar sexual demographics. When frequent and less frequent users were compared, more frequent users had early (pre-18) heterosexual intercourse. The male marijuana abusers had sexual demographics similar to the frequent users. Table I presents the complete sexual demographic statistics of this population.

Sexual Activity and Substance Abuse Patterns

Subjects reported what role marijuana, alcohol and other drugs played in their first heterosexual experience and the proportion of the time they used these drugs in conjunction with their current sexual activity.

Users versus comparison group: No nonuser reported having used alcohol, marijuana or other drugs before their first sexual intercourse, compared with 33% of the users who had used an intoxicant ($p = .0015$) (see Table II). All of the subjects were asked if they had ever engaged in intercourse when intoxicated and, if so, would they have, had the intoxicant not been a factor. Forty six percent of the marijuana users had had this experience, and of these, 30% implicated alcohol, 17% cited marijuana and 52% blamed other drugs or a combination of intoxicants. By contrast, 33% of the nonusers had experienced undesired intercourse when intoxicated, with 76% of these citing alcohol and 12% implicating marijuana and another 12% indicating other drugs or a combination of drugs. The patterns of group differences were significantly different ($p = .05$) (see Table III).

With respect to ongoing sexual activity, about 65% of both groups used alcohol one percent to 10% of the time they had sex, but more nonusers than users had never used alcohol before sex and fewer nonusers reported using it at high levels of frequency ($p = .06$). None of the nonusers had used marijuana or other drugs more than 10% of the time they engaged in sexual activity. By contrast, 45% of the users had used marijuana more than 10% of the time they engaged in

TABLE II
INTOXICATION AND INITIAL INTERCOURSE

	Population		User Gender		Recent Usage		Abuse Status	
	Users	Nonusers	Males	Females	Less Frequent	Frequent Users	Male Nonabusers	Male Abusers
	(N = 97) %	(N = 35) %	(N = 60) %	(N = 37) %	(N = 75) %	(N = 22) %	(N = 52) %	(N = 8) %
First intercourse after intoxicant?								
No	67	100	68	65	69	59	67	75
Yes, alcohol	23	0	22	24	23	23	24	13
Yes, marijuana	7	0	7	8	7	9	6	13
Yes, other drugs/combination of drugs	3	0	3	3	1	9	4	0
Group differences	p = .0015		Not significant		Not significant		Not significant	
Intoxicant influence first intercourse? (of those using intoxicant)	(N = 36) %	(N = 0) %	(N = 22) %	(N = 14) %	(N = 28) %	(N = 8) %	(N = 19) %	(N = 3) %
No effect	50	0	50	50	54	38	53	33
Made more willing	50	0	50	50	46	63	47	67
Group differences	No chi-square		Not significant		Not significant		Not significant	

sexual activity ($p < .0001$), and 67% of users versus 21% of nonusers had at some time used other drugs or combinations of drugs preceding intercourse ($p < .01$) (see Table IV).

Sexual activity and substance use patterns of selected groupings of users:

1. Males and females: The male and female users did not differ significantly on any of the substance use variables (see Tables II-V).
2. Frequent and less frequent users: The frequent users differed from the less frequent users only in terms of their current usage patterns. The

frequent users more often used alcohol ($p = .10$), marijuana ($p = .004$) and other drugs ($p = .02$) in conjunction with their sexual activity than did the less frequent users (see Table IV). Moreover, their use of marijuana was more likely to be by design in preparation for sexual activity than was the use of the less frequent users ($p = .004$) (see Table V).

3. Male abusers and nonabusers: The abusers differed from the nonabusers marginally in one category, the use of other drugs before intercourse ($p = .07$) (see Table IV).

TABLE III
INTOXICANT EVER LEAD TO UNDESIRABLE INTERCOURSE?

	Population		User Gender		Recent Usage		Abuse Status	
	Users	Nonusers	Males	Females	Less Frequent	Frequent Users	Male Nonabusers	Male Abusers
	(N = 97) %	(N = 35) %	(N = 60) %	(N = 37) %	(N = 75) %	(N = 22) %	(N = 52) %	(N = 8) %
"Yes," any intoxication	46	33	45	49	44	55	46	43
Of those answering "yes":								
Alcohol	30	76	28	34	29	33	27	33
Marijuana	17	12	24	12	17	25	27	0
Other drugs/combination of drugs	52	12	48	56	54	42	46	66
Group differences	p = .05		Not significant		Not significant		Not significant	

TABLE IV
PERCENT OF TIME DRUGS USED BEFORE INTERCOURSE

	Population		User Gender		Recent Usage		Abuser Status	
	Users	Nonusers	Male	Female	Less Frequent	Frequent Usage	Male Nonabusers	Male Abusers
	(N = 97) %	(N = 35) %	(N = 60) %	(N = 37) %	(N = 79) %	(N = 22) %	(N = 52) %	(N = 8) %
Alcohol:								
0%	5	18	7	3	7	0	8	0
1%-10%	64	67	64	64	63	67	60	88
11%-25%	19	12	21	17	23	10	22	13
25% +	12	3	9	17	8	24	10	0
Group differences	p = .06		Not significant		p = .10		Not significant	
Marijuana:								
0%	2	41	3	0	3	0	4	0
1%-10%	53	59	52	54	60	29	50	63
11%-25%	22	0	21	23	22	19	22	13
25% +	24	0	24	23	15	53	24	25
Group differences	p < .00001		Not significant		p = .004		Not significant	
Other drugs/combination of drugs:								
0%	32	79	29	38	40	5	34	0
1%-10%	64	21	67	59	57	90	64	88
11%-25%	2	0	4	0	2	5	2	13
25% +	1	0	0	3	2	0	0	0
Group differences	p = .01		Not significant		p = .02		p = .07	

Summary of sexual activity and substance use patterns: The users as a group were more likely than nonusers to utilize intoxicating substances before sexual activity. Marijuana was consumed by the users more often than alcohol or other drugs in conjunction with sexual activity. However, it was less likely than alcohol to have been used before sexual initiation or undesired intercourse. Other drugs or combinations of intoxicants were most often linked to undesired intercourse. Frequent users were more likely to use marijuana by design in preparation for sex than were less frequent users.

General Marijuana-Induced Effects on Sexual Performance

The users were asked whether or not marijuana affected them with regard to the duration of intercourse, the quality of orgasm, the number of orgasms and their ability to repeat intercourse. Specifically, they reported whether marijuana increased, decreased, variably affected (i.e., was setting-dependent) or had no effect on each of these aspects of sexual performance.

Comparisons of selected groupings of users:

1. Males and females: In general, the majority of females reported no effect in any of these categories. A larger minority of males (39%) reported that marijuana increased or variably increased the duration of intercourse. This compares with 26% of the women reporting an increase or variable increase in duration (p = .05). More males (68%) than females (50%) reported that marijuana enhanced or variably enhanced the quality of their orgasm (p = .02).

The number of orgasms increased or variably increased for 27% of the women and 19% of the men (not significant) and decreased for two percent of the men. The ability to repeat increased or variably increased for eight percent of the women and 17% of the men (not significant), and decreased for two percent of the men (see Table VI).

2. Frequent and less frequent users: When those who had used marijuana at least five times per

TABLE V
PERCENT OF TIME MARIJUANA USED BY DESIGN
IN PREPARATION FOR SEXUAL ACTIVITY

	Gender		Recent Usage		Abuser Status	
	Males	Females	Less Frequent	Frequent Users	Male Nonabusers	Male Abusers
	(N = 60)	(N = 37)	(N = 75)	(N = 22)	(N = 52)	(N = 8)
	%	%	%	%	%	%
Coincidental use only	20	29	28	8	19	25
1%-10%	43	36	45	17	45	25
11%-25%	17	14	16	17	16	25
25% +	20	21	12	58	19	25
Group differences	Not significant		p = .004		Not significant	

TABLE VI
MARIJUANA-INDUCED EFFECTS ON SEXUAL PERFORMANCE

	Gender		Recent Usage		Abuser Status	
	Males	Females	Less Frequent	Frequent Users	Male Nonabusers	Male Abusers
	(N = 60)	(N = 37)	(N = 75)	(N = 22)	(N = 52)	(N = 8)
	%	%	%	%	%	%
Duration of intercourse:						
Increased	27	8	22	14	28	25
Decreased	0	0	0	0	0	0
Variable	12	8	10	14	10	25
No Effect	61	84	68	72	62	50
Group differences	p = .05		Not significant		Not significant	
Quality of orgasm:						
Enhanced	58	32	51	36	57	63
Decreased	0	0	0	0	0	0
Variable	10	8	8	14	8	25
No Effect	32	60	41	50	35	12
Group differences	p = .02		Not significant		Not significant	
Number of orgasms:						
Increased	12	16	16	5	12	13
Decreased	2	0	1	0	2	0
Variable	7	11	5	18	6	13
No Effect	80	73	78	77	80	75
Group differences	Not significant		Not significant		Not significant	
Ability to repeat:						
Increased	14	3	11	5	12	25
Decreased	3	0	3	0	4	0
Variable	3	5	4	5	4	0
No Effect	80	92	82	90	80	75
Group differences	Not significant		Not significant		Not significant	

week were compared with the others, there were no statistically significant differences (see Table IV).

3. Male abusers and nonabusers: Male abusers and nonabusers reported very similar effects of marijuana on their sexual performance and there were no statistically significant differences. It is interesting to note that the males reporting negative effects (i.e., a decrease in number of orgasms and a decrease in ability to repeat) were not among the abusers or the frequent users (see

Table VI).

Summary of marijuana-induced effects on sexual performance: Over half of the males and less frequent users reported an enhancement of quality of orgasm. The majority of subjects reported no effect of marijuana on duration of intercourse, number of orgasms or ability to repeat. When effects were reported they were almost always positive. A very small percentage of males – not marijuana abusers or frequent users – reported negative effects on their performance. (See Table VI for a complete presentation of these data.)

TABLE VII
MARIJUANA-INDUCED EFFECTS ON SEXUAL PARTNER PREFERENCE

	Gender		Recent Usage		Abuser Status	
	Males	Females	Less Frequent	Frequent Users	Male Nonabusers	Male Abusers
	(N = 60) %	(N = 37) %	(N = 75) %	(N = 22) %	(N = 52) %	(N = 8) %
Desire familiar partner:						
Increased	50	60	52	59	54	25
Decreased	3	3	4	0	2	13
Variable	12	11	11	14	10	25
No Effect	35	27	33	27	34	38
Group differences	Not significant		Not significant		Not significant	
Desire unfamiliar partner:						
Increased	43	14	28	41	39	63
Decreased	5	3	3	9	4	13
Variable	3	5	4	5	4	0
No Effect	49	78	65	46	53	25
Group differences	p < .01		Not significant		Not significant	
Desire multiple partners:						
Increased	12	3	8	9	14	0
Decreased	3	0	3	0	2	13
Variable	0	0	0	0	0	0
No Effect	85	97	89	91	84	88
Group differences	Not significant		Not significant		Not significant	
Desire homosexual partner:						
Increased	7	3	4	9	8	0
Decreased	2	0	1	0	2	0
Variable	0	3	0	5	0	0
No Effect	91	94	95	86	90	100
Group differences	Not significant		Not significant		Not significant	

TABLE VIII
MARIJUANA-INDUCED EFFECTS ON SPECIFIC SENSES
DURING SEXUAL ACTIVITY*

	Gender		Recent Usage		Abuser Status	
	Males	Females	Less Frequent	Frequent Users	Male Nonabusers	Male Abusers
	(N = 60) %	(N = 37) %	(N = 75) %	(N = 22) %	(N = 52) %	(N = 8) %
Touching:						
Enhanced	59	57	62	47	60	50
Decreased	0	0	0	0	0	0
Variable	3	3	4	0	3	0
No Effect	39	40	35	53	37	50
Physical Closeness:						
Enhanced	51	56	50	67	55	25
Decreased	0	0	0	0	0	0
Variable	9	4	8	0	10	0
No Effect	40	41	42	33	36	75
Snuggling:						
Enhanced	34	56	42	50	36	25
Decreased	0	0	0	0	0	0
Variable	9	4	8	0	7	25
No Effect	57	41	50	50	58	50
Taste:						
Enhanced	23	33	24	42	23	25
Decreased	0	0	0	0	0	0
Variable	0	4	2	0	0	0
No Effect	77	63	74	58	77	75
Smell:						
Enhanced	23	7	16	17	23	25
Decreased	3	0	0	8	3	0
Variable	0	4	2	0	0	0
No Effect	74	89	82	75	74	75
Hearing:						
Enhanced	17	11	16	8	19	0
Decreased	0	0	0	0	0	0
Variable	3	0	2	0	0	25
No Effect	80	89	82	92	81	75
Sight:						
Enhanced	11	7	10	8	13	0
Decreased	0	0	0	0	0	0
Variable	0	4	0	0	0	0
No Effect	89	93	90	92	87	100

*No group differences significant at or above .05 level.

TABLE IX
IS MARIJUANA AN APHRODISIAC?

	Gender		Recent Usage		Abuser Status	
	Males (N = 60)	Females (N = 37)	Less Frequent Users (N = 75)	Frequent Users (N = 22)	Male Nonabusers (N = 52)	Male Abusers (N = 8)
	%	%	%	%	%	%
Yes, mild	36	34	33	54	38	25
Yes, strong	8	11	10	8	9	0
Variable effect	28	21	26	23	25	50
No effect	28	29	31	15	28	25
Group differences	Not significant		Not significant		Not significant	

Marijuana-Induced Effects on Sexual Partner Preference

Comparisons of selected groupings of users:

1. Males and females: A majority of subjects (60% of males, 72% of females) reported that marijuana increased or variably increased their desire for a familiar partner. Three percent of both males and females reported a decrease.

More males than females reported an increased desire for an unfamiliar partner ($p < .01$). Marijuana had no effect on desire for multiple partners or homosexual partners for over 85% of both males and females. Further analysis revealed that all subjects reporting an increase in their desire for a homosexual partner claimed either bisexuality or homosexuality as their sexual orientation (see Table VII).

2. Frequent and less frequent users: There were no significant differences between frequent and less frequent users on sexual partner preference (see Table VII).
3. Male abusers and nonabusers: There were no significant differences between the groups, but this may be due to the small number of abusers in the sample. When percentage scores were examined, the groups appeared quite distinct, although this may reflect differences in sexual contacts more than differential effects of marijuana. In general, the abusers were more likely to experience an increase in their desire for an unfamiliar partner than for a familiar partner, a pattern unlike any of the other groups under study (see Table VII).

Summary of marijuana-induced effects on sexual partner preference: At least 50% of all groups reported an increase or variable increase in their desire for a familiar partner. A significantly greater percentage of males than females reported an increase in their desire

for an unfamiliar partner. Higher proportions of frequent users and abusers also reported this increase. (See Table VII for the partner preference data.)

Marijuana-Induced Effects on Specific Senses During Sexual Activity

The users were asked if marijuana had effects on their senses of touching, smell, sight, taste and hearing as well as snuggling and physical closeness during sexual activity. They reported whether each sense was enhanced, decreased, variably enhanced or was unaffected (see Table VIII).

The modalities most affected by marijuana were the tactile-related senses of touching and physical closeness, which were reported enhanced or variably enhanced by 60% of the users. The next most affected was snuggling (50%), followed by taste (29%), smell (19%), hearing (17%) and sight (10%). Two male subjects reported that marijuana decreased their sense of smell.

The men and women did not differ significantly in their reports of any of these sensory effects, nor did the frequent and less frequent users. A smaller proportion of abusers reported enhancement of touching (50% vs. 63% for nonabusers) and of physical closeness (25% vs. 65%), but there were no significant differences between the groups in their reports on sensory modalities.

General Effects of Marijuana on Sexual Activity and Enjoyment

Perceived aphrodisiac: Over 70% of the users felt that marijuana acts as an aphrodisiac, but only about nine percent rated the effect strong. There were no significant group differences in this estimation (see Table IX).

Pleasure and satisfaction: A majority (81%) reported that feelings of sexual pleasure and satisfaction increased or variably increased when they used mari-

TABLE X
MARIJUANA-INDUCED EFFECTS ON SEXUAL ENJOYMENT*

	Gender		Recent Usage		Abuser Status	
	Males	Females	Less Frequent	Frequent Users	Male Nonabusers	Male Abusers
	(N = 60)	(N = 37)	(N = 75)	(N = 22)	(N = 52)	(N = 8)
	%	%	%	%	%	%
Feelings of Sexual Pleasure and Satisfaction:						
Increased	70	76	75	65	72	50
Decreased	3	0	2	0	3	0
Variable	5	14	8	12	6	0
No Effect	23	10	15	24	19	50
Feelings of Emotional Closeness and Intimacy:						
Increased	46	63	52	58	48	25
Decreased	3	0	2	0	3	0
Variable	14	7	10	17	13	25
No Effect	37	30	36	25	36	50

*No group differences reached .05 level of significance.

juana.

Emotional closeness and intimacy: Sixty four percent reported an increase or variable increase in feelings of emotional closeness and intimacy. Three percent of the males reported a marijuana-induced decrease in both these feelings (see Table X). Overall, however, the males did not differ from the females, nor did the frequent users differ strikingly from the less frequent users in their report of these marijuana-induced feelings.

The abusers reported less effect on their sexual pleasure and satisfaction, and their feelings of emotional closeness and intimacy than nonabusers. The differences, however, were not statistically significant.

Summary of general effects of marijuana on sexual activity and enjoyment: About three-quarters of the users considered marijuana an aphrodisiac, but less than 10% considered the effect strong. Feelings of marijuana-induced sexual pleasure and satisfaction were reported by high percentages (above 75%) of all groups except the abusers. Feelings of emotional closeness and intimacy were reported increased or variably increased by 60% or more of all groups except, again, the abusers. (See Table X for a detailed summary.)

CONCLUSIONS

The evidence from this study indicates that mari-

juana, when it affects the sexual experience, affects it in a positive way. The most uniformly reported effects were general ones: feelings of sexual pleasure and satisfaction, feelings of emotional closeness and intimacy, and a general concurrence that marijuana has mild aphrodisiac properties.

Specific performance variables were apparently not affected to any large extent. For the majority of these subjects, both men and women, marijuana does not increase the duration of intercourse, as was suggested in the early 1970's, nor does it increase the number of orgasms or the ability of these sexually active adults to repeat sexual activity. However, the majority of males reported an enhanced quality of orgasms while about 40% of the women reported this effect. If as many as one-third of women never or only occasionally experience orgasm (Fisher 1973), then one-third of the females in this sample would have little or no basis of comparison for this item. Controlling for this possibility, about 60% of the orgasmic females would then be reporting enhanced quality of orgasm — a figure roughly comparable to the men. This effect is probably less attributable to set and expectancy than some other general findings, and therefore suggests that marijuana may have some mild but specific effects on sexual performance.

Of the sensory variables, the items involving touch

were, in general, enhanced by marijuana for the majority of users. Enhancement of the other senses was reported by considerably fewer subjects.

Marijuana appeared to increase, in some nonspecific fashion, the desire for a partner (both familiar and unfamiliar) for about half of the male users. Marijuana consistently increased the desire for a familiar partner only on the part of the majority of the women. It may be reassuring for society to note that for most of these chronic marijuana users – men and women – marijuana intoxication did not increase their desire for an unfamiliar partner, for multiple partners or for a homosexual partner. Thus marijuana may be promoting fidelity, a virtue not often associated with this drug or its users.

Comparison of the marijuana users with the non-users yielded three main differences: (1) more users remained single; (2) the users' first sexual relations occurred at an earlier age; and (3) more users had engaged in homosexual activity. The two groups were

quite similar, however, with respect to infidelity rates, the single subjects' number of sexual partners, and participation in group sex or partner swapping.

More users than controls had used an intoxicant at the time of their first heterosexual intercourse, however alcohol was usually the associated drug in these instances. Moreover, the use of all intoxicants, including alcohol, was a less frequent phenomenon in the sex lives of the comparison group.

While a significant majority of the users agreed that marijuana is consistently an aphrodisiac, or at least under some circumstances, it is apparent that only the most frequent users often seek out the use of this substance specifically for its sexually stimulating qualities. For the others, their use of marijuana is more likely to be coincidental to their sexual behavior. While marijuana does appear to be a drug of choice for the users where sexual activity is concerned, the effects are mild, positive and facilitating, but not compelling.

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PSYCHOCLINICAL EFFECTS OF LONG-TERM MARIJUANA USE IN 275 INDIAN CHRONIC USERS. A COMPARATIVE ASSESSMENT OF EFFECTS IN INDIAN AND USA USERS

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INTRODUCTION

The use of marijuana has aroused horror and rejection as well as adulation in the world. The present widespread use of the drug is a worldwide phenomenon. No caste, creed, nation, or country is free from its use. There are divergent views about its long-term effects. Despite keen public and professional interest in the adverse reactions and complications that result from chronic use of cannabis drugs, the description and documentation of associated medical and psychic effects have seldom gone beyond generalizations. This study will report on 275 chronic cannabis users and also on 17 alienated youths ("hippies") from America and Europe who had come from Nepal to India and smoked or consumed cannabis drugs regularly for periods of 6 months to several years. They volunteered information and submitted to examination. The studies were conducted in original settings at places of indulgence and work.

METHODOLOGY

The subjects were examined immediately after they had taken the drug and also after its effects had disappeared. Routine physical and neurologic examinations were performed, during which the individuals were subjected to intense interviews concerning the history of drug abuse, dose, frequency of use, duration, family, friends, interest in work, and their own assessment of the effects of marijuana. The subjects were also evaluated with respect to personality, mood, attitudes, and emotional stability.

Clinical Groups

Considering that the Indian and Nepali marijuana used in India is approximately equal in potency to the Mexican plant, which contains 1.47% Δ^9 -tetrahydrocannabinol (Δ^9 -THC), TABLE 1 lists the mean daily dose of the subjects as calculated in equivalents of Δ^9 -THC content. The subjects were divided into four groups according to age, dose, and duration of use. Educational and vocational and income data are presented in TABLES 2 and 3, respectively.

TABLE 1
DOSE, AGE, AND DURATION

Group	Sample No.	Mean Age (years)	Mean Duration (years)	Mean Daily Dose of Δ^9 -THC (mg)
I	56	48.5	27.1	350
II	58	29.7	7.0	150
III	72	19.1	3.5	75
IV	89	17.2	2.1	40

* *Bhang*, *ganja*, and *charas* were assessed and found to contain about 1, 3, and 5% by weight of Δ^9 -THC, respectively.

TABLE 2
EDUCATIONAL LEVELS

Group	Sample No.	Uneducated		High School *		University	
		No.	%	No.	%	No.	%
I	56	40	71.42	16	28.57	—	—
II	58	32	55.17	18	31.03	8	13.79
III	72	20	27.77	45	62.50	7	9.72
IV	89	17	19.10	30	33.70	42	47.19
Total	275	109	39.63	109	39.63	57	20.72

* Fifteen hippies were high-school dropouts, and two were high-school graduates.

TABLE 3
VOCATIONS AND INCOME

Vocation	Number	Percent	Average Monthly Income (US dollars)
No income, beggars	26	9.45	0
Religious mendicants	25	9.09	25
Priests	20	7.27	31
Laborers	80	29.09	40
Artisans	46	16.72	50
Semiskilled workers	35	12.72	40
Skilled workers	15	5.45	65
Students	22	8.01	dependent on parents
White-collar workers	6	2.18	75

RESULTS

Subjective Assessment of Physical Health

The subjects' assessments of the effects of marijuana on their general health and working capacity are listed in TABLE 4. The 29.09% from the younger groups who used smaller doses believed that the drug had no adverse effect on their health. In 23.60% of the cases, health was thought to be impaired to a minor degree, whereas 43.63% complained of a marked degree of impairment in their general health and working capacity. The remaining 10 (3.68%) thought that their health and working capacity had improved.

TABLE 4
SUBJECTIVE ASSESSMENT OF PHYSICAL HEALTH

Group	Number	Mean Daily Dose of Δ^9 -THC (mg)	No Adverse Effect on Health	Minor Impairment	Marked Impairment	Improve- ment
I	56	350	26 (32.50) *	18 (27.69)	50 (41.56)	
II	58	150	13 (16.25)	28 (43.07)	35 (29.16)	
III	72	75	22 (27.50)	5 (7.5)	25 (20.88)	6 (60)
IV	89	40	19 (23.75)	14 (21.53)	10 (8.3)	4 (40)
Total	275		80 (29.09)	65 (23.6)	120 (43.63)	10 (3.63)

* Figures within parentheses are percentages.

Effects of habitual indulgence in cannabis drugs on general health (TABLE 5) were generally minor, taking into consideration the poor nutrition and insanitary health conditions in which the Indian marijuana users live, when compared to the effects of other psychotoxic drugs, including alcohol. The former included respiratory disorders, such as laryngitis, pharyngitis, asthma, irritation cough, and dyspnea. The gastrointestinal system was seldom involved, although there were instances of increased appetite, dyspepsia, and minor liver damage. In the long-standing cases, there was evidence of malnutrition, anemia, poor skin condition, and congestion of ciliary vessels, sometimes with discoloration of the conjunctiva due to prolonged congestion. All of the effects were more pronounced in the first two groups, which was comprised of older individuals taking large drug doses over prolonged periods.

TABLE 5
GENERAL SYSTEMIC EFFECTS (SAMPLE 275)

Effects	Group				Total
	I	II	III	IV	
Malnutrition, anemia, asthenia, sal- low complexion	15 * (5.45) †	7 (2.54)	2 (0.72)	—	24 (8.62)
Conjunctival vessels, congestion, discloration of conjunctiva	38 (13.81)	13 (4.72)	5 (0.18)	—	56 (20.25)
Respiratory disorders, pharyngitis, dryness of throat, chronic bronchitis	58 (21.09)	23 (8.35)	8 (2.90)	—	89 (32.36)
Gastrointestinal disorders, indiges- tion, unduly increased appetite, diarrhea	17 (6.18)	8 (2.90)	4 (1.45)	—	29 (10.54)
Poor condition of skin, sallow muddy complexion	51 (18.54)	30 (10.9)	23 (8.36)	6 (2.18)	110 (40.0)

* Number.

† Percent.

Psychopharmacologic Effects of Daily Doses in Chronic Users

TABLE 6 summarizes the effects and symptoms observed in each group with controlled doses. Most of the subjects in our present series took the drug with the objective of attaining a mild sense of intoxication, a relaxation of feelings toward sociability. The environment had a pronounced effect on the general trend of the subjective symptoms. Even though the doses were regulated, adverse reactions occurred in some individuals. These reactions are listed in TABLE 6.

Adverse psychic effects were found to occur with a greater incidence in the younger groups, which included subjects with mean ages between 19.1 and 17.2 years. Some of these younger subjects had histories of childhood neurosis, psychopathic personality, deviancy, and anxiety. They took the drug to stabilize these conditions and to regain self-confidence.

Psychologic Reactions When the Daily Dose Was Exceeded

Numerous addicts were contacted in the same region. Eighty-five subjects were found who had taken the drug in larger than the usual doses and were in a state of acute intoxication. TABLE 7 shows the adverse psychiatric reactions that occurred and the mean doses necessary to elicit each reaction, with the durations and doses specified. It can be seen that the type and intensity of the reaction varied with the dosage. As previously reported, prolonged marijuana use in larger doses may induce psychosis in individuals with low psychotic thresholds. It may also produce hallucinations and psychomimetic effects, as seen in stage of acute intoxication. There were wide variations in reactions among different individuals and within the same individual. The variations can be attributed to dosage, mood, personality, and preexisting psychopathology.

In all cases, the reactions subsided when the individual was no longer under the influence of the drug. Abnormal reactions that occur after large doses are manifestations of a temporary effect on the cerebral cells, whose physiologic activities are either maintained at a status quo or are partially or totally disorganized. This distorted action of the cerebral cells causes the higher control centers to be activated, thus allowing the senses to be more easily influenced by the preexisting personality traits or external stimuli. When the drug is absorbed into the system, it does not add any new elements to the brain; it only removes the higher control activity and excites the preexisting trend of mental aberrations, if any.

Long-Term Effects

During these investigations, relatives, friends, and employers of these addicts were contacted. They gave information regarding the daily lives of the subjects, the extent of their family interest, their attitudes toward society, and their interest in work. The subjects were examined several times by a sociologist and a psychiatrist. TABLE 8 summarizes these observations.

It is obvious that persons from groups I and II were more involved with the drug. Those in groups III and IV were younger, had used marijuana for a shorter period, and were taking smaller doses. Continued states of intoxica-

TABLE 6
PSYCHOLOGIC REACTIONS WITH CONTROLLED DAILY DOSES (SAMPLE 275)

Reactions	Group				Total
	I	II	III	IV	
Prolonged sense of well-being with euphoria	50 * (18.18) †	34 (12.35)	59 (21.45)	24 (8.72)	167 (60.72)
Weakening of inhibitions, false sense of ability to perform physical and intellectual duties	20 (7.27)	12 (4.35)	8 (2.90)	9 (3.27)	49 (17.81)
Amotivation, self-neglect, dirty habits	15 (5.45)	4 (1.45)	2 (0.72)	—	21 (7.63)
Release of social inhibitions	50 (18.18)	30 (10.90)	23 (8.35)	21 (7.63)	124 (45.09)
Amnesia	58 (21.09)	23 (8.35)	7 (2.54)	4 (1.45)	92 (33.45)
Partial loss of sense of time and space, mild degree of confusion	5 (1.8)	4 (1.45)	6 (2.18)	—	15 (5.45)
	18 (6.54)	2 (0.72)	2 (0.72)	—	22 (8.0)
Increased sexual drive	30 (10.90)	15 (5.45)	8 (2.90)	15 (5.45)	68 (24.72)
Hallucinations and delusions	5 (1.80)	4 (1.45)	—	—	9 (3.27)

* Number.

† Percent.

TABLE 7
PSYCHOLOGIC REACTIONS WITH HIGHER DOSES

Reactions	Number	Percent	Mean Dose of Δ^9 -THC (mg)	Approximate Duration
Elation, feeling of happiness, weakening of inhibition, false sense of security	10	11.75	100	0.5-2 hr
Amnesia	6	7.05	100	0.5-6 hr
Release of repressed behavior, occasionally hostile and violent	16	18.82	105	2-3 hr
Mild degree of confusion	10	11.75	75	10-24 hr
Loss of control, staggering gait, loss of coordination of muscular movements, slurred speech, dizziness	7	8.23	175	1-2 hr
Disorientation, depersonalization	2	2.35	175	0.5-2 hr
Hallucinations and delusions	4	4.70	180	0.5-36 hr
Amotivation, lethargy, self-neglect, general apathy	10	11.75	110	4-24 hr
Schizophrenia	6	7.05	190	several days
Paranoia of a minor degree	1	1.17	100	several days
Depressions of short duration	4	4.70	90	4 days
Anxiety	3	3.52	110	a few to 36 hr
Agitation	1	1.17	150	2 days
Acute brain syndrome	1	1.17	200	4-6 days
Criminal and aggressive tendencies	4	4.70	85	more or less permanent change in personality

tion, present in some individuals at some times, led to a state of confusion, manifested by disturbances in performance of their physical and intellectual work or duties. Little or no gross damage was noticed in the last two groups. More individuals in groups I and II showed a lack of initiation, motivation, and interest in their work and family. The work performed by these individuals while under the influence of the drug was not up to normal standards, as compared with that of a control group composed of individuals from the same area and of same general characteristics.

Behavioral Changes

Amotivational Syndrome

Chronic cannabis use in heavy doses affects the central nervous system. The changes are related to the type of dose and the setting in which the drug is taken. Overall, the picture is one of depression and apathy, but continued repeatedly higher doses sometimes may produce increased locomotor activity

and aggressive behavior. Subjects who take smaller doses tend to be quiet, apathetic, and disinterested in their surroundings; these changes are followed by permanent behavioral alterations, which are more marked under stress, starvation, poor health, and so on, resulting in an "amotivational syndrome." In the present studies, all of the subjects were extensively interviewed and questioned about their goals, interest in life and family, and their attitudes toward Indian society and the world in general. Eighty-two (29.81%) individuals showed behavioral changes (TABLE 8) concerning lack of interest in work and family, a happy-go-lucky attitude, and other personality traits. In addition, 30 (10.90%) individuals, who mostly belonged to lower social strata, such as religious mendicants and other beggars, exhibited an "amotivational syndrome." They were generally ill-nourished and neglectful of personal hygiene. Excessive use is associated with personality inadequacies. Persons who exhibit emotional immaturity, low frustration tolerance, and failure to assume responsibility tended to be overrepresented in groups I and II, the heavy cannabis users. In behavioral terms, these traits are manifested in an unrealistic emphasis on the present as opposed to the future, a tendency to drift along in a passive manner, failure to develop long-term abilities or skills, and a tendency to favor regressive and magical rather than rational thinking processes.

Crime

Cannabis drugs are generally used by the poorer sectors of society, which include a higher percentage of criminals and other disreputable individuals.

TABLE 8
LONG-TERM EFFECTS (SAMPLE 275)

Effects	Group				Total	
	I	II	III	IV	No.	%
Amotivational syndrome	14	12	3	1	30	10.90
Lazy habits, loss of drive	6	7	2	—	15	5.45
Instability and immaturity	7	1	6	2	16	5.81
Short-term amnesia	4	2	3	—	9	3.27
Impairment of intellectual faculties	5	3	—	—	8	2.90
Lack of interest in work and family	9	2	1	5	17	6.18
Change in goals, happy-go-lucky attitude toward life	10	2	6	4	22	8%
Slow breakdown of personality	4	1	1	—	6	2.18
Character changes	8	3	7	2	20	7.27
Suspicious and hypersensitive, easily excited, unreasonable, aggressive	4	5	7	1	17	6.18
Premature senility	2	3	1	1	7	2.54
Status intoxicatus	4	2	—	—	6	2.18
Dementia	2	—	—	—	2	0.72
Criminal tendency	9	5	1	—	15	5.45

Most of their earnings are used for the purchase of drugs at exorbitant prices, through the black market. Little money thus remains for food and daily necessities. In such a situation, some of the heavy and chronic addicts are impelled to steal and commit other crimes to sustain themselves. In such instances, cannabis addiction is indirectly associated with crime. Concerning premeditated crime, cannabis may actually act as a deterrent due to its stupefying and depressive effects. Unlike alcohol, there therefore is little or no feelings in such a mental state toward violence. Another category of chronic cannabis users have personality problems, and exhibit irritable and amotivational behavior, and want to live by themselves quietly, undisturbed, and not interested in violence. Such persons sometimes may become irritable and violent when they feel that their "quiet" life is being disturbed. We came across four such instances among the religious mendicants, who attacked their associates with rods when disturbed under the influence of the drug. They may have been hallucinating or suffering from delusions while performing the acts of violence. TABLE 9 provides an analysis of the statements regarding convictions.

Twenty-six (9.44%) persons, mostly ganja and charas users, admitted having been convicted once. Nineteen (6.88%) stated that they had been convicted more than once. These conviction figures are higher than those for the general population. Ganja and charas users predominated, because the effects are more intense and instantaneous when the drugs are smoked; also, ganja and charas smokers mostly come from the lower sections of society, which has a higher percentage of habitual criminals.

Homicide and Suicide

Cannabis drugs have been used from very ancient times by criminals to fortify themselves for committing premeditated crime and also to enable them to endure unusual fatigue or exposure to inclement weather. Cannabis drugs are rarely used for suicidal or homicidal purposes, in comparison to opium and barbiturates. There are, however, few cases on record in India where ganja or charas was used to stupefy the victims for purposes of theft. It is doubtful that cannabis alone can fulfill this objective, so it is mixed with *dhatura* or *stra-*

TABLE 9
DRUG CONVICTIONS

Drug	Sample No.	No Convictions	One Conviction	More Than One Conviction
Bhang (mean Δ^9 -THC): dose, 150 mg; range, 75-200 mg	192	171 * (89.06)†	15 (7.82)	6 (3.12)
Charas and ganja (mean Δ^9 -THC): dose, 300 mg; range, 200-350 mg	83	59 (71.08)	11 (13.26)	13 (15.66)
Totals	275	230 (83.63)	26 (9.44)	19 (6.98)

* Number.

† Percent.

TABLE 10
EFFECTS IN CHRONIC USERS

Drug Data	Stimulant	Depressant	Stimulant Earlier and Depressant Later	No Effect
Mostly bhang: mean dose, 150 mg; range, 75–200 mg (sample 83)	33 * (39.75) †	8 (9.36)	19 (22.88)	23 (27.74)
Mostly ganja and charas: mean dose, 300 mg; range, 200–300 mg (sample 192)	29 (15.10)	67 (34.89)	50 (26.06)	46 (23.98)

* Number.

† Percent.

monium to stupefy the victim. There is another preventive factor, in that ganja and charas can be readily detected by their pungent odor. Thus, it is difficult to mix them with tobacco or other substances for the purpose of smoking without fear of detection. Ganja and charas, however, have been employed to stupefy persons who are habituated to their use by secretly mixing potent drugs like dhatura with them. There were three such instances, in which prostitutes were stupefied in this manner and robbed of their jewelry. Similar cases have also been reported among children who were offered sweets that contained bhang or ganja to stupefy them and were robbed of their belongings. Such instances are, however, rare in adults because of easy detection and uncertain action.

In this connection, it may be stated that one of the authors came across an interesting case during his law practice, where the wife of a medical practitioner who was habituated to ganja smoking regularly gave dhatura mixed with ganja to her husband for several years to stupefy him and make him incapable of sexual performance, with the objective that she could enjoy illicit intercourse with her lover. The case is still pending in the court at Patiala.

Sexuality

Aphrodisiac use of cannabis drugs have been reported from very ancient times. It is claimed by younger users that sexual performance and enjoyment are enhanced when under the influence of the drug. The subjective impression of slowing of time might, indeed, confer on the performer a very unusual gratification in an orgasmic experience, if it is extended from 30 sec to 30 min. These effects are more common with a low dosage. When taken in moderate doses, the effects are somewhat similar to those of alcohol: the drug induces the desire but makes performance impossible. The chronic use of the drug leads to a sad condition, where the lack of desire may also be coupled with inability to perform. TABLE 10 summarizes the experience of chronic marijuana users.

Fecundity

The marital histories of 75 chronic marijuana users in the present series who were married and taking the drug prior to marriage and after it were carefully studied. The average duration of use was 10.2 years. Numbers of children and the mean doses are given in TABLE 11. The number of sterile marriages was higher with larger doses. Those who used smaller doses had more children than those who took large doses.

In addition to the information obtained above, the question of fertility was pursued further in 150 subjects in five villages of Patiala who were married or widowers and who were using cannabis prior to marriage or who began to use it soon afterward. The number of children per 100 families was compared to that found in opium users and in the general population. The figures obtained were 344, 273, and 396, respectively. Sterility was found in 2% of the marriages, or almost twice the percentage in the general population but much lower than the 8.4% found among families of opium addicts. It is concluded that the fertility rate is lower than normal among cannabis users but higher than in opium addicts. Also, there was a marked difference between the bhang and the ganja and charas users: 0.4% of the marriages of bhang users were sterile, as opposed to 5.7% of ganja and charas user marriages, and the proportion of families with five or more children was higher in the former than in the latter group. This finding was attributed to the fact that ganja and charas "are mostly taken by sadhus, fakirs, and low-class people with loose morals and high incidence of venereal disease."

Tolerance and Dependence

It was verbally ascertained that subjects acquired tolerance to each dosage within a few days after each increment. In several cases, it developed rapidly and was more marked. These subjects become refractory to the drug, even to the point when toxicity symptoms developed. On withdrawal of the drug, abstinence symptoms occurred, namely, irritability, yawning, loss of appetite, occasional tremors, twitching, cramps, insomnia, and photophobia. Withdrawal symptoms, though mild, developed within a few hours of abstinence and lasted

TABLE 11
CANNABIS AND MARITAL HISTORY

Drug Data	Sterile Marriages	One or Two Children	More Than Three Children
Bhang (mean Δ^9 -THC): dose, 150 mg; range, 75-200 mg	1	31	18
Ganja and charas (mean Δ^9 -THC): dose, 300 mg; range, 200-350 mg	7	9	9
Totals	8 (10.66)*	40 (53.33)	27 (36.01)

* Percent.

TABLE 12
NEUROLOGIC EFFECTS

Effects	No.	Average Duration
Partial numbness	4	0.5-1 hr
Lack of coordination of muscles, as seen in weakening of hand grip and staggering gait	18	1-2 hr
Increased sense of taste and smell	7	a few minutes
Romberg's sign was positive in individuals who took large doses, and there was difficulty in maintaining the balance	2	a few minutes
Impairment of muscular grip when measured with ergograph	4	0.5-2 hr

for 3-4 days. Tolerance was less marked than with opiates, barbiturates, and alcohol but was similar to that which occurs with other hallucinogenic drugs, such as amphetamines and lysergic acid diethylamide. The withdrawal symptoms of some subjects subsided on administration of alcohol or barbiturates, thus suggesting a cross-tolerance reaction among cannabis, alcohol, and barbiturates. Also, it cannot be excluded that a storage capacity for the drug might also be achieved in some individuals over prolonged periods of cannabis consumption. In judging the presence or absence of psychic dependence in an individual, it is important to ascertain to what extent the use of the drug is a life-organizing factor, to what extent it takes precedence over the use of other means for coping with personality problems, or whether both factors are important. Our studies indicate that a large percentage of heavy users developed dependence. Whereas most of those who used it a few times on an experimental basis, or casually on a few festive occasions, during one year did not show psychic or other forms of dependence.

Neurologic Reactions

With higher doses of cannabis drugs, intellectual and physical performances are affected. Four typists in the series were given a passage to type. At the same time, four other typists, of the same age and group, who had never used cannabis were given the same passage to type. There were significant differences in the time required to type the passage and in the number of mistakes made. Five to 10% more time was required, and 6-12% more mistakes were made by those under the influence of the drug. Tests that involved counting backward and recitation of the alphabet also demonstrated the adverse effects of cannabis. Work performed under the influence of cannabis showed decreased accuracy. With larger doses, there was a marked decline in coherence and clarity. The performance impairment of complex tasks appears to arise from difficulty in maintaining and a logical train of thought (TABLE 12).

Acute Toxicity

Acute somatic toxicity of cannabis drugs is low when compared with that of other simple chemical substances that are rapidly absorbed in their pure form

in the gastrointestinal tract. This lower toxicity explains why marijuana is not used for suicidal purposes. It was observed that severe physical side effects of marijuana are poorly correlated with its psychotoxicity and its ability to disintegrate mental functions, a condition that secondarily may cause bodily harm to self and others.

Chronic Toxicity

Among the vital organs affected by cannabis are the brain, which is the primary target, the liver, lungs, where the active ingredients are metabolized, and the heart, which rapidly accelerates its rate in response to the drug. Despite the long history of use of this drug, as old as the history of man, it has not been possible to observe any structural changes in the brain. There appears to be no or little morphologic or structural changes in the brain. Apparently, however, alterations in sensitivity of brain cells, or distortions in their functions occur, which result in changes in performance of mental functioning. One cannot exclude the possibility that repetitive impairment of these processes by frequent and long-term cannabis intoxication in adolescent years might induce permanent changes in thinking patterns or behavior. Such permanent changes would be related to permanent organic alterations.

COMPARATIVE ASSESSMENT OF EFFECTS IN INDIAN AND USA CHRONIC CANNABIS USERS

The subjective effects varied widely among different individuals and within the same individual. These variations may be explained by the fact that the crude form of the drug, as used in India, is not always of the same potency. It consists of a mixture of stems, leaves, and flowering tops with varying psychoactive properties. This factor partially explains the differences in observations by researchers in India and in the West, where observations are based mostly on studies of occasional and comparatively smaller numbers of subjects using weaker preparations. It is thus difficult to judge even approximately what drug potency is being studied. In our study, we have used an approximately equivalent Δ^9 -THC content for determining the mean daily dose. Other than information about the active ingredient, Δ^9 -THC, knowledge about other elements of the plant is lacking. Because of the dramatic changes in the psychologic, environmental, and sociologic aspects of the world today, more knowledge is needed about the long-term effects of marijuana. The present studies are only a preliminary effort in this direction. The intensity of the chronic effects of marijuana usage, as observed in India and Africa, has not been reported by Western observers. The milder preparations of cannabis used in the West partially explain this comparative absence of such psychoses. In India, there has always been a popular belief that prolonged and excessive use of these drugs leads to certain types of mental disorder and crimes of a violent nature. In previous studies, we have discussed the relationship between hemp habituation and mental disease and crime. It became evident in these studies that excessive indulgence in these drugs by unstable and susceptible individuals was likely to produce states of confusion, characterized by hallucinations, delusions, and disorientation. Prolonged excessive use also appeared to lead to the develop-

ment of toxic psychosis. This paper was based on a study of 200 cannabis dependents that took place from 1963 to 1968. Taken into consideration were age of onset, education, socioeconomic status, dosage, motivation, psychologic and general health, signs of malnutrition, personality type, and so on. The present study also suggests similar findings.

Motivation and the environment have important roles in inducing predominant psychic effects. Various individuals listed different reasons for using cannabis. Most commonly, it was used as a substitute for alcohol. Among the 275 persons studied, 20% used the drug as a substitute for opium or alcohol. The lower cost of cannabis drugs than hemp, and the fact that the withdrawal symptoms are milder, make it an attractive substitute in developing countries, such as India. The use of cannabis drugs by certain sectors of the population in developing countries can be compared to the use of alcohol in the West. However, a recent study conducted at a university campus in Punjab (India) revealed that 60% of the students were using cannabis drugs, mostly ganja. It appears that the younger generation in India is trying to rapidly "catch up" with their counterparts in the West. This phenomenon appears to be characteristic of the general widespread use of marijuana worldwide. Distinctions should thus be made among occasional, regular, and moderate users and those who indulge excessively. The latter category of users is obviously more prone to adverse psychoclinical effects. Users in the United States and Canada belong mostly to the first two categories. This fact, again, partly explains the low frequency of acute toxic reactions among users in the United States and Canada. Like alcohol, excessive cannabis use can be attributed to preexisting personality problems. This conclusion is supported by a Moroccan saying, which states that, "You are a kif addict before you smoke your first pipe." In India, the highest percentage of excessive hemp users comes from the unemployed, from low-income classes, and from the student community. These individuals are mostly passive and nonproductive and are more prone to psychosis than are normal individuals, who have a regular, daily vocation.

Cannabis has also played a central role in the religions of Africa and South America, and in India. In Africa, an entire village has sometimes experienced a situation of "madness" after indiscriminate indulgence of *dagga*. In India, the drug is commonly abused by religious mendicants in places of worship and in the *takyas* of Muslim fakirs.

Marijuana has also been, and is, used by persons in the arts; supposedly, it enables one to expand his creativity. It is likely that the drug enhances the emotional aspects of the art media. However, there is no proof that it helps in technical performance. This is true in certain chronic users who use the drug in moderation.

Marijuana is also used for the relief of fatigue, monotony, and boredom. Cannabis is smoked among the laboring and working classes in urban areas to relieve these conditions. Such usage is not frequently excessive and is similar to that of alcohol in Western society.

CONCLUSIONS AND SUMMARY

Despite the rapidly changing scene of cannabis drug usage, it is becoming more frequent among university students; however, the majority of users (41.8%) are still uneducated. A high school education had been attained by

34.57% of this majority, while the remaining 29.5% were university students. Adverse reactions were more common in the uneducated group. Again, a different situation exists in the United States, where many marijuana users are educated youth from college campuses. With regard to occupation, persons in lower income groups were more susceptible to adverse reactions. This finding, again, contrasts with marijuana users in the United States and other Western countries, where users are mostly from the middle classes.

The individuals studied were apparently healthy persons with little or no apparent personality problems and no history of mental disorder or neurosis. An invariable element was their history of drug use. The symptoms and the effects were so similar and uniform that they suggest that, simply, a definite effect follows a definite cause. The effects were mostly of a mental nature that simulated toxic psychosis. There were no other common factors beyond the use of the drug. This eliminated the possibility that the adverse toxic reactions observed were caused by other factors. Thus, cannabis may precipitate latent psychiatric disorders, may aggravate preexisting psychiatric problems, or may have both effects.

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AN ATTITUDE SURVEY OF THE EFFECTS OF MARIJUANA ON SEXUAL ENJOYMENT

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Determined attitudes on the effects of marijuana on sexual enjoyment by self-report for a group of 84 graduate students of health sciences. The students were grouped in three categories: those who had sexual experience while under the influence of marijuana (experienced smokers), those who have smoked marijuana but who have not had such experience (non-experienced smokers), and non-smokers. Results are again inconclusive despite the fact that a majority in each category responded in a positive manner to the initial question concerning the effect of marijuana on the enjoyment of sexual intercourse. There is sufficient support to indicate that at least some experienced smokers have derived an enhancement of sexual pleasure while they were using marijuana. The implication is that there may be value in researching the use of marijuana in treatment of sexual disorders.

One of the persistent questions related to marijuana usage is that of its effect on sexual performance and enjoyment. Part of the mystique associated with marijuana usage involves its purported qualities as an aphrodisiac. Although marijuana long has been rumored to have these qualities, little systematic research has been directed to this area. Nevertheless, there are several accounts of an enhancement of sexual pleasure as an effect of marijuana usage (Brown & Stickgold,

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1974; Chausow & Saper, 1974; Hager, 1975). Bouguet (1950) stated that in North Africa and Egypt there is a strong belief that marijuana enhances sexual satisfaction and that this is an important cause for initiating use. Chopra and Chopra (1967) reported that 10% of a sample of approximately 1200 users listed increased sexual excitement as a cause that led to the cannabis habit. Goode (1969) surveyed 200 marijuana users with regard to the effects of marijuana on sexual enjoyment. In response to the question, "Do you think being high on marijuana stimulates sex interest, or not?", 38% replied that it did not; 5% replied that it had a decidedly negative effect; 13% replied that the effect depended on either their mood, partner or both; but 44% replied that marijuana definitely increases their sexual desire. With respect to the male-female response pattern, 39% of the men and 50% of the women claimed increased sexual interest. There is, however, insufficient evidence at the present time for conclusive statements on the relationship between marijuana and sexual enjoyment. The need for further investigations in this area is obvious. The present study is an assessment of attitudes with regard to the effects of marijuana on sexual excitement.

METHOD

Subjects and Instruments

Eighty-four graduate students of health sciences enrolled in a southeastern medical center served as Ss. A 57-item multiple choice and true-false questionnaire was developed by one of the authors to determine the attitudes of the individuals in the sample with regard to sexual behavior and marijuana usage as well as the actuarial characteristic of the sample. Included among these questions were 15 Lie (L) scale items from the MMPI¹ (Reproduced by permission for research purpose only. Copyright 1943, renewed 1970 by the University of Michigan. Published by The Psychological Corporation, New York, N.Y. All rights reserved.) These questions were used as a rough validity check of the responses.

Fifty-one percent of the 84 students in this survey were between the ages of 24 and 28; 44% were between the ages of 19 and 23. As might be expected, only 4% of the students were above 28 and 1% below 18 years of age. Seventy-eight percent of the respondents were male and 22% female.

Procedure

An explanation of the purpose of the questionnaire (i.e., to investigate the perceived effects of marijuana on sexual pleasure and satisfaction) was given to the students in a classroom setting. Individuals who had participated in sexual activity while under the influence of marijuana were asked to complete the questionnaire with respect to their personal experience. Those who had not had such experience, whether or not they had ever used marijuana, were asked to answer the question in terms of what they thought the relationship between marijuana and sexual activity would be.

The completed questionnaires were collected and the answers tabulated. Individuals who scored above 11 on the Lie scale questions and those who neglected to note whether they were experienced users of marijuana were omitted from further consideration. Eleven questionnaires were eliminated for these reasons.

RESULTS

A majority of the sample (59 of 84) reported that they had at least once, but most of these smokers reported their use as less than 15 times. Thirty-nine percent of those surveyed reported that they had engaged in sexual intercourse

¹Since there is evidence to indicate that item responses obtained to selected items isolated from the context of a personality inventory may not be comparable to those obtained within the context, the results of this research should not be considered applicable to the standardized complete form of the inventory.

while under the influence of marijuana. Of the remainder of the sample, 26 were smokers and 25 were not. Since all *Ss* were asked to complete the questionnaire regardless of their experience, the data are best viewed with a consideration of three *S* types: Experienced smokers (33 *Ss*), non-experienced smokers (26 *Ss*), and non-smokers (25 *Ss*). The pertinent results are presented in Table 1.

TABLE 1
GROUP RESPONSES TO QUESTIONS THAT CONCERN EFFECT OF MARIJUANA
ON SEXUAL PLEASURES

Question	A	B	C	D
	Experienced smokers (<i>N</i> = 33) (%)	Non-experienced smokers (<i>N</i> = 26) (%)	Non-smokers (<i>N</i> = 25) (%)	Total (<i>N</i> = 84) (%)
34. Marijuana usage has the following effect on enjoyment and satisfaction associated with sexual intercourse:				
A. Increases pleasure	88	77	52	74
B. Decreases pleasure	6	8	20	11
C. No effect	6	15	28	15
35. While under the influence of marijuana the sensations associated with sexual intercourse are:				
A. Positive effect	48	69	48	55
B. Negative effect	12	12	12	12
C. No effect	36	19	24	27
D. No response	4	0	16	6
46. Marijuana usage has the following effect on the frequency of engaging in sexual intercourse:				
A. Positive effect	27	38	32	32
B. Negative effect	3	15	12	10
C. No effect	64	46	44	52
D. No response	6	1	12	6
49. My partner's use of marijuana has the following effect on my sexual enjoyment:				
A. Increases pleasure	48	54	44	49
B. Decreases pleasure	3	8	4	44
C. No effect	12	38	52	5
D. No response	7	0	0	2
51. Marijuana usage affects the satisfaction and enjoyment associated with oral sex as follows:				
A. Increases pleasure	42	54	20	39
B. Decreases pleasure	3	15	20	12
C. No effect	39	27	52	39
D. No response	16	4	8	10
52. I engage in more varied sexual activity while under the influence of marijuana:				
A. More varied	12	54	40	33
B. No more varied	76	42	40	55
C. No response	12	4	20	12
53. Marijuana usage affects the frequency of my engaging in oral-genital sex as follows:				
A. Positive effect	24	38	28	30
B. Negative effect	0	4	4	2
C. No effect	64	54	56	58
D. No response	12	4	12	10

TABLE 1 (continued)

Question	A	B	C	D
	Experienced smokers (<i>N</i> = 33) (%)	Non-experienced smokers (<i>N</i> = 26) (%)	Non-smokers (<i>N</i> = 25) (%)	Total (<i>N</i> = 84) (%)
54. When both my partner and I use marijuana, sexual pleasure and satisfaction is affected as follows:				
A. Increases pleasure	76	65	32	60
B. Decreases pleasure	3	8	16	8
C. No effect	12	23	40	24
D. No response	9	4	12	8
55. The use of marijuana has the following effect on the intensity of sexual orgasm:				
A. Increases intensity	58	35	36	44
B. Decreases intensity	6	15	12	11
C. No effect	27	46	40	37
D. No response	9	4	12	8
57. An aphrodisiac increases sexual pleasure and I feel marijuana is an aphrodisiac.				
A. True	61	35	36	45
B. False	27	50	50	44
C. No response	12	15	14	11

Experienced smokers (cf. Table 1) held the most positive views on the pleasure-enhancing effects of marijuana. Marijuana was seen as increasing sexual pleasures and sensations as well as the intensity of orgasm. Usage by the partner or by both individuals was seen as enhancing sexual enjoyment. In general, these students did not feel that marijuana had any major effect on the frequency of sex or oral sex. The majority of this group (61%) considered marijuana an aphrodisiac.

Non-experienced smokers (see Table 1) differed only slightly in their ideas about how marijuana would influence sexual behavior. Marijuana was felt by most students to increase pleasure and sensations associated with sexual intercourse and oral sex. Usage by the partner or by both members was viewed as enhancing pleasure. In general, marijuana was felt to have little or no effect on the frequency of intercourse or oral sex, the variety of sexual encounters, or the intensity of orgasm. In contrast to experienced smokers, this group did not consider marijuana to be an aphrodisiac.

Non-smokers (cf. Table 1) conceded that marijuana would increase the pleasure and sensations of sexual intercourse, but in general viewed marijuana as having no effect. Similarly, marijuana was not considered an aphrodisiac.

When the total sample (cf. Table 1) is considered, highest percentages of positive responses are seen in those items that pertain to increased pleasure, sexual sensations, and intensity of orgasms as well as increasing variety of sexual experiences. Smoking by both partners also is viewed as enhancing pleasure. Respondents reported no effect or a split decision on marijuana's effect on frequency of intercourse or oral sex, and pleasure associated with oral sex, as well as pleasure associated with partner's usage. Similarly, the aphrodisiac question was a split decision; 45% viewed marijuana as an aphrodisiac and 44% said no. Yet, very few respondents felt that marijuana would decrease pleasure or have deleterious effects.

DISCUSSION

The results of this study revealed rather complicated attitudes about the effects of marijuana on sexual excitement, yet several general statements are apparent. Enthusiasm for marijuana as an agent that enhanced sexual pleasure was most prominent in the group of experienced smokers, with the non-experienced smokers and non-smokers following in that order. Very few Ss in any of the groups felt that marijuana use would decrease pleasure or have negative effects, yet only the experienced smokers considered marijuana to be an aphrodisiac.

There are at least two possible explanations for the mode of action of marijuana in this regard. The first is that smokers are more inhibited or sexually conflicted and that cannabis use is directed at lessening inhibitions, decreasing anxiety, and/or repressing conflicts. Brill and Christie (1974) in their follow-up study of the psychosocial adaptation of a collegiate population speculated that although users are sexually more active, they are also more maladjusted with regard to sex and marriage. If marijuana is being used to diminish sexual inhibitions, the mechanism might be similar to the punishment-lessening effects of benzodiazepines (Stein, Belluzzi, & Wise, 1977). Winstead and his associates (Winstead, Blackwell, & Lawson, 1978) have viewed drug use as a biological coping device aimed at decreasing an individual's level of discomfort, which is seen as a combination of internal personality susceptibility and external environmental stress. Such a theory would view marijuana use at the time of a sexual encounter as an individual's attempt to cope with the stress of the situation.

An alternate explanation is that marijuana enhances sexual pleasure by a direct euphorogenic mechanism. Research by Heath and his associates (Heath, 1964, 1972; Heath & Gallant, 1964; Heath, John, & Fontana, 1968) suggests that the active constituents of marijuana produce a unique effect on the activity of brain cells associated with pleasurable feelings. Other data confirm this, as marijuana users have been found to begin sexual experience at an earlier age and to have more sexual experience as well as a more liberal attitude toward sex (Hochman & Brill, 1973). Pleasure enhancement also might be related to marijuana's reported influence on temporal span of awareness and the secondary increase in concentration on present events (Melges, Tinklenberg, Hollister, & Gillespie, 1971).

Obviously both mechanisms might be possible in different individuals or in the same individual at different points in time. Alternately, the effects merely may be dose-related.

Unfortunately, our present study does not answer this question of mode of action. Further research is necessary before any definitive answers are available. Nevertheless, the possibility that marijuana has a role as a treatment adjunct for sexual dysfunctions should be explored.

When one is considering the results of this study, it is important to note several limitations. As is true in much survey research, the validity of individual responses is almost impossible to verify, although an attempt to do so has been made here by inclusion of the Lie scale items from the MMPI. Also, the limited nature of the sample in terms of socioeconomic background must be considered as well. Obviously generalization beyond equivalent samples is questionable at best. Problems of multiple drug use and the confounding effects of drug interactions have not been addressed in spite of the known pattern of simultaneous alcohol and marijuana use (Kandel & Faust, 1975). It is the intention of the authors to present these findings not as conclusive, but for their heuristic value for further investigations.

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Psychological Effects, Personality and Behavioral Changes Attributed to Marihuana Use

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Abstract

Data from 530 marihuana users on the psychological effects, personality and behavioral changes attributed to their marihuana use are presented. Age, sex, marital status, and educational level are reported. Data were analyzed according to five use patterns: (1) trial users, (2) past users, (3) occasional users, (4) regular users, and (5) daily users. Ss reported on the occurrence of 33 psychological effects of marihuana, changes in 14 behavioral and personality variables, effect on alcohol and tobacco consumption, effect on sexual orientation, and reasons for marihuana use.

Results are consistent in that as marihuana use increases, there is an increase in pleasurable effects and beneficial results in personality and behavioral realms and a decrease in negative and untoward sequelae. Trial users report the least pleasant effects and the greatest untoward effects, and past users report considerably less benefits than current users.

The recent volume *Marihuana: A Signal of Misunderstanding* (Shafer et al., 1972), the official report of the National Commission on Marihuana and Drug Abuse, has increased the already widespread interest in the marihuana phenomenon. Until the past 6 or 7 years, most reports of the effects of marihuana were either anecdotal in style or based on poorly designed studies from abroad. More recently there have been laboratory studies on the physiological effects of marihuana (e.g., Isbell, 1967; Weil, Zinberg, and Nelsen, 1968); effect on human performance (e.g., Clarke, 1971; Crancer, 1969; Jones and Stone, 1969; Kiplinger, 1971); and clinical reports on adverse reactions such as feelings of confusion and disorientation (e.g., Smith and Mehl, 1970); depression, panic, and depersonalization (e.g., Keeler, 1967); anxiety and paranoia (e.g., Durham, 1968); and psychotic reactions (e.g., Hekimian and Gershon, 1968). Especially among social scientists there is a trend away from an attempt to relate marihuana use to specific behavioral effects, such as opiate addiction or criminal activity, and to explore the complexity of factors which determine functional use or abuse of marihuana (e.g., Blum, 1969; Blumer, 1967; Fisher and Strantz, 1972; Goode, 1970; Kaplan, 1970; McGlothlin and West, 1968; Smith and Mehl, 1970). The Canadian Commission of Inquiry into the Non-Medical Use of Drugs (Canadian Interim Report, 1970) has concluded, ". . . the psychological effects of cannabis vary greatly with a number of factors and are often difficult to predict. . . (and) depend to a considerable degree on the personality of the user, his past experience with cannabis or other drugs, his attitudes and the setting in which the drug is used."

The present study reports on the natural use of marihuana and presents data on the reported psychological effects of marihuana, the personality and behavioral changes attributed to marihuana use, and the reasons given for use. These data are self-report data and contain all the limitations inherent in such a study.

THE SAMPLE

The sample consists of 530 Ss. Each S completed a 220-item questionnaire. The data were collected in 1969-1970 and sampling was conducted

using two methods: The social network method and random sampling utilizing voter registration lists. The locale was predominantly Southern California. For the social network method, questionnaires were distributed to acquaintances of the researchers who were asked to enlist the cooperation of their marihuana-using friends. A cover letter explaining the research as well as a stamped, return-addressed envelope accompanied the questionnaire. Anonymity of respondents was assured. Since we were primarily interested in an adult middle to upper class sample, an attempt was made to restrict social networks to this population. However, college and university students were included in these networks. In order to broaden the base of sampling, random sampling, from voter registration lists from Los Angeles County, was conducted. Precincts that were predominantly middle-upper to upper class were utilized. The return rate from the mail-out questionnaire was 35%. Of those 525 usable returned questionnaires, 98 were from *Ss* who had used or were currently using marihuana. Thus the user rate from this sample was 18.7%. Of the total 530 users studied, 98 (18.5%) were from the random mail-out sample.

For analysis the sample was categorized according to marihuana use pattern. The following categories were established: (1) *Trial users*: $N = 47$ (*Ss* who had only used marihuana from one to three times); (2) *past users*: $N = 79$ (*Ss* who had used marihuana in the past but who currently considered themselves nonusers); (3) *occasional users*: $N = 147$ (*Ss* whose current use was less than once per week); (4) *regular users*: $N = 200$ (*Ss* who use at least once per week to those who use up to 6 days a week); (5) *daily users*: $N = 57$ (*Ss* who use at least once every day).

DEMOGRAPHIC CHARACTERISTICS OF SAMPLE

Age

Age distribution by marihuana use group is given in Table 1. The

Table 1
Age Distribution by Marihuana Use Groups

Age	Trial users		Past users		Occasional users		Regular users		Daily users	
	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>
20 and under	21.7	(10)	17.9	(14)	12.4	(18)	31.2	(62)	28.6	(16)
21-30	47.8	(22)	57.7	(45)	57.2	(83)	57.8	(115)	58.9	(33)
31-40	17.4	(8)	12.8	(10)	17.9	(26)	8.0	(16)	8.9	(5)
Over 40	13.0	(6)	11.5	(9)	12.4	(18)	3.0	(6)	3.6	(2)

majority of users in all use groups are in the 21 to 30 year age bracket. The range in age was from 16 to 66 years. The sample is essentially of adults with a tendency for the more frequent users to be younger.

Sex

Sex distribution by marijuana use groups is given in Table 2. The sample consisted of 300 males and 224 females. There was a tendency for the more frequent users to be male and for the occasional users to be female. Trial and past use groups did not differ in sex composition.

Table 2
Sex Distribution by Marijuana Use Group

Sex	Trial users		Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N	%	N
Male	47.8	(22)	47.4	(37)	61.4	(89)	59.3	(118)	60.7	(34)
Female	52.2	(24)	52.6	(41)	38.6	(56)	40.7	(81)	39.3	(22)

Marital Status

Marital status by marijuana use group is shown in Table 3. The majority of respondents in all categories are single. The regular and daily users have the highest percentage of single respondents, and part of this is undoubtedly due to their being a younger group. About 10% of Ss in all use categories are divorced or separated.

Table 3
Marital Status by Marijuana Use Group

Marital status	Trial users		Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N	%	N
Single	50.0	(23)	55.3	(42)	54.6	(77)	70.9	(139)	64.3	(36)
Married	41.3	(19)	35.5	(27)	33.3	(47)	17.9	(35)	25.0	(14)
Divorced/ separated	8.7	(4)	9.2	(7)	9.9	(14)	10.2	(20)	10.7	(6)
Widowed	0	(0)	0	(0)	2.1	(3)	1.0	(2)	0	(0)

Educational Level

Educational level by marijuana use group is shown in Table 4. The sample is fairly well educated with only a small percentage of Ss having

less than some college education. Occasional users are the best educated—64.4% having baccalaureate or graduate degrees, and the trial users the least educated—13.3% having less than some college education.

Table 4
Educational Level by Marihuana Use Groups

Education	Trial users		Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N	%	N
Less than high school	2.2	(1)	0	(0)	0.7	(1)	1.5	(3)	5.4	(3)
High school graduate	11.1	(5)	6.3	(5)	2.7	(4)	4.1	(8)	1.8	(1)
Some college	51.1	(23)	46.8	(37)	32.2	(47)	60.4	(119)	57.1	(32)
College graduate	17.8	(8)	22.8	(18)	24.7	(36)	15.2	(30)	23.2	(13)
Graduate or professional degree	17.8	(8)	24.1	(19)	39.7	(58)	18.8	(37)	12.5	(7)

PSYCHOLOGICAL EFFECTS OF MARIHUANA

Respondents were asked about the feelings and experiences that occur to them when using marihuana. The question was asked "Check the following words which you would use to describe the feelings and experiences *you* have with marihuana." Table 5 shows the results of this question. The phenomena are listed from the most frequently checked to the least frequently checked for the total group. It is readily apparent that Ss use marihuana because they have more pleasant than unpleasant experiences. Of the 33 phenomena studied, 14 can be considered desirable, 12 undesirable, and seven neutral, depending on a S's reaction to the phenomenon (e.g., distortion of time sense, altered depth perception, openness to suggestion). Of the 16 top ranked occurring phenomena, 10 are positively valued, six neutrally valued, and none negatively valued. Among the 10 lowest ranked occurring phenomena, eight are negatively valued, one neutrally valued, and one positively valued.

Over half of all Ss experience tranquility (73.3%), increased sensory awareness (69.3%), hunger (68.9%), giggles (64.8%), distortion of time sense (63.3%), and drowsiness (56.3%). Over 40% of all Ss experience euphoria (49.6%), introspectiveness (45.8%), difficulty with concentration (43.2%), love for fellow man (40.7%), and psychological insight (40.7%). About one-third of all Ss report experiencing eroticism (39.6%), openness

Table 5
Marihuana-Induced Phenomena Experienced by Subjects by Use Pattern Groups

Item	Rank frequency	Total Ss reporting		Trial users		Past users		Occasional users		Regular users		Daily users	
		%	N	%	N	%	N	%	N	%	N	%	N
Tranquility	1	73.3	(387)	40.4	(19)	53.8	(42)	77.0	(114)	81.4	(162)	89.3	(50)
Increased sensory awareness	2	69.3	(366)	31.9	(15)	53.8	(42)	67.6	(100)	81.9	(163)	82.1	(46)
Hunger	3	68.9	(364)	25.5	(12)	64.1	(50)	59.5	(88)	82.4	(164)	89.3	(50)
Giggles	4	64.8	(342)	34.0	(16)	57.7	(45)	66.2	(98)	73.9	(147)	64.3	(36)
Distortion of time sense	5	63.3	(334)	36.2	(17)	57.7	(45)	60.8	(90)	72.9	(145)	66.1	(37)
Drowsiness	6	56.3	(297)	17.0	(8)	61.5	(48)	58.1	(86)	63.3	(126)	51.8	(29)
Euphoria	7	49.6	(262)	23.4	(11)	32.1	(25)	48.0	(71)	59.3	(118)	66.1	(37)
Introspectiveness	8	45.8	(242)	12.8	(6)	30.8	(24)	41.9	(62)	57.8	(115)	62.5	(35)
Difficulty with concentration	9	43.2	(228)	21.3	(10)	55.1	(43)	31.8	(47)	53.3	(106)	39.3	(22)
Love for fellow man	10, 5	40.7	(215)	12.8	(6)	32.1	(25)	35.1	(52)	50.8	(101)	55.4	(31)
Psychological insight	10, 5	40.7	(215)	6.4	(3)	24.5	(23)	27.7	(41)	58.8	(117)	55.4	(31)
Eroticism	12	39.6	(209)	12.8	(6)	33.3	(26)	39.9	(59)	48.2	(96)	39.3	(22)
Openness to suggestion	13	36.2	(191)	10.6	(5)	33.3	(26)	25.0	(37)	44.7	(89)	60.7	(34)
Heightened creativity	14	32.8	(173)	6.4	(3)	17.9	(14)	25.0	(37)	43.7	(87)	57.1	(32)
Greater honesty	15	30.5	(161)	6.4	(3)	21.8	(17)	25.7	(38)	36.2	(72)	55.4	(31)
Altered depth perception	16	25.6	(135)	21.3	(10)	26.9	(21)	21.6	(32)	30.7	(61)	19.6	(11)
Depression	17	23.7	(125)	14.9	(7)	33.3	(26)	16.9	(25)	29.1	(58)	16.1	(9)
Fear	18	23.3	(123)	19.1	(9)	25.6	(20)	19.6	(29)	26.6	(53)	21.4	(12)
Synesthesia	19	22.5	(119)	4.3	(2)	19.2	(15)	19.6	(29)	27.1	(54)	33.9	(19)
Greater ability to concentrate	20	22.2	(117)	12.8	(6)	3.9	(3)	22.3	(33)	25.6	(51)	42.9	(24)

Sadness	21	21.2 (112)	14.9 (7)	23.1 (18)	19.6 (29)	22.1 (44)	25.0 (14)
Self-consciousness or embarrassment	22	18.6 (98)	10.6 (5)	19.2 (15)	9.5 (14)	25.1 (50)	25.0 (14)
Religious or mystical feelings	23	18.0 (95)	2.1 (1)	14.1 (11)	13.5 (20)	22.1 (44)	33.9 (19)
Hallucinations	24	17.2 (91)	8.5 (4)	15.4 (12)	12.8 (19)	19.1 (38)	32.1 (18)
Hyperactivity	25	15.5 (82)	6.4 (3)	11.5 (9)	10.1 (15)	20.1 (40)	26.8 (15)
Better judgment	26	13.4 (71)	2.1 (1)	5.1 (4)	6.8 (10)	19.1 (38)	32.1 (18)
Telepathy	27.5	12.5 (66)	6.4 (3)	10.3 (8)	7.4 (11)	16.1 (32)	21.4 (12)
Poor judgment	27.5	12.5 (66)	8.5 (4)	24.4 (19)	8.1 (12)	12.6 (25)	10.7 (6)
Headaches	29	11.4 (60)	14.9 (7)	14.1 (11)	8.1 (12)	10.6 (21)	16.1 (9)
Grandeur or feeling of omnipotence	30	8.5 (45)	2.1 (1)	11.5 (9)	7.4 (11)	7.5 (15)	16.1 (9)
Nausea	31	7.4 (39)	4.3 (2)	14.1 (11)	8.1 (12)	4.0 (8)	10.7 (6)
Anger	32	4.2 (22)	0.0 (0)	2.6 (2)	5.4 (8)	4.5 (9)	5.4 (3)
Less honesty	33	2.8 (15)	2.1 (1)	5.1 (4)	.7 (1)	3.0 (6)	5.4 (3)

to suggestion (36.2%), heightened creativity (32.8%), and greater honesty (30.5%). Fewer than 10% of all Ss experienced grandeur or feelings of omnipotence (8.5%), nausea (7.4%), anger (4.2%), and being less honest (2.8%). The most frequently reported negatively valued phenomena are depression and fear, and these two reactions are reported by 23.7 and 23.3% of Ss, respectively.

Consequently, Ss using marihuana report experiencing considerably more pleasant than unpleasant phenomena, and what we have conservatively called neutral phenomena (e.g., openness to suggestion, altered depth perception) are probably experienced more as a pleasant effect rather than as a negative effect.

Table 6 is generated from the data in Table 5 and reports the ranked frequency of reported phenomena by use pattern group. An attempt was made to determine if there was a difference in reported effects by Ss with differing use patterns. As use increases there is an increase in the reported frequency of the varying phenomena. This is understandable in that the more one uses marihuana, the more likely the occurrence of a variety of psychic effects. There are marked differences among use pattern groups in the frequency of the occurrence of certain phenomena. As use increases, there is an increase in the reporting of positively valued phenomena. Trial users report the least pleasant experience and the most unpleasant experiences. This would undoubtedly relate to their not becoming marihuana users in that their experiences were not that pleasant. For example, of the 13 most frequently reported phenomena for trial users, only four are positively valued, four negatively valued, and five neutrally valued whereas for daily users, of the 13 most frequently reported phenomena, nine are positively valued, none are negatively valued, and four are neutrally valued. In addition, what we have called "neutrally" valued probably become positively valued as marihuana use increases. It is of interest that characteristic but unusual phenomena which might be distressing to the novice is less prominent to the habitual user. For example, *altered depth perception* is ranked seventh by trial users, fifteenth by past users, seventeenth by occasional users, sixteenth by regular users, and twenty-sixth by daily users. Obviously, adaptation to this characteristic phenomenon occurs with increased use, and it becomes less prominent in the consciousness of the user. This same phenomenon apparently applies to *difficulty with concentration*, which is ranked seventh by trial users, fifth by past users, eleventh by occasional users, tenth by regular users, and fifteenth by daily users. *Distortion of time sense*, another characteristic phenomenon, apparently does not "adapt" in the same fashion, as this

phenomenon is ranked high by all groups: second by trial users, third by past users, fourth by occasional users, fifth by regular users, and fourth by daily users. *Hunger* is also among the top five ranked phenomena by all use pattern groups.

It is interesting to observe the difference among groups in reported *drowsiness*. Trial users rank it tenth, past users second, occasional and regular users sixth, and daily users thirteenth. Although it is somewhat pretentious to speculate on the dynamics of these differences, it may be that trial users did not relax enough to get the drowsiness sensation, past users had it so frequently so as to make the experience uninteresting, occasional and regular users experience it as part of the total marihuana experience, and daily users have integrated use into their life style to such an extent that marihuana ceases to dull the consciousness as it does in less frequent users.

Post-marihuana *depression* is a sometimes complaint of marihuana users. Past users rank depression ninth and trial users rank it twelfth, whereas occasional users rank it twenty-one, regular users seventeenth, and daily users twenty-eighth. Consequently there is a large difference in the occurrence of depression among use pattern groups with past users reporting the greatest, and daily users the least prominence of this phenomenon in their marihuana experience.

Great differences also occur among use pattern groups in the prominence of other negatively valued phenomenon: *fear* is ranked ninth by trial users, sixteenth by past users, and twenty-fourth by daily users; *headaches* are ranked twelfth by trial users, and twenty-seventh, twenty-ninth, and twenty-eighth by occasional, regular, and daily users, respectively; *sadness* is ranked twelfth by trial users and twenty-second by regular and daily users.

The greatest differences among use pattern groups appear to be in the prominence and frequency of positively valued phenomena. Positive psychologically oriented phenomena are reported more frequently as use increases. For example, *heightened creativity* is ranked ninth by daily users (57.1%), fourteenth by regular users (43.7%), fourteenth by occasional users (25.0%), twenty-second by past users (17.9%), and twenty-fourth by trial users (6.4%). *Greater honesty* is ranked eleventh by daily users (55.4%), fifteenth by regular users (36.2%), thirteenth by occasional users (25.7%), nineteenth by past users (21.8%), and twenty-fourth by trial users (6.4%). *Introspectiveness* is ranked seventh by daily users (62.5%), ninth by regular users (57.8%), thirteenth by past users (30.8%), and fifteenth by trial users (12.8%). *Euphoria* is ranked fourth by daily

Table 6

Rank	Trial users	Percentage of Ss reporting	Rank	Past users	Percentage of Ss reporting	Rank	Occasional users	Percentage of Ss reporting
1	Tranquility	(40.4)	1	Hunger	(64.1)	1	Tranquility	(77.0)
2	Distortion of time sense	(36.2)	2	Drowsiness	(61.5)	2	Increased sensory awareness	(67.6)
3	Giggles	(34.0)	3.5	Giggles	(57.7)	3	Giggles	(66.2)
4	Increased sensory awareness	(31.9)	3.5	Distortion of time sense	(57.7)	4	Distortion of time sense	(60.8)
5	Hunger	(25.5)	5	Difficulty with concentration	(55.1)	5	Hunger	(59.5)
6	Euphoria	(23.4)	6.5	Tranquility	(53.8)	6	Drowsiness	(58.1)
7.5	Altered depth perception	(21.3)	6.5	Increased sensory awareness	(53.8)	7	Euphoria	(48.0)
7.5	Difficulty with concentration	(21.3)	9	Eroticism	(33.3)	8	Introspectiveness	(41.9)
9	Fear	(19.1)	9	Depression	(33.3)	9	Eroticism	(39.9)
10	Drowsiness	(17.0)	9	Openness to suggestion	(33.3)	10	Love for fellow man	(35.1)
12	Headaches	(14.9)	11.5	Euphoria	(32.1)	11	Difficulty with concentration	(31.8)
12	Sadness	(14.9)	11.5	Love for fellow man	(32.1)	12	Psychological insight	(27.7)
12	Depression	(14.9)	13	Introspectiveness	(30.8)	13	Greater honesty	(25.7)
15.5	Introspectiveness	(12.8)	14	Psychological insight	(29.5)	14.5	Openness to suggestion	(25.0)
15.5	Love for fellow man	(12.8)	15	Altered depth perception	(26.9)	14.5	Heightened creativity	(25.0)
15.5	Eroticism	(12.8)	16	Fear	(25.6)	16	Greater ability to concentrate	(22.3)
15.5	Greater ability to concentrate	(12.8)	17	Poor judgment	(24.4)	17	Altered depth perception	(21.6)

Rank Order of Marihuana-Induced Experiences by Use Pattern Groups

Rank	Regular users	Percentage of Ss reporting	Rank	Daily users	Percentage of Ss reporting
1	Hunger	(82.4)	1.5	Tranquility	(89.3)
2	Increased sensory awareness	(81.9)	1.5	Hunger	(89.3)
3	Tranquility	(81.4)	3	Increased sensory awareness	(82.1)
4	Giggles	(73.9)	4.5	Distortion of time sense	(66.1)
5	Distortion of time sense	(72.9)	4.5	Euphoria	(66.1)
6	Drowsiness	(63.3)	6	Giggles	(64.3)
7	Euphoria	(59.3)	7	Introspectiveness	(62.5)
8	Psychological insight	(58.8)	8	Openness to suggestion	(60.7)
9	Introspectiveness	(57.8)	9	Heightened creativity	(57.1)
10	Difficulty with concentration	(53.3)	11	Greater honesty	(55.4)
11	Love for fellow man	(50.8)	11	Love for fellow man	(55.4)
12	Eroticism	(48.2)	11	Psychological insight	(55.4)
13	Openness to suggestion	(44.7)	13	Drowsiness	(51.8)
14	Heightened creativity	(43.7)	14	Greater ability to concentrate	(42.9)
15	Greater honesty	(36.2)	15.5	Difficulty with concentration	(39.3)
16	Altered depth perception	(30.7)	15.5	Eroticism	(39.3)
17	Depression	(29.1)	17.5	Synesthesia	(33.9)

(continued)

Table 6

Rank	Trial users	Percentage of Ss reporting	Rank	Past users	Percentage of Ss reporting	Rank	Occasional users	Percentage of Ss reporting
18.5	Self-consciousness or embarrassment	(10.6)	18	Sadness	(23.1)	19	Sadness	(19.6)
18.5	Openness to suggestion	(10.6)	19	Greater honesty	(21.8)	19	Fear	(19.6)
20.5	Poor judgment	(8.5)	20.5	Synesthesia	(19.2)	19	Synesthesia	(19.6)
20.5	Hallucinations	(8.5)	20.5	Self-consciousness or embarrassment	(19.2)	21	Depression	(16.9)
24	Psychological insight	(6.4)	22	Heightened creativity	(17.9)	22	Religious or mystical feelings	(13.5)
24	Heightened creativity	(6.4)	23	Hallucinations	(15.4)	23	Hallucinations	(12.8)
24	Greater honesty	(6.4)	25	Nausea	(14.1)	24	Hyperactivity	(10.1)
24	Telepathy	(6.4)	25	Headaches	(14.1)	25	Self-consciousness or embarrassment	(9.5)
24	Hyperactivity	(6.4)	25	Religious or mystical feelings	(14.1)	27	Headaches	(8.1)
27.5	Nausea	(4.3)	27.5	Hyperactivity	(11.5)	27	Poor judgment	(8.1)
27.5	Synesthesia	(4.3)	27.5	Grandeur or feelings of omnipotence	(11.5)	27	Nausea	(8.1)
30.5	Less honesty	(2.1)	29	Telepathy	(10.3)	29.5	Grandeur or feelings of omnipotence	(7.4)
30.5	Better judgment	(2.1)	30.5	Better judgment	(5.1)	29.5	Telepathy	(7.4)
30.5	Religious or mystical feelings	(2.1)	30.5	Less honesty	(5.1)	31	Better judgment	(6.8)
30.5	Grandeur or feelings of omnipotence	(2.1)	32	Greater ability to concentrate	(3.9)	32	Anger	(5.4)
33	Anger	(0.0)	33	Anger	(2.6)	33	Less honesty	(0.7)

(continued)

Rank	Regular users	Percentage of Ss reporting	Rank	Daily users	Percentage of Ss reporting
18	Synesthesia	(27. 1)	17. 5	Religious or mystical feelings	(33. 9)
19	Fear	(26. 6)	19. 5	Better judgment	(32. 1)
20	Greater ability to concentrate	(25. 6)	19. 5	Hallucinations	(32. 1)
21	Self-consciousness or embarrassment	(25. 1)	21	Hyperactivity	(26. 8)
22. 5	Sadness	(22. 1)	22. 5	Sadness	(25. 0)
22. 5	Religious or mystical feelings	(22. 1)	22. 5	Self-consciousness or embarrassment	(25. 0)
24	Hyperactivity	(20. 1)	24. 5	Telepathy	(21. 4)
25. 5	Better judgment	(19. 1)	24. 5	Fear	(21. 4)
25. 5	Hallucinations	(19. 1)	26	Altered depth perception	(19. 6)
27	Telepathy	(16. 1)	28	Headaches	(16. 1)
28	Poor judgment	(12. 6)	28	Depression	(16. 1)
29	Headaches	(10. 6)	28	Grandeur or feelings of omnipotence	(16. 1)
30	Grandeur or feelings of omnipotence	(7. 4)	30. 5	Nausea	(10. 7)
31	Anger	(4. 5)	30. 5	Poor judgment	(10. 7)
32	Nausea	(4. 0)	32. 5	Anger	(5. 4)
33	Less honesty	(3. 0)	32. 5	Less honesty	(5. 4)

users (66.1%), seventh by regular users (59.3%), and eleventh by past users (32.1%). It is of interest to note that *greater ability to concentrate* is reported by 42.9% of daily users and ranked fourteenth, whereas only 3.9% of past users reported this phenomenon and ranked it thirty-second. It is also of interest that *eroticism* is ranked highest (ninth) by occasional (39.9%) and past users (33.3%), followed by regular users (48.2%) who rank it twelfth, and ranked equally low (fifteenth) by trial (12.8%) and daily users (39.3%). Thus eroticism appears to be of less prominence for daily and regular users than for less frequent users, and this may be because eroticism is less integrated for less frequent users than for more frequent users. Worth comment is the fact that few Ss report feelings of *anger* with marihuana. Anger is ranked thirtieth by daily, thirty-first by regular, thirty-second by occasional, and thirty-third by past and trial users. *Less honesty* is another infrequently reported phenomenon by all groups: ranked last by daily, regular, and occasional users, and thirtieth by past and trial users. *Poor judgment* is ranked low by current users: thirtieth by daily, twenty-eighth by regular, and twenty-seventh by occasional users, but ranked considerably higher (seventeenth) by past users and twentieth by trial users. *Hallucinations*, a supposedly common phenomenon with marihuana use, is ranked relatively low by all groups: twentieth by trial, twenty-third by past and occasional, twenty-fifth by regular, and nineteenth by daily users.

Thus the differences in experienced phenomena by use pattern groups are fairly clear: those who use it most report the greatest frequency of the most favorable phenomena and the least relative occurrence of negatively valued phenomenon, whereas past users and trial users, respectively, report the highest relative occurrence of negatively valued phenomena and the lowest relative occurrence of positively valued phenomena.

CHANGE IN SEXUAL ORIENTATION, AND ALCOHOL AND TOBACCO CONSUMPTION AS AN EFFECT OF MARIHUANA USE

Respondents were asked if the use of marihuana had altered their sexual orientation. Of the 495 Ss answering this item, 88.3% answered that marihuana use had no effect on their sexual orientation whereas 11.7% stated it had had some effect. Four Ss (0.9%) (one past user, two occasional users, and one daily user) stated their sexual orientation had changed in the direction of homosexuality; 24 Ss (4.9%) (two past users, three occasional users, 15 regular users, and four daily users) stated their

sexual orientation had changed in the direction of heterosexuality; and 30 Ss (6.1 %) (one trial user, one past user, five occasional users, 17 regular users, and six daily users) stated their sexual orientation had changed in the direction of bisexuality. For this latter category, we have no data indicating what percentage of Ss who were tending toward a bisexual orientation were previously exclusively heterosexual and what percentage had previously been exclusively homosexual. Thus the most frequent change (6.1 %) in sexual orientation is toward bisexuality, followed by a change (4.9 %) toward heterosexuality, with few Ss (0.9 %) changing toward homosexuality. These data do not support the contention that marihuana use causes marked changes in sexual orientation.

Respondents were asked if marihuana had altered their use of alcohol. Table 7 shows the results of this question by use pattern group. As marihuana use increases, there is a decrease in the use of alcohol. Very few Ss (total of 13) report an increase in alcohol consumption. The percentage of Ss reporting a decrease in alcohol consumption rises sharply as marihuana use increases. These data tend to support the contention that marihuana replaces alcohol use. Other data available indicate that when Ss were asked their use of alcohol, current users reported more use of alcohol than nonusers or past users. Thus it is not that marihuana users use less alcohol than nonusers, but that the more they use marihuana, the less they use alcohol. A confounding factor in these data, however, is that wine consumption was not separated out from use of hard liquor. It is apparently a very common practice that wine and marihuana are used simultaneously. Consequently marihuana users reported usage of alcohol may be highly determined by their use of wine rather than hard liquor. When Ss were asked if the reasons for their use of marihuana

Table 7
Effect of Marihuana in Changing Use of Alcohol by Use Pattern Group

Change in alcohol use	Use pattern group									
	Trial users		Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N	%	N
Alcohol increased	3.0	(1)	1.3	(1)	0.7	(1)	4.7	(9)	1.8	(1)
Alcohol decreased	6.1	(2)	14.7	(11)	27.5	(39)	41.7	(80)	60.0	(33)
No change	90.1	(30)	84.0	(63)	71.8	(102)	53.6	(103)	38.2	(21)
		(33)		(75)		(142)		(192)		(55)

Table 8
Effect of Marihuana Use on Tobacco Use by Use Pattern Group

Change in tobacco use	Use pattern group							
	Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N
Tobacco increase	5.4	(4)	2.9	(4)	10.5	(20)	10.9	(6)
Tobacco decrease	12.2	(9)	5.0	(7)	12.1	(23)	29.1	(16)
No change	82.4	(61)	92.1	(129)	77.4	(147)	60.0	(33)
		(74)		(140)		(190)		(55)

paralleled most peoples use of alcohol, among the current users there was an inverse relationship between answering this question positively and frequency of marihuana use. That is, 66.9% of occasional users, 42.7% of regular users, and 34.6% of daily users answered "yes," i.e., that their *reasons* for using marihuana were the same as most peoples' *reasons* for using alcohol. Thus it appears that as an individual's marihuana use increases, his use of alcohol declines, that the heavier the use of marihuana, the less likely is the individual to judge the reason for his use of marihuana parallels other peoples' reason for using alcohol, but that in frequency of use, the heavier the use of marihuana, the heavier the use of alcohol. This last fact, however, might be highly contaminated by the use of wine by marihuana users rather than hard liquor, though we have no data on this factor.

Respondents were asked if their marihuana use had increased, decreased, or had no effect on their use of tobacco. Table 8 shows the results of this question by use pattern group. The majority of respondents in all use groups state that marihuana use has had no effect on their tobacco consumption. Very few respondents (from 2.9 to 10.9%) state their tobacco use has increased as a function of their marihuana use. Twice as many daily users (29.1%) than any other use group state that their tobacco consumption has *decreased* as a function of their marihuana use. Consequently marihuana use does not appear to affect tobacco consumption with the exception of daily marihuana users, 29.1% of whom state their tobacco consumption decreased as a function of marihuana use.

CHANGES IN ATTRIBUTES OF SELF AS A FUNCTION OF MARIHUANA USE

Respondents were asked if they attributed any change in themselves in a number of areas in their life as a function of their use of marihuana. Table 9 shows the results of this question.

Table 9
*Changes in Attributes of Self as a Function of Marihuana Use
 by Use Pattern Group*

	Use pattern group							
	Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N
Self-knowledge								
Increased	30.4	(21)	34.3	(48)	59.3	(115)	70.9	(39)
Decreased	1.5	(1)	0.0	(0)	0.0	(0)	0.0	(0)
No change	47.8	(33)	54.3	(76)	32.5	(63)	20.0	(11)
Doesn't apply	20.3	(14)	11.4	(16)	8.3	(16)	9.1	(5)
Self-approval								
Increased	8.7	(6)	21.4	(30)	35.9	(69)	56.4	(31)
Decreased	13.0	(9)	2.1	(3)	2.1	(4)	1.8	(1)
No change	56.5	(39)	64.3	(90)	47.9	(92)	30.9	(17)
Doesn't apply	21.7	(15)	12.1	(17)	14.1	(27)	10.9	(6)
Sexual pleasure								
Increased	25.4	(17)	33.6	(47)	57.5	(111)	69.8	(37)
Decreased	1.5	(1)	0.7	(1)	1.0	(2)	0.0	(0)
No change	53.7	(36)	56.4	(79)	34.2	(66)	26.4	(14)
Doesn't apply	19.4	(13)	9.3	(13)	7.3	(14)	3.8	(2)
Enjoyment of music, movies, paintings, TV								
Increased	36.2	(25)	55.4	(77)	81.4	(158)	83.3	(45)
Decreased	0.0	(0)	0.7	(1)	0.0	(0)	0.0	(0)
No change	43.5	(30)	37.4	(52)	16.0	(31)	14.8	(8)
Doesn't apply	20.3	(14)	6.5	(9)	2.6	(5)	1.9	(1)
Enjoyment of nature								
Increased	34.8	(24)	46.7	(64)	75.5	(145)	75.9	(41)
Decreased	1.5	(1)	0.7	(1)	0.0	(0)	0.0	(0)
No change	46.4	(32)	46.7	(64)	20.3	(39)	22.2	(12)
Doesn't apply	17.4	(12)	5.8	(8)	4.1	(8)	1.9	(1)
Ability to communicate with others								
Increased	18.6	(13)	25.0	(35)	47.1	(89)	63.5	(33)
Decreased	5.7	(4)	0.7	(1)	2.7	(5)	1.9	(1)
No change	58.6	(41)	62.9	(88)	40.7	(77)	30.8	(16)
Doesn't apply	17.1	(12)	11.4	(16)	9.5	(18)	3.9	(2)
Ability to think through problems								
Increased	10.3	(7)	12.1	(17)	22.4	(43)	39.6	(21)
Decreased	11.8	(8)	3.6	(5)	7.3	(14)	3.8	(2)
No change	58.8	(40)	73.6	(103)	62.0	(119)	54.7	(29)
Doesn't apply	19.1	(13)	10.7	(15)	8.3	(16)	1.9	(1)

(continued)

Table 9 (continued)

	Use pattern group							
	Past users		Occasional users		Regular users		Daily users	
	%	N	%	N	%	N	%	N
Creativity, imagination								
Increased	10.3	(7)	23.0	(32)	49.0	(94)	63.0	(34)
Decreased	7.4	(5)	0.7	(1)	0.5	(1)	1.9	(1)
No change	61.8	(42)	66.2	(92)	44.8	(86)	33.3	(18)
Doesn't apply	20.6	(14)	10.1	(14)	5.7	(11)	1.9	(1)
Memory								
Increased	3.0	(2)	2.9	(4)	6.8	(13)	15.1	(8)
Decreased	16.4	(11)	7.9	(11)	20.4	(39)	20.8	(11)
No change	59.7	(40)	77.0	(107)	67.0	(128)	62.3	(33)
Doesn't apply	20.9	(14)	12.2	(17)	5.8	(11)	1.9	(1)
Mystical interest								
Increased	19.4	(13)	23.0	(32)	43.0	(83)	52.8	(28)
Decreased	1.5	(1)	1.4	(2)	1.0	(2)	1.9	(1)
No change	55.2	(37)	59.7	(83)	44.0	(85)	41.5	(22)
Doesn't apply	23.9	(16)	15.8	(22)	11.9	(23)	3.8	(2)
Sense of responsibility								
Increased	4.4	(3)	6.4	(9)	10.4	(20)	18.9	(10)
Decreased	15.9	(11)	3.6	(5)	12.5	(24)	9.4	(5)
No change	60.9	(42)	73.6	(103)	66.1	(127)	66.0	(35)
Doesn't apply	18.8	(13)	16.4	(23)	10.9	(21)	5.7	(3)
Acceptance of conventional values								
Increased	5.9	(4)	0.7	(1)	3.6	(7)	5.6	(3)
Decreased	32.4	(22)	37.7	(52)	58.0	(112)	61.1	(33)
No change	41.2	(28)	51.4	(71)	26.9	(52)	24.1	(13)
Doesn't apply	20.6	(14)	10.1	(14)	11.4	(22)	9.3	(5)
Conformity to conventional modes of behavior								
Increased	0.0	(0)	0.7	(1)	2.1	(4)	1.9	(1)
Decreased	25.4	(17)	34.8	(48)	56.5	(109)	64.8	(35)
No change	56.7	(38)	55.1	(76)	32.6	(63)	31.5	(17)
Doesn't apply	17.9	(12)	9.4	(13)	8.8	(17)	1.9	(1)
Conventional religious interest								
Increased	4.4	(3)	3.6	(5)	4.7	(9)	7.6	(4)
Decreased	10.3	(7)	8.0	(11)	18.8	(36)	24.5	(13)
No change	64.7	(44)	70.3	(97)	57.1	(109)	49.1	(26)
Doesn't apply	20.6	(14)	18.1	(25)	19.4	(37)	18.9	(10)

Self-Knowledge and Self-Approval. As marihuana use increases, there is an increase in self-knowledge and self-approval. Among daily users, 70.9% reported an increase of self-knowledge, and only one *S* of the total group reported a decrease in self-knowledge. Daily users also reported the highest increase, 56.4%, in self-approval, and past users reported the highest decrease, 13.0%, in self-approval. Consequently, the more one uses, the greater the probability of his reporting an increase in self-knowledge and self-approval, with no current users reporting a decrease in self-knowledge and a minimum number reporting a decrease in self-approval.

Enjoyment of Nature, Music, Movies, Sexual Pleasures, etc. As marihuana use increases, there is an increase in sexual pleasure. Daily users report the highest increase in sexual pleasure, 69.8%, and past users report the least amount of increase, 25.4%. Only three *Ss* of the total group report a decrease in sexual pleasure. As use increases, there is an increase in the enjoyment of music, movies, painting, TV, etc. A high percentage of regular and daily users, 81.4 and 83.3% respectively, report an increase in enjoyment in these areas. Only one *S* of the total group reported a decrease of enjoyment in these areas. Again, past users report the least increase, 36.2%. As use increases, there is an increase in the enjoyment of nature. Only two *Ss* of the total group report a decrease in this area. A high percentage of regular and daily users, 75.5 and 75.9%, respectively, report an increase in enjoyment of nature.

Ability to Communicate, Think Through Problems, and to be Creative and Imaginative. As marihuana use increases, there is an increase in the ability to communicate with others, to think through problems, and to be creative and imaginative. Only seven current users (about 1%) report a decrease in the ability to communicate, and three report a decrease in the ability to be creative and imaginative. A larger, but still negligible percentage (about 5%), report a decrease in the ability to think through problems. Daily users again report the greatest increase, 63.5%, in ability to communicate and the greatest increase, 63.0%, in creativity and imagination. Past users report the smallest percentage of increase and the largest percentage of decrease in all three areas.

Memory. Among all use groups, the majority of *Ss* report no change in memory. However, 20% of both regular and daily users report a decrease in memory whereas 16% of past users and 8% of occasional users report such a decrease. It is of interest to note that 15% of daily users report an increase in memory function whereas only 7, 3, and 3% of the other use groups report such an increase. Consequently, the ma-

jority of Ss report no change in memory with about 20% of regular and daily users reporting a decrease and 15% of daily users an increase.

Mystical Interest and Conventional Religious Interest. As use increases, there is an increase in mystical interest and a decrease in conventional religious interest. Except for daily users, the majority of users report no change in their interest in conventional religion. Very few Ss report an increase in conventional religious interest and few Ss report a decrease in mystical interest. Daily users report the highest increase, 52.8%, in mystical interest and the highest decrease, 24.5%, in conventional religious interest.

Sense of Responsibility. The majority of all Ss in all use groups report no change in sense of responsibility. As use increases, there is an increase in sense of responsibility, with 18.9% of daily users reporting such an increase. Past users report the highest decrease, 15.9%, in sense of responsibility whereas 12.5% of regular users report a decrease, and 9.4% of daily and 3.6% of occasional users report such a decrease. Consequently, most Ss report no change in sense of responsibility with past users reporting the highest decrease (15.9%) and daily users reporting the highest increase (18.9%).

Conformity to Conventional Modes of Behavior and Acceptance of Conventional Values. As use increases, there is a decrease in acceptance of conventional values and a decrease in conformity to conventional modes of behavior. Very few Ss report an increase in either area. Past users report the least change and daily users the greatest changes in these two areas. There is a greater change for all groups in their value system than there is in their conformity to conventional modes of behavior. Consequently, behavior changes appear more slowly than value changes.

The results of these aspects of attributes of self as a function of marihuana use are not surprising. The greater the use of marihuana, the more favorable the reporting of the consequences of that use. Past users report the least favorable results and the greatest negative results, whereas daily users generally report the greatest favorable results and the least negative results. It is of interest that a very high percentage of users reported favorable results in almost all areas and a negligible number of users reported unfavorable results. The only exception to this is in the area of memory, where one-fifth of daily and regular users report decreases in memory function. This phenomenon is certainly not new and is part of the marihuana folklore.

REASONS FOR USING MARIHUANA

Respondents were asked "How frequently do you take marihuana for the following reasons" and the Ss marked "never," "occasionally," "frequently," or "always" to 16 listed reasons. Table 10 shows the results to this question by use pattern group with the reasons listed in order from the most to least frequent given reason for using as "frequently" or "always."

As use increases, there is an increase in the frequency of using marihuana for a variety of reasons. Daily users use marihuana for a greater variety of reasons more often than do regular users, and they, in turn, use for a greater variety of reasons more often than do occasional users. For example, 44.4% of daily users report "frequent or always" use of marihuana for "developing inner life" whereas 16.7% of regular users and 5.8% of occasional users report using marihuana with that frequency for that reason. Again 29.1% of daily users report "frequent or always" use of marihuana for introspective psychological purposes whereas 15.4% of regular and 9.2% of occasional users report using that often for that purpose. Among daily users, 34.5% report "frequent or always" use for "facilitating creative abilities" whereas 13.9% of regular and 5.8% of occasional users report using marihuana that frequently for that endeavor. This pattern is seen throughout the data and consistently applies to all motivations—the more one uses, the more varied are the reasons for use. Consequently, the greater the use of marihuana, the greater the effects of the drug and the more varied the experiences with the drug. This confirms other data in the study.

The primary reason for using marihuana is "to have fun," supporting the notion that marihuana, regardless of the plethora of reasons for use, is a pleasure-recreational drug. Of note is that this reason is given almost twice as frequently as the second most popular reason. The second most popular reason, like the first, is to increase and sustain pleasure. The third most frequent reason is again in the service of pleasure, i.e., to be relieved of boredom, monotony, and dullness. The fourth ranked reason is of a different quality, that of inducing relaxation by relieving tension. The fifth ranked reason is again in the service of pleasure, specifically sexual pleasure. The next four reasons given are in the area of psychological introspectiveness, creativity, and sociability. Relatively few Ss (about 5%) state that they "frequently or always" use marihuana out of a compulsion or something they feel they have to have. Thus it appears that few Ss

Table 10

Rank order	No. Ss reporting frequent or always	Reason	Occasional users					
			Never		Occasionally		Frequent or always	
			%	N	%	N	%	N
1	280	To have fun	10.6	(15)	25.5	(36)	63.8	(90)
2	147	To make a good mood last longer or to make a fine feeling into an even better one	30.7	(43)	45.0	(63)	24.3	(34)
3	81	To relieve boredom, e.g., break up monotony or a dull period	45.8	(65)	44.4	(63)	9.9	(14)
4	75	To relieve tension or nervousness	45.8	(65)	44.4	(63)	9.9	(14)
5	72	To improve your sexual appetite or sensitivity or to improve your sexual capacities	46.1	(65)	39.7	(56)	14.2	(20)
6	64	To develop inner life	74.8	(104)	19.4	(27)	5.8	(8)
7	60	To make you more friendly or extroverted, to enhance sociability	52.5	(73)	36.7	(51)	10.8	(15)
8	59	To find out more about yourself, e.g., about your personality, your inner problems, or your human potentials	62.4	(88)	28.4	(40)	9.2	(13)
9	54	To facilitate creative abilities	76.8	(106)	17.4	(24)	5.8	(8)
10	31	To make you feel less depressed or sad	74.6	(106)	23.2	(33)	2.1	(3)
11	26	To have a religious or mystical feeling or to come close to God	85.2	(121)	13.4	(19)	1.4	(2)
12.5	17	To relieve or counteract anger or irritability	84.3	(118)	15.0	(21)	0.7	(1)
12.5	17	To satisfy a strong craving or compulsion, something you just <i>had</i> to have	90.8	(129)	6.3	(9)	2.8	(4)
14.5	10	To make you feel less afraid or more courageous	90.8	(128)	7.8	(11)	1.4	(2)
14.5	10	To make you smarter or improve your ability to learn or remember things	95.7	(135)	4.3	(6)	0.0	(0)
16	1	To reduce sexual desires or sexual activities	97.1	(135)	2.9	(4)	0.0	(0)

Reasons for Using Marihuana by Use Pattern Group

Regular users			Daily users								
Never		Occasionally	Frequent or always		Never		Occasionally		Frequent or always		
%	N	%	N	%	N	%	N	%	N	%	N
4.1	(8)	23.2	(45)	72.7	(141)	1.8	(1)	10.7	(6)	87.5	(49)
14.9	(29)	40.2	(78)	44.8	(87)	13.0	(7)	38.9	(21)	33.8	(26)
25.4	(50)	50.8	(100)	23.9	(47)	12.5	(7)	51.8	(29)	35.7	(20)
28.4	(55)	50.0	(97)	21.6	(42)	13.5	(7)	50.0	(26)	36.5	(19)
41.8	(82)	40.8	(80)	17.3	(34)	20.4	(11)	46.3	(25)	33.3	(18)
57.8	(111)	25.5	(49)	16.7	(32)	33.3	(18)	22.2	(12)	44.4	(24)
40.7	(79)	42.8	(83)	16.5	(32)	34.5	(19)	41.8	(23)	23.6	(13)
49.2	(96)	35.4	(69)	15.4	(30)	34.5	(19)	36.4	(20)	29.1	(16)
53.6	(104)	32.5	(63)	13.9	(27)	30.9	(17)	34.5	(19)	34.5	(19)
51.0	(98)	39.1	(75)	9.9	(19)	18.9	(10)	64.2	(34)	17.0	(9)
75.9	(148)	17.9	(35)	6.2	(12)	60.0	(33)	18.2	(10)	21.8	(12)
72.3	(141)	23.6	(46)	4.1	(8)	37.0	(20)	48.1	(26)	14.8	(8)
78.1	(153)	17.9	(35)	4.1	(8)	64.3	(35)	25.9	(14)	9.3	(5)
84.5	(164)	14.9	(29)	0.5	(1)	72.2	(39)	24.1	(13)	3.7	(2)
91.2	(176)	6.7	(13)	2.1	(4)	74.5	(41)	14.5	(8)	10.9	(6)
96.9	(186)	3.1	(6)	0.0	(0)	92.6	(50)	5.6	(3)	1.9	(1)

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feel they are addicted or habituated to marihuana use. Marihuana is seldom used to make one feel less afraid and more courageous, a concept that heretofore has been much proposed by opponents of marihuana.

Summarily, the more one uses marihuana, the more varied the effects and the greater the breadth of reasons for use. Marihuana is used primarily for pleasure-recreational purposes and, secondly, for psychological introspective purposes. A sizeable number of daily users also use the drug to induce a religion-mystical consciousness. Few Ss consistently use marihunana for any other reasons.

IMPLICATION FOR DRUG EDUCATION

Among our Ss, there was a relationship between frequency of use and reported effects—the more frequent the use, the more varied the effects, the more pleasant and beneficial the effects, and the fewer the unpleasant and untoward effects. Those Ss who had more unpleasant than pleasant effects either did not continue to use after trial experimentation or else they quit after some period of use. For those continuing to use, beneficial results far outweigh negatively valued results. In a previous paper (Fisher and Strantz, 1972) we have said, “. . . in approaching a project aimed at the ameliorating of drug abuse it behooves the change agent. . . (to) analyze whether use or abuse is occurring. He must first of all determine if the user. . . considers his drug use to be functional (usage) or dysfunctional (abusage), i.e., whether or not he sees his drug use as an integral part of his whole life style in that it enhances and enables him to meet needs and achieve goals, within his system, that he deems of value. If in fact, he evaluates his drug use as an enabling phenomenon within his total value orientation, it is highly unlikely that an external change agent is going to have much success in changing the user's *evaluation* of his drug experience. . . . If the user evaluates his drug usage as basically dysfunctional, i.e., not positively contributing to a realization of his value system, then the change agent has some entree into the user's psychological world.” In a program with youthful drug offenders, Blumer (1967) sought to establish a core of prestigious youth leaders, who would be won over to a position of nonusage, and that these youths would by their opinion leadership position be influential in convincing other youths to give up drug usage. Blumer stated, “We found rather early we were not having any success in developing a form of collective abstinence. It became clear that the youths were well anchored in their drug use and well fortified in their belief against all the ‘dangers’ of drug use. . . we would invite any group of educators, scientists, welfare workers or police officials to try

to meet effectively the well-buttressed arguments, based on personal experience and observation, that our youthful drug users present in frank, open and uncowed discussion. In sum, we learned that youthful drug users are just not interested in abstaining from drug use."

The results of this study would suggest that it would be highly unlikely that these marihuana users would give up their usage as they overwhelmingly report positive, rather than negative, results from their usage. If the dominant culture evaluates such drug usage to be dysfunctional, whereas the user judges such usage to be functional, what position and action can agents of the dominant culture take? The current position in America is to imprison the breaker of the cultural mores. An alternative would be to let the individual be his own judge as to the effective-ineffective use of the drug. A third alternative, the success of which rests upon the ingenuity of the establishment's change agent, is the ecological approach. Based on the assumption that for any one individual there exists a complex of interrelated variables relative to his drug use, and that it is the individual's evaluation of his drug use differential to each of these variables within his total system, we have earlier suggested, ". . . the only position the change agent can take is to induce a change in the *evaluation* by the user of his drug experience by changing the ecosystem of which that drug experience is but one part. The only entree the change agent has is through manipulating other variables in the ecosystem of the user. In manipulating and changing the character of the user's ecosystem lies the possibilities of changing the evaluation by the user of his drug usage" (Fisher and Strantz, 1972, p. 1409). We await with interest the reporting of research and treatment programs which successfully implement changes in the marihuana habituee's ecosystem which appreciably reduces his use of the drug.

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Marijuana and Sexual Activity

WAYNE C. KOFF

Abstract

This research was intended to discern any correlations between marijuana and human sexual activity. I was specifically interested in exploring the concept that the drug might produce different effects on males and females in regard to their sexual activity. Finally, I was concerned with the dosage of the drug which would produce the most pronounced effect on the majority of the users in regard to their sexual activity.

The controversy over a possible aphrodisiac effects of marijuana has lingered ever since introduction to the drug. Our research was limited to a study of marijuana and heterosexual activity.

In researching the connection between marijuana and various aspects of sexual activity, several methods were utilized. Questionnaires were distributed at eight major universities in the United States. The colleges involved were Washington University; Michigan State University; SUNY at Albany; University of Miami; University of Denver; Massachusetts Institute of Technology; Boston University; George Washington University. The method of distribution was via the campus mail of the colleges, to insure confidentiality. The participants were chosen at random, and of the 640 questionnaires 345 were returned, a ratio of 53.9%. Figure 1 is a sample of the questionnaire distributed.

The second method consisted of interviews with known marijuana users. The questions were directed towards the comparison between sexual activity with and without the use of marijuana. The final method of research was aimed at eliminating a variable in marijuana use, that of dosage. Several marijuana users were asked to roll certain weeds (including marijuana) into cigarettes which were then weighed to determine the "average" constitution of a joint. The results of these tests will be discussed extensively in a later section.

One must bear in mind that the majority of cannabis users (in the U.S.) are youths between the ages 14—25. Bloomquist (1968) notes, "The age span 14—25 needs no aphrodisiac to stimulate either interest or capacity to perform. If young men have the sex act in mind when they use the drug, they will probably move toward a

The following questionnaire is a segment of a research project concerning the connections between sexual activity and marijuana. You have been chosen in a random sampling and we wish that you will answer the questions truthfully and to the best of your ability. When you have completed this form please return it to:

RESEARCH STUDY
Box 4375 Washington University
6515 Wydown Blvd.
Clayton, Missouri 63105

One final note, the questionnaire is designed to be anonymous, so please *do not* include your name. Thank You.

1. Sex: M F (circle one)
 2. Age: a) less than 17 b) 17–24 c) 25–30 d) over 30 (circle one)
 3. Use of Marijuana: a) never
 b) occasionally—at parties etc. (circle one)
 c) daily
 d) other—Please comment
 4. Method of using Marijuana:
 a) smoking
 b) eating—in brownies, cookies, etc. (circle one or more)
 c) other—Please comment
 5. Amount of marijuana used each time you take the drug:
 a) one “joint” or less
 b) 2–4 “joints” (circle one)
 c) more than 4 “joints”
 6. Following the use of marijuana, was *sexual desire*:
 a) increased
 b) decreased (circle one)
 c) remained the same
 7. As compared to sexual activity without the use of marijuana, was sexual activity following the use of marijuana:
 a) more enjoyable
 b) less enjoyable (circle one)
 c) the same
 8. As compared to sexual activity without the use of marijuana, would you say *your partner* following the use of marijuana found sexual activity:
 a) more satisfying
 b) less satisfying (circle one)
 c) the same
 9. Realizing that marijuana affects different people in different ways due to such factors as personality and atmosphere, please comment on the way in which the drug affects *you*, and what effect it has on *your* sexual activity. Please feel free to add any additional comments concerning marijuana and sexual activity on both the remainder of this side and on the back of this page.
-
-
-

FIG. 1. RESEARCH STUDY: *Marijuana and human sexual activity*

selected partner. The woman for her part will find it easier to acquiesce . . . ”

Medical opinion as to the capacity of marijuana to act as an aphrodisiac is extremely varied. Some physicians undoubtedly are convinced that the drug is specifically associated with sensuousness and carnality, while others claim that the aphrodisiac effect of marijuana is purely a wild notion. It is a known fact that the Orientals in the 19th century took the drug to prolong coitus. Doria, in Brazil, reports instances of women becoming unusually aggressive in sexual affairs while under the influence of the drug. Considering this wide diversity of opinion, the questionnaire (fig. 1) and interviews were conducted as an attempt to clear up this controversy. Table 1 gives the numerical results of the questionnaire. It must be noted that of the 345 replies, 93 never smoked marijuana and so are not included in the results.

As shown in Table 1, #6, following the use of marijuana sexual desire was said to increase by 48.5% of those questioned. The significant plurality of this result may be attributed to various factors. First of all, the mysticism surrounding the drug plays an integral part in its effect. Psychologists stress the importance of mood, expectation, and setting as shaping the nature of the drug experience. With marijuana, all of the ideas concerning its inhibition releasing and sexual stimulating tendencies may result in the increase of sexual desire. It seems conclusive now that the drug itself is not a sexual stimulant. However, one cannot separate the drug from its surroundings. The social conditions of marijuana use make it act as an aphrodisiac.

Ms. A is between the ages 17–24. She smokes marijuana two to three times per week, averaging two joints per sitting. Her comment concerning the issue of sexual desire was, “Marijuana itself does not in any way increase sexual desire. It is merely the atmosphere in which the drug is used combined with the drug . . . a darkened room with candlelight, incense burning possibly, often just the two alone, which actually promotes sexual desire.”

Mr. B smokes marijuana occasionally one joint or less and is also between the ages 17–24. He comments, “I find that after using marijuana, I experience a period of intense sexual arousal and suggestibility for about 40 minutes after which the effect seems to diminish . . . closely related to this phenomenon is the increase of

TABLE 1

1. Sex:	Male 123	Female 128	Total 251			
2. Age:	98% of sample between ages 17-24; 2% were 25-29					
3. Use of marijuana:						
a) occasionally-	Male 65.3%	Female 81.2%				
b) daily-	Male 22.2%	Female 8.5%				
c) other-	Male 12.4%	Female 10.2%				
4. Method of using marijuana:						
a) smoking-	Male 85.4%	Female 79.8%	Total 82.6%			
b) eating-	Male 14.5%	Female 20.1%	Total 17.3%			
c) other—two replies of snorting the drug						
5. Average dosage each time drug is taken:						
a) 0-1 joints	Male 25.0%	Female 22.6%	Total 23.8%			
b) 2-4 joints	Male 68.8%	Female 71.4%	Total 70.1%			
c) More than 4	Male 6.2%	Female 5.9%	Total 6.1%			
6. Sexual Desire:	Increased	Decreased	Remains the Same			
a) Male	39.1%	10.9%	50.0%			
b) Female	57.8%	4.8%	37.4%			
c) Total	48.5%	7.9%	43.6%			
7. Sexual Enjoyment:	Increased	Decreased	Remains the Same			
a) Male	59.8%	6.5%	34.7%			
b) Female	42.9%	6.5%	50.6%			
c) Total	51.3%	6.5%	42.2%			
8. Partner Satisfaction—from sexual activity following use of marijuana.						
	Increased	Decreased	Remains the Same			
a) Male	59.5%	4.1%	36.4%			
b) Female	47.4%	8.8%	43.7%			
c) Total	53.5%	6.5%	40.0%			

fantasies, and the relaxation of the body. I strongly suspect that part of the excitement generated by pot is a result of psychological suggestion, one expects to be aroused after its use.”

Though 48.5% of all the people replying noted that sexual desire was increased, the proportions were extremely varied between males and females. While only 39.1% of males noted an increase, a remarkable 57.8% of the females said that their desire was increased. Performing a chi-square probability test on these results, we obtained a P value equal to .048 which is equivalent to saying that the results were significant and not dependent on chance alone. How then may

this 18.7% difference between males and females be explained? Erich Goode, a sociologist at SUNY Stony Brook, interviewed 200 marijuana users in 1969 and recorded a 50% increase in sexual desire among women following marijuana use as compared to a 39.0% increase among men. Goode (1969) notes, "First, because of their cultural association with sex, women are more likely to think themselves into becoming excited; second, women need an excuse to justify their desire; third, men are less concerned with the ritual of sex and with what textbooks refer to as foreplay, than are women. For women, these aspects of the sexual act are often more meaningful than the immediate physical gratification it gives her . . . a woman is more preoccupied with the path to sex, whereas for the man, the overture is often only instrumental." In addition one may say that man's cultural role permits him to freely express his desires. The woman has been taught to repress sexual desires more than man. They have been taught the sex-evil, sex-dirty, sex-forbidden notions more than the sex-fun, sex-enjoyable ones. The lessening of tensions and of inhibitions allows the woman to overcome these concepts and to express her desires. Therefore, as an inhibition releaser and body-relaxer, one may group these effects of marijuana under the heading of "stimulant to human sexual activity."

The next area of interest is the connection between marijuana and sexual enjoyment. It was shown that 51.3% of those questioned said that following the use of marijuana, sexual enjoyment increases. This result may be accounted for in different ways. First of all, many of those replying noted that sex while "high" was a completely different experience than sex while straight. It seems probable that the effects of the drug cloud the mental scope of human sexual activity and allow the physical sensation to become more pronounced. To many, this pronouncement of the physical sensation seemed exciting, vibrant, and fantastic.

Ms. C replying to the question concerning sexual enjoyment said, "Although I seemed to get more physically involved, I was much less mentally involved . . . it kind of feels like you're in a weird, dream-like world with the person you're with, and sex can be more exciting because it's a new and different experience."

Ms. D, a 19 year old marijuana user who averages smoking two joints per day notes, ". . . sex is different since some sensations are seemingly heightened by the drug. However, sex is neither worse nor

better. Sexual activity seems to take on a bit more variety or bizarreness when you are under the influence of pot.”

From the male point of view, Mr. E eats the equivalent of one joint of marijuana in brownies and cookies every other day. He replies, “Any effects of the drug would tend to make the user less inhibited under situations where you would worry if someone walked in on you or fear pregnancy. The effect of the drug seems more noticeable during orgasm, there appeared to be more sensation in the genital organs and the rest of the body seems to be placed in a void. While I find a relaxed mood after sexual intercourse, I found that marijuana seemed to take a lot out of me, leaving me very tired while still being sexually aroused. While the physical sensation may be better, I find the mental sensation not as pleasing as when straight.”

Dividing the males and females up for the question of sexual enjoyment, our results show the converse of sexual desire. While 59.8% of the males seemed to enjoy sexual activity more when stoned, only 42.9% of the females were in accord with this concept of increased enjoyment. At first glance, these results seem unexplainable in light of the sexual desire figures. However, by taking into account the cultural and sociological factors, one arrives at a definite correlation between the results on sexual desire and sexual enjoyment. Referring to the culture scheme once again, the physical sensation of sexual activity is more predominant than the mental response from the males' standpoint. In contrast, the female views the foreplay as a more gratifying precursor to the actual climax than the male. When marijuana is smoked (or ingested), the drug tends to relay a feeling of unreality while also making tactile stimulation seem more distinct. In other words, physical sensations seem more real, and mental reactions more oblique. For the female, her inability to have complete control of the mental feelings lessens her enjoyment. For the male, the increased physical sensation results in a more enjoyable sexual experience.

Another factor closely related to sexual enjoyment concerns partner satisfaction. In our sample, 59.5% of the males believe that their partners' satisfaction of sexual activity was greater while stoned, while 47.4% of the females believe that their partners found sexual activity more satisfying while “high.” When the male is enjoying sexual activity, it seems reasonable for him to assume that his partner is also enjoying it. The same is true for females. Thus, there should

be a positive correlation between the questions of sexual enjoyment and partner satisfaction. We verify this by comparing the results of #7 and #8 in Table 1 and noting that they are nearly identical. Upon questioning Mr. F concerning sexual enjoyment and partner satisfaction, he replied "We had made love just before getting stoned, not expecting to want to afterwards. My girlfriend was turned on sexually and I got aroused; we made love and I climaxed much sooner after the last time than I would normally have been able to. My girlfriend's desire and satisfaction were probably heightened judging from the number of her orgasms."

From the female standpoint: Ms. G smokes daily and believes that both sexual desire and sexual enjoyment are increased from the drug, as well as her partner's satisfaction. She is between the ages 25–30 and comments, "... the closeness of someone's body while stoned gives me a sense of security and uniqueness. Weed decreases my inhibitions allowing me to express more affection and give more to my partner's enjoyment."

Realizing that partner satisfaction is undoubtedly more subjective than replies concerning desire and enjoyment, conclusions reached from the area of partner satisfaction are considered less relevant than others. However, it is interesting to note that the majority of those people claiming that sexual enjoyment was decreased following the use of marijuana, also stated that they believed that their partner's satisfaction was also decreased.

Upon obtaining results for such concepts as sexual desire and enjoyment following marijuana use, one must not overlook the variable factor of dosage. Dosage can be divided into two categories, those being quality and quantity. For our purposes, the quality of the marijuana used was impossible to be accurately judged since those interviewed and questioned used different types of marijuana at different times. It is learned that the strength of the drug is dependent on its content of both 9-THC and 6-THC. (THC is abbreviation of tetrahydrocannabinol; 9 and 6 are the two most active constituents of marijuana, distinguished by their chemical formulas.) The quality of the marijuana is dependent on the quality of the resin found in the plant. The most potent marijuana known originates in Thailand and consists of 4.1% THC. Most marijuana used in the United States originates in Mexico and its THC content ranges from 0.8%–1.4%. For the sake of simplicity, we assume that

the THC content of marijuana from Mexico has the average value of 1.0%. Having ascertained a value for the quality of the drug, the final aspect of dosage is the quantity. To find the average constitution of a joint of marijuana by weight, twenty users of the drug volunteered to roll into cigarettes four leafy, grainy substances (one of which was marijuana). Upon averaging the weights of the rolled marijuana cigarettes, the value of .73 gm was found for the constitution of a joint by weight. The weights of the rolled cigarettes ranged from .49–1.8 gms. By simple mathematics, it is shown that a joint smoked and shared by two people places between 3.75 and 5.00 mg of THC into the bloodstreams of the users. One marijuana cigarette is usually sufficient to produce an adequate intoxication of two people.

Having determined the dosage, one is now able to make a comparison of the effects of one joint of marijuana on sexual desire and enjoyment of sexual activity, as opposed to using two or more joints of the drug. Specifically, in regard to sexual desire, 61% of those individuals who smoked one joint or less noted an increase. Separating this percentage by the sexes of the individuals involved, 50.5% of the males and 70.9% of the females noted an increase in sexual desire. For the people who smoked two or more joints per sitting, males recorded a 34.5% increase while 49.5% of the females concurred that their sexual desire had increased. Thus, it is evident that as dosage increases, the tendency for an increase in sexual desire decreases.

Concerning enjoyment of sexual activity following the use of marijuana, males who smoked one joint or less noted more of an increase in enjoyment than those who smoked two or more joints per sitting. The same quantitative conclusions were recorded by the females. This result further substantiates the idea that as the dosage is increased past a peak concentration point, the positive effects of increased sexual desire and enjoyment of sexual activity will not be as noticeable. The quantitative results of the question concerning dosage are summarized in Table 2.

From the results in Table 2, it seems evident that over-intoxication of marijuana does not enhance either sexual desire or enjoyment of sexual activity as much as mild dosage. Once again it must be noted that the varied quality of the marijuana has a definite effect on these results. For instance, one cigarette of 2% THC quality is equivalent to two cigarettes of 1% THC quality. For our purposes however,

assuming the use of a consistent quality of the drug upholds the validity of our data and subsequent conclusions.

Finally, a comparison may be made between the effects of smoking the marijuana through cigarette or pipe, or ingesting it through brownies, cookies, etc. The different methods of use are known to cause different types of "highs." Smoking yields a shorter, more potent intoxication, while eating results in a milder, longer intoxication. From our survey, 82.6% of those questioned smoked their marijuana while 17.3% ingested the drug to obtain a "high." With regard to sexual desire and enjoyment of sexual activity, the results indicate that there is no appreciable difference in the effect of the different methods of use. The quantitative results of this question are compiled in Table 3. Thus, although the type of "high" obtained from the two methods is different, both affect sexual desire and enjoyment in a similar fashion. This may be explained by noting that although the type of "high" differs, a person who eats marijuana is more likely to use a larger dose than one who smokes, assuring himself of an adequate supply of THC in his bloodstream. Overcoming the digestion process (in which some of the THC is not absorbed into the bloodstream) by using larger doses, the ingester matches the THC content of the smoker and thus shows the same effects to sexual stimuli.

TABLE 2

	Increased	Decreased	No Change
1. Sexual Desire			
a) 1 joint or less			
1) Male	50.5%	8.6%	40.9%
2) Female	70.9%	5.4%	23.7%
3) Total	61.0%	6.9%	32.1%
b) 2 or more joints			
1) Male	34.5%	14.6%	50.9%
2) Female	49.5%	4.6%	45.9%
3) Total	42.1%	9.6%	48.3%
2. Enjoyment of Sexual Activity	Increased	Decreased	No Change
a) 1 joint or less			
1) Male	67.0%	2.5%	30.5%
2) Female	51.0%	5.1%	43.9%
3) Total	59.0%	3.8%	37.2%
b) 2 or more joints			
1) Male	45.2%	10.7%	44.1%
2) Female	32.5%	8.4%	59.1%
3) Total	38.9%	9.5%	51.6%

TABLE 3

1. Sexual Desire	Increased	Decreased	No Change
a) Smoking	48.1%	8.5%	43.4%
b) Eating	48.8%	7.8%	43.4%
2. Enjoyment of Sexual Activity	Increased	Decreased	No Change
a) Smoking	52.7%	6.9%	40.4%
b) Eating	50.1%	6.2%	43.7%

Totals given without respect to sex. Insufficient numbers of individuals who ingested marijuana made a division by sex invalid for our purposes. There were 44 individuals who noted ingesting marijuana, of which 27 were female and only 17 male.

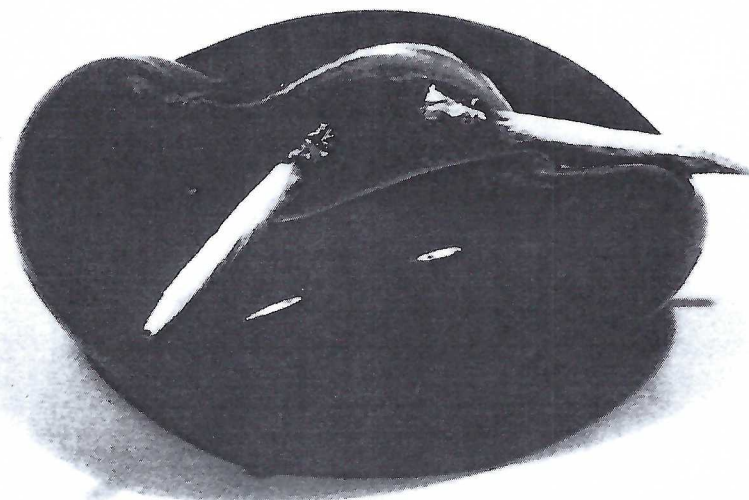
In summary, the study of the effects of marijuana on human sexual activity is a field in need of more research. One must consider the psychological and sociological factors of both the drug and human sexual activity when attempting to draw the connective lines. The physiological effects of marijuana may also affect the sexual response of the human being. Our survey revealed cases of secondary impotence among males, and cases of situationally nonorgasmic females following marijuana use. On the other hand, there were also cases of multi-orgasm (from two different girls who both stated that they never had more than one orgasm when engaged in intercourse while not under the influence of marijuana). Three males noted that orgasm was reached at a faster rate after using marijuana as against not using it. It seems conceivable that marijuana, with suitable psychological and sociological conditions, and taken in a light to moderate dose releases inhibitions to the extent of being termed "aphrodisiac." Perhaps a certain level of THC content in the blood is needed for these effects to be manifest. Our results have shown that the most active dose (the one in which sexual desire and enjoyment is increased to the greatest extent) is between 1–2 cigarettes containing 1% of THC. To verify these results, laboratory tests on THC content in the blood, absorption rates of THC into the bloodstream, and THC content of the resin of *Cannabis sativa* should be undertaken. Our study has tried to reveal some of the mysteries of marijuana in connection with human sexual activity and to offer highly qualitative and semi-quantitative conclusions. Quantitative laboratory data are now needed to confirm our hypotheses and conclusions.

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Sex and Marijuana

Yes, they are related, but not as directly as myth would have it.



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In April 1971, an article entitled "Effects of Marijuana on Adolescents and Young Adults" was published in *The Journal of the American Medical Association*. It was written by two Philadelphia psychiatrists, Harold Kolansky and William Moore. Among the many ill-effects sustained by Kolansky and Moore's young patients was, in their terms, "sexual promiscuity." In summarizing thirteen cases of "female individuals" (the term "promiscuity" does not, apparently, apply to young men), they state: "This group is singled out because of the unusual degree of sexual promiscuity, which ranged from sexual relations with several individuals of the opposite sex to relations with individuals of the same sex, individuals of both sexes, and, sometimes, individuals of both sexes on the same evening. In the histories of all of these individuals, we were

struck by the loss of sexual inhibitions after short periods of marijuana smoking. Seven patients of this group became pregnant (one on several occasions), and four developed venereal diseases. . . . In no instance was there sexual promiscuity prior to the beginning of marijuana smoking. . . . *We take these results to indicate marijuana's effect on loosening the superego controls and altering superego ideals*" (my emphasis).

Dr. Thaddeus Mann, Professor of Physiology of Reproduction at Cambridge University in England, claims that there is "evidence of a link" between the use of marijuana (as well as other drugs, such as opiates, LSD, and the amphetamines) "and certain types of sexual incompetence or deviation." "Young people frequently seem to indulge in drugs," Dr. Mann writes, "for their presumed pleasure-giving properties, and in the hope,

however ill-founded, of prolonging sexual gratification. To them the drugs serve as a sex substitute." Dependency on drugs, including cannabis, "stems from decreased capability and is a pathetic attempt at overcoming . . . sexual incompetence."

There is an important difference between these conclusions. Dr. Mann suggests that drugs, marijuana included, may be used *because of* sexual incompetence—in addition to *further* deteriorating sexual capabilities. Drs. Kolansky and Moore mention only one direction for this relationship—that marijuana *causes* sexual behavior of an overactive sort. Perhaps, too, mention should be made of the factor of gender. Sexual promiscuity tends to be mentioned almost exclusively with women—a reflection of our prevailing double standard. Sexual incompetence is associated overwhelmingly with marijuana use

among men; the analogous situation among women, frigidity, is rarely discussed in association with the marijuana smoking of women. What is supposed to happen under the influence or after a certain duration of marijuana use fits in very neatly with what is most feared and condemned by conventional society about the behavior of the two sexes. The male is urged to be aggressive and masculine; his greatest failure lies today in impotence. The female, virtuous and passive, is most condemned for "promiscuity," an overeagerness in regard to sex. In this context the marijuana-sex link is an exemplification of society's insecurities and fears—but they tell us practically nothing about the influence of the drug itself!

These ideological colorations of the issue operate on both sides of the controversy. To most members of the "counter culture," both a permissive style of sexual expression as well as marijuana use have become accepted—indeed, even glorified. Thus, marijuana, as the common denominator of the drug-using counter-culture, must be attributed with causing more sex, better sex, and just plain sex. In this case, as with conventional attributions, that which is considered "good" is linked with something else considered "good." But this is another mythology. After the ideology has been paraded, what are the facts? What is the relationship between sex and marijuana?

An archaic view would be that specific drugs "cause" specific outcomes, both effects and behavior. We now know that this is false, that a multitude of factors influence the drug-effects and drug-behavior equations. Some of these factors are related to the drug itself (such as dose, or potency, and route of administration), but the most important factors are non-pharmacological and have to do with the people themselves and the social environment they live in.

Drugs do not act on mindless tissue; their "effects" are weighed, interpreted, considered, translated, accepted, struggled against, thought about, explained, and woven into certain activities. No drug-taking occurs in a sociocultural vacuum; each of these social processes has an impact on



Drugs do not act on mindless tissue

what "effects" a given drug has, as well as what forms of behavior follow its ingestion.

Every drug has a wide range of effects, and each effect touches off a wide range of human reactions. A drug's formal biochemical properties only form a *potential*. Of the many possible effects that a drug has, or might have, some or one or two may be emphasized by a group or individual taking it. Users may "attend" to certain effects, while ignoring or discounting others. Users learn to attune their bodies to the specific effects which their social group approves of, and to discount and disregard those that are not "supposed" to happen. Drug experience is totally dependent on these subcultural and individual conventions.

Effect of marijuana

There are at least two types of marijuana effects of interest to the researcher. The first would be those which can be observed or measured externally by the scientist; these can be called "objective" effects. Heart-beat rate would be an example. So would be performance on various standardized performance tests, memory, motor coordination, and so on. In addition, certain types of behavioral changes are commonly associated with heavy "chronic" use—such as a diminished interest in conventional achievement—but as to whether this is a direct action of the drug, or is a consequence of differential subcultural involvement, cannot be known for sure at this

point.

The second type of effect cannot be observed externally; the researcher must rely on self-descriptions by the user himself. Here we are in the realm of the drug *experience*—or the "subjective" effects.

A dozen or so studies have been published in the past few years on marijuana's subjective effects. There are a number of consistent threads running through descriptions unearthed by these studies, in spite of some surface differences. The following effects appear to be very frequently mentioned by users as a common component of the marijuana experience: (1) *relaxation*; (2) *euphoria*; (3) *increased sensitivity in all of the senses*; (4) *greater emotional impact of everything*; (5) *a feeling of freedom*; (6) *a sensation of time slowing down*; (7) *heightened hilarity at everything*; (8) *a sense of one's mind wandering*; (9) *greater enjoyment in doing things*; (10) *forgetfulness*; (11) *increased hunger*; (12) *greater pleasure specifically in listening to music*; (13) *a feeling of lethargy*.

There are, of course, many more commonly reported "subjective" effects. But the overall thrust of these and the hundreds of others that crop up appears to be in the direction of the simple, the hedonistic, the frivolous, the sensual, the pleasurable. This is not to say that the much publicized negative or painful experiences do not result in some users. Nausea and vomiting, diarrhea, and psychotic episodes have been known to occur, but they are extremely rare. Most marijuana smokers enjoy what they feel while high, and use, and continue to use, the drug specifically *because* they enjoy what they feel.

What is fascinating about these self-reports by marijuana users on the effects of the drug is that *they are not simple out-and-out endorsements of cannabis*. Users do not offer an across-the-board eulogy of their high experiences. An obvious objection to accepting the word of users on being high is that they have an all-too-obvious motive for painting a rosy picture. This is a plausible objection, but it cannot account for the fact that many positive effects are *denied* as happening, and a few negative effects are des-

cribed. Activities of a rational and logical character tend to *deteriorate* under the influence, according to users' descriptions. In my own study of 200 New York marijuana users, only a third of the interviewees said that they had ever read or studied a book while high, and of these, two thirds said that the reading experience was impaired by being high. A study by Richard Brotman and Frederic Suffet of 74 New York marijuana users found that while most or nearly all respondents agreed to certain positive effects, such as relaxation and music sounding better, some responses were more often denied than agreed to—such as bringing out talent (51% disagreed) and understanding oneself better (62% dis-

agreed). Marijuana users offer *selective* endorsements of their drug of choice, and not simple indiscriminate tributes to it.

Sexual reactions

What of sex under the influence of marijuana? Positive descriptions and evaluations by users of the sexual experience while high almost universally figure heavily in nearly all studies of marijuana's subjective effects. Two physicians, Joel Simon Hochman and Norman Q. Brill, found that "increased sexual pleasure" was the *second most common response* agreed to among "chronic" marijuana users as an effect of the drug—83 percent said that they experienced it often or always. (Among occasional marijuana

users, increased sexual pleasure was often or always experienced by only 50 percent, and it was the eighth most common effect.) "Increased sexual appetite" was experienced by 60 percent of the chronics, and 43 percent of the occasionals. As a check, Hochman and Brill asked their sample about "decreased sexual appetite" and "decreased sexual pleasure"; 75 percent of the chronics said that the first *never* occurred, and 85 percent said the second never occurred—the figures were 70 and 78 percent for the occasionals.

Three other physicians, James Halikas, Donald Goodwin, and Samuel Guze, found that a third (or 34%) of their sample of regular marijuana users



Expectations make a profound difference . . .

Comment by:

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DR. GOODE'S ARTICLE underscores a number of important points about marijuana which are frequently ignored even in professional discussion. Drug use and its effects are deeply embedded in the sociocultural context. The expectations created by the culture make a profound difference, whether we are talking about effects on sexuality or effects on other aspects of behavior or subjective experience.

The classical 1894 Report of the Indian Hemp Drugs Commission, for example, commented that hemp drugs have "no aphrodisiac power whatever; and, as a matter of fact, they are used by ascetics in this country [i.e., in India] with the ostensible object of destroying sexual appetite." Others in other times and places have found they enhance experience, while not a few claim that chronic use results in impotence. In short, users and those observing them have to a considerable extent experienced what they expected to on the basis of their cultural orientation, their personal set, and the setting of use.

Although, as Dr. Goode observes, a majority of the 150 experienced American users studied by Tart found their sexual experiences to be enhanced, Tart also observed that at very high levels of intoxication "chances are good that the user will be absorbed in his own inner experience and not get interested in making love with someone." A minority, he also reported, found their contact with their sexual partners reduced as they became absorbed in their own intensified sensation. Thus, it should be kept in mind that, like other psychoactive drugs, marijuana's effects are heavily dependent on dosage as well as the set and setting of use. None of this is intended to deny that large numbers in any given culture may agree on a particular effect—it is only to emphasize that psychoactive drugs, including marijuana, do not simply have effects on people but that people and drugs interact, sometimes in unexpected ways.

The observations cited by Dr. Goode are based virtually on the experiences of white, middle-class

Americans. Little is known about the experiences of others from different socioeconomic levels and other ethnic and racial groups. Obviously, these are also of interest and importance.

Patterns and personal expectations regarding sexual behavior are also profoundly variable from culture to culture, and even within the same culture and within the same individual from time to time. This, too, must be taken into account in considering the effects of such drugs as alcohol and marijuana on sexual feelings and subjective experience.

Finally, it should be emphasized that while in the affluent West marijuana is most commonly used for recreational purposes, in much of the rest of the world it is more typically used as a means of warding off fatigue, as self-medication for a wide array of illness, and as part of religious expression. It is of obvious interest and importance to learn more about the multiple uses and effects of marijuana cross-culturally—including those involving effects on human sexuality.

said that they "usually" experienced a "heightened sexual feeling" while under the influence; 59 percent said that they felt this occasionally. Almost exactly the same percentages said that they usually (33%) or occasionally (59%) felt an "increased sexual arousal." A psychologist, Charles Tart, found that two thirds of his sample of users (or 65%) reported very often or usually experiencing their sense of touch, while high on marijuana, as more exciting than usual. Over half (or 56%) said that their sexual orgasm was very often or usually more exciting than when "straight." And the response "touch takes on new qualities" was agreed to by 55 percent of Tart's sample.

In my own interview study, marijuana and sex were closely intertwined. Three quarters of my respondents said that they had had intercourse at least once when high. When I asked "Do you think that being high on marijuana stimulates your sex *interest*, or not?" slightly over a third said that it was no different from normal, 5 percent said that marijuana usually had a negative effect, that it tended to turn them off sexually, 13 percent said that it depended—and 44 percent said that the drug tended to *increase* their sexual desires. And when I asked "Is your *enjoyment* of sex any different high?", about two thirds (68%) said that marijuana generally acts as a pleasure-enhancer—that it usually *increased* their sexual enjoyment.

There were, moreover, interesting variations among the respondents. The *frequent* users attributed significantly more sexual impact to the drug than the infrequent users did. Over *half* (52%) of the three times a week or more users said that marijuana acted as an aphrodisiac, and stimulated their sexual desires, but less than a third (30%) of the infrequent, or less than weekly, users agreed. The same pattern obtained for answers to the question on orgasmic pleasure. More than three quarters (77%) of the frequent users claimed that marijuana tended to increase their sexual enjoyment, while only half (49%) of the infrequent users agreed.

Clearly, these evaluations of the "high" sexual experience were not specific to sex itself. The other areas



Frequent users are more likely to have premarital sex than nonusers

which marijuana was said to improve—as well as those thought to be impaired—yield clues as to *why* sexual gratification and interest were described as heightened under the influence by most users. Activities requiring precision, attention to detail, sustained effort, and technical mastery, are widely denigrated as rewarding "high" experiences; behavior involving spontaneity, immediacy, visceral involvement, and emotional engagement, are felt to be intensified.

The following reasons are offered by marijuana smokers as explanations of why being under the influence renders the sexual experience more pleasurable and exciting:

- (1) One's sense of touch is more intense and stimulating.
- (2) One's skin feels warm, tingly, and flushed.
- (3) The emotional impact of the experience is much greater.
- (4) Emotional warmth and affection toward one's partner appear to be stronger.
- (5) The sex act appears to last longer than clock time indicates.
- (6) One feels more relaxed, less uptight, freer, more "natural."
- (7) The sex act becomes a total entity in itself, a kind of totally involving, all-encompassing vortex or experience.
- (8) The orgasm is more intense than usual.

Of course, the traditionalist will object that many, if not all, of these

perceptions are "objectively" in error; more time did not "really" pass, and one does not "really" feel more love for one's sex partner. But within the microcosm of the high sexual experience, these effects are perceived to occur; they do, in fact, occur—viscerally. The *sensation* of their occurrence is the very reality, the experience itself.

The role of life style

These "effects" are not simple pharmacological consequences of marijuana. The predominant source of these positive evaluations is locatable within the subcultural arena. As a young person begins to use marijuana, his friendships and peer network undergo a subtle transformation. Using marijuana implies having friends with certain attitudes and practices. Marijuana use, especially at specific frequencies, can be used as an indicator of one's involvement with the drug subculture. Thus, one is likely to *ascribe* to the marijuana experience positive evaluations specifically within those areas that one's social intimates value. A positive evaluation of sex under the influence is, in part, merely a reflection of one's immersion in, and agreement with, a certain social group.

Which leads us to the connection between marijuana use and sexual behavior. Does marijuana "cause" sexual "promiscuity"? If we accept these data on sexual pleasure as valid in characterizing the nature of the sexual experience under the influence of marijuana, what would we predict in regard to the sexual *behavior* of users? In what way does the drug become woven into the sexual life styles of marijuana smokers? What is known about patterns of sexual activity among users?

I distributed a questionnaire on drug use to the undergraduates attending a large lecture course at a state university in 1970; there were between five and six hundred respondents in the study. I employed four measures of sexual activity: whether or not the respondent had ever engaged in premarital intercourse; the total number of different sexual partners he or she had ever had sex with; the age at first engaging in intercourse; and the average frequency of having intercourse in the six months prior to the question-

naire. I also asked about three indices of drug use: whether or not the respondent had ever smoked marijuana; the frequency of smoking marijuana in the six months prior to the survey; and the total number of drugs or drug types the respondent had ever tried or experimented with. What I found was that *all measures of sexual activity correlated significantly and powerfully with all measures of drug use*. Marijuana users were *far* more likely to have engaged in premarital sex than nonusers. The overwhelming majority

of users or experimenters had had intercourse at least once (72%, in fact), whereas only a third (34%) of the nonusers reported ever having engaged in premarital sexual intercourse. And the more frequently that any given undergraduate smoked marijuana, the greater was his or her likelihood of having engaged in intercourse; there was an almost perfect linear relationship between frequency of smoking marijuana and premarital sexual experience.

In addition, the more frequently marijuana was used, and the greater

the number of drugs experimented with, *the greater the number of sexual partners the respondent had had intercourse with*. Among the frequent, or three times a week or more, marijuana smokers, only *one in five* (19%) claimed to be virginal; this was true of *six in ten* (61%) of the respondents who had not smoked marijuana at all in the previous six months. At the other end of the sex spectrum, *a third* of the frequent users (32%) said that they had had intercourse with *four or more* partners in their lives; this was true of

Myth of the "perfect orgasm" may lead to gilding the lily with drugs . . .

Comment by:

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IT IS CERTAINLY true that "drugs do not act on mindless tissue." The same claims about enhancement of sexual performance and enjoyment were being made several years ago on behalf of LSD and, in some people's minds, the effects of marijuana still pale when contrasted with those of amyl nitrate ("poppers"). That drugs with such divergent pharmacological effects should all enjoy a reputation as sexual superchargers suggests that their effects are mainly in the eye of the beholder. One can't help wondering if there is not some pervasive myth of the perfect orgasm that keeps driving people to gild the lily with drugs. In any case, if marijuana is as beneficial for sexual performance as is claimed, one might make a strong case for limiting its use to people over forty years of age. It is one of the great paradoxes that sexual stimulants are sought by those who have least need of them.

Nonetheless, if someone believes a drug works, and the manifestation of the desired action is a psychological effect, then it works. In pharmacology, we refer to this phenomenon as the "placebo effect"—the ability of the drug to please the patient (or the physician) by meeting his prior expectations. Studies

to date indicate a rather high degree of such placebo effects among marijuana users, many of whom are able to attain satisfactory "highs" with marijuana which contains virtually no active materials. Truly these are instances of mind over matter.

So much about sexual performance. What about sexual behavior? I'm afraid that the lib movements have not yet convinced me of sexual equality. A woman can engage in sexual intercourse even if she is frigid; a man cannot if he is impotent. It's just that simple. So the effects of a drug on sexual behavior may vary between the sexes. The observation of Shakespeare that wine increases lechery and lessens performance referred to men. Ogden Nash's couplet about seduction, "Candy is dandy but liquor is quicker," referred to women. One must, however reluctantly, give the psychoanalysts their due: drugs can break down the ordinary controls of conscience that limit one's behavior, and alcohol and marijuana are among these so-called disinhibiting agents.

That one's pattern of sexual behavior could be changed under the influence of marijuana is entirely possible. The thorny question is how often is the taking of the drug related to the conscious adoption

of a life style in which many behaviors are altered, including that of drug-taking? No simple answer will do; it depends on your point of view. If you are a sociologist sending out questionnaires to large groups of people, you may favor the latter pattern. If you are a psychiatrist, trying to deal with parents distraught by the fact that their cherished daughter became the neighborhood trollop after taking up marijuana smoking, you may favor the former hypothesis.

Let us suppose that use of marijuana is the paradigm of the "drug culture," with all of its altered ways of living. We then have a situation in which those who seek the many attractive pharmacological effects of a drug lose to some degree their choice of life style. A somewhat similar situation prevails with heroin use, which must of necessity (because of the way the drug is trafficked) involve the user in criminal activity. We have no such precedents with other social drugs, for the decision to use alcoholic beverages or nicotine smokes entails no change from "straight" life. To the extent that we can separate the decision to enjoy the effects of a drug from the necessity to change one's life, we may better preserve the freedom of the drug user.

only one fifth as many marijuana absters (7%). By employing the number of drugs ever tried, or experimented with, exactly the same relationship prevailed; the greater the number of drugs ever experimented with, the greater the number of sexual partners the respondents had ever had in their lives. If having had intercourse with four or more partners is defined as "promiscuous" (a heavily loaded value term), then marijuana users, especially at the upper reaches of frequency of use, are much more likely to be "promiscuous" than nonusers. This is not to say that all, or even most, were, but the correlation was about as striking as any the social researcher is likely to see.

Drug users generally, and marijuana smokers specifically, also tended to have intercourse *earlier* in their lives. Among drug absters, only 4 percent said that they had had intercourse by age 16; this was true of six times as many (24%) of the respondents who had experimented with four or more drugs. At the other end, fully two thirds of the respondents who had never tried any drugs in their lives (or 67%) were virginal, but this was true of less than a fifth (18%) of the four or more drug experimenters.

The magnitude of this relationship might incline the observer to posit that somehow marijuana, as well as other drugs used, *causes* early sex, and sex with a number of partners. This conclusion would, I think, be entirely mistaken. The relationship can be turned around. Not only were marijuana smokers, and drug experimenters generally, more likely to have sex early in their lives, *it is also the sexually precocious who are more likely to use drugs, including marijuana.* Of all those respondents who said that they had intercourse by age 16, only 7 percent said that they had *not* tried any illegal drug, but this was true of *almost half* (47%) of those who were virginal. A third of those who had lost their virginity by age 16 (33%) had tried four or more drugs; this was true of only one in 10 (10%) of the virginal respondents. Thus, it is clear that using marijuana or other illegal drugs no more "causes" sexual behavior than sexual behavior "causes" drug use.

There is a powerful *selective re-*



Marijuana use grows out of a specific life style

ruitment process operating here. *Both* sexual permissiveness *and* marijuana use—as well as, to some extent, experimentation with certain other illegal drugs—are indicators of the young person's involvement in and with a subculture which is tolerant toward a wide range of nontraditional values and activities. This subculture embraces certain styles of dress and tonorial fashion, specific musical tastes, attitudes toward formal religious ties and activities (usually alienated), as well as attitudes toward the formal aspects of college and university institutions (often negative), and, above all, politics and ideology (liberal or radical). Thus, to say that marijuana use "causes" a liberal or radical political orientation would be absurd.

Sexual permissiveness is an organic component of this emerging counter-culture ideology in much the same way that a liberal political style is. Clearly, the "cause" of sexual permissiveness is much the same as the "cause" of a liberal ideology—and of marijuana use as well. The origin of all three is a culture which is anti-authoritarian and nontraditional in a wide range of ways. As a young person becomes interested in, and makes friends with, individuals who are a bit older and more involved with this way of life, they begin to adopt similar styles, attitudes, and forms of behavior—which include marijuana use and sexual permissiveness. To be a part of this subculture almost implies certain atti-

tudinal and behavioral correlates.

Sociologist Bruce Johnson, in a thorough survey of drug use patterns in colleges and universities in and around the New York area, found an almost perfect correlation between marijuana use and a number of simple social variables—gender, cigarette use, politics, and religious orientation. It was possible to predict, with almost perfect accuracy, who would use marijuana, and who would not—simply by knowing four basic social facts about the respondent: gender (men were more likely to use marijuana than women), whether or not he or she smoked tobacco cigarettes (smokers were more likely to use marijuana than nonsmokers), whether he or she participated in formal religion or not (the religiously alienated were more likely to use marijuana than religious believers and participants), and the respondent's politics (liberals were more likely to use marijuana than conservatives and middle-of-the-roaders). In fact, *97 percent of the nonreligious, liberal, cigarette-smoking men had tried marijuana, and 62 percent smoked it weekly or more!* But only *4 percent of the religious, politically conservative, non-smoking women had even tried marijuana, and not one was a weekly or more marijuana user!* Quite clearly, marijuana use grows out of a specific life style, which is, in turn, partly dependent on specific sociocultural background factors. And permissive sexual behavior (branded as "promiscuous" by those who disapprove of it) is a part of this life style.

Psychological problems

There are experts in the drug field who disagree with this characterization of an emerging "normal" permissive sexual life style among marijuana users. Jordan Scher, in "The Marijuana Habit," an article published in *The Journal of the American Medical Association*, claims that something like one user in five or ten experiences sufficient psychic difficulty in his life—in large part due to his use of marijuana—that he requires psychiatric attention. Furthermore, Scher observes that his marijuana-using patients progressively lose interest in sex as they use the drug over a period of time. (However, Scher has also suggested, in



It can make sex more pleasurable as can perfume and even waterbeds . . .

Comment by:

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MARIJUANA IS a social drug. Its use is learned in a social setting and its use is continued in a social setting. The major effects of the drug are the result of the interaction of the drug and the beliefs, expectations, and experiences of the user. Many users do not become intoxicated (get off) the first time they use the drug, and do not get off until they learn to interpret certain drug effects as "being stoned" and ignore others as irrelevant. In this context the impact of being "stoned" may well represent a self-fulfilling prophecy—one gets stoned in the way the culture who taught you to expects you to. If you believe marijuana to have aphrodisiac qualities, you probably will be aroused when you first get "turned on." If you expect to eat a lot and enjoy food or get lost in music, you will do those things. If you expect to go crazy from the

drug you will probably get very anxious or experience nothing.

In screening subjects for experiments with marijuana we asked over 100 "normal" (at least not referred patients) young men about their most pleasant experience with marijuana, and the largest commonly mentioned event was sexual behavior. Many subjects reported that smoking marijuana did not increase desire for sexual behavior—that is, it did not act as an aphrodisiac—but that it could make sexuality more pleasurable. As one of our subjects stated, "Smoking dope doesn't make you sexually aroused, but if that's where you're at it really enhances it." Subjects report increased tactile awareness, increased imagery, and time distortion as major experience-enhancing features of intoxication. Similar things can be said for candlelight, perfume, or even waterbeds.

A second major question is the extent to which marijuana creates long-term changes in social behavior, or chemically erodes superegos or otherwise saps morality. A common belief is that chemical changes underlie and are causal to "deviant behaviors" observed in drug users. Changes in level of aspiration, redefinition of goals from achievement to growth orientation, can then be seen as pathology and changes in sexual mores are seen as the result of drugs. It may well be that increases in subscribing to sexual activity on questionnaires is related to a "new ethic" that embraces candor as well as marijuana, or that embraces more open sexual behavior or even "promiscuity" (a most unfortunate value-laden sexist word). It would appear that sex and marijuana are related, but mostly if you would like them to be related.

The American Journal of Psychiatry, that marijuana substitution be tried to wean alcoholics off their drug of choice; of the two, Scher feels that alcohol is far more damaging and debilitating than marijuana.)

Although this view cannot account for the fact that frequent and long-term users are most likely to attribute positive sexual effects to marijuana (a finding which all surveys have turned up), and it is, I believe, mistaken as to the magnitude of the number of users who experience difficulty in their lives due to the use of the drug, the source of the disagreement might rest more in the universe under study than in actual substance. The sociologist examines the full range of a given phenomenon, whereas the psychiatrist typically looks at a fairly narrow segment of it. This is not to say that one is wrong and the other right, but that they are attempting to describe and explain quite different aspects of that reality.

There are something like 15 million Americans who have tried and who use marijuana—probably a conservative estimate. Judging from a wide range of studies, it is clear that the average frequency of the use of marijuana is less than once a week. This means that the typical marijuana smoker is under the influence of his drug 3 or 4 percent of his waking hours. It is against this background that any description of the impact of marijuana use must be made.

Now, it is conceivable that some marijuana smokers use the drug to avoid meaningful contact with members of the opposite sex. It is certainly possible that some users experience difficulty in their lives which can, at least in part, be traced in some way or another to their use of marijuana. And no doubt some users engage in a compulsive, self-flagellating form of "promiscuity" that they themselves despise and condemn. Marijuana users

can certainly be dredged up with sexual hangups, as can nonusers. Possibly with a greater volume and complexity of sexual episodes will come a greater volume of psychic problems, especially given their opposition to dominant "mainstream" values. But these generalizations are not a valid characterization of the full range of users and their behavior. Most marijuana users enjoy their high experiences, and they use the drug as an adjunct and an enhancer of recreational activities, and for this reason their numbers are increasing. But this is not an endorsement of the values and behaviors of the—for want of a better word—"drug culture," but it is a life style which appears well on the way to becoming conventional and standard among very large segments of respectable conforming members of society and therefore cannot be ignored. As with many beliefs and practices, the cultural margin will eventually become the center. □

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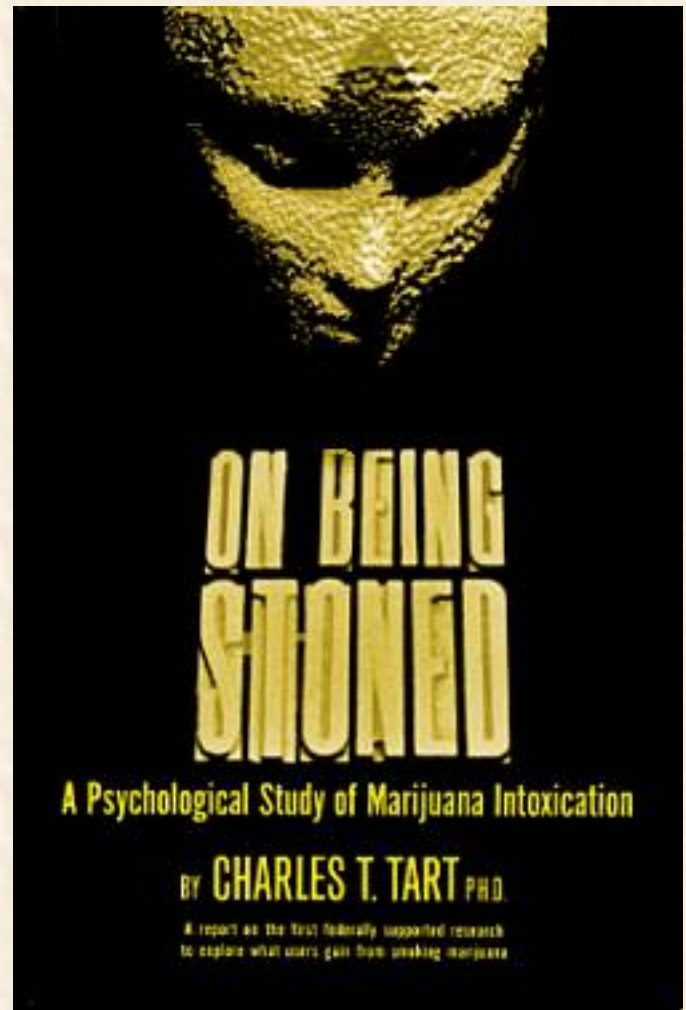
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On Being Stoned

A Psychological Study of Marijuana Intoxication

Charles T. Tart, Ph. D.



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On Being Stoned

Charles T. Tart, Ph. D.

Foreword

THE RESEARCH reported in this book is both innovative and relevant. At a time in our culture when there is a growing concern about drug abuse among the young, and the use of marijuana is increasing more than it ever has in our country's history, it is fortunate that someone has seriously attempted to investigate the psychological and subjective effects of marijuana. This book should prove valuable for the interested layman who is curious about such effects and also for the scientist who may be stimulated to carry the results of this research further.

It is important for anyone to note before reading this book that the content is a careful study of the personal *experience* encountered when marijuana is used. This important fact sets this book apart from those primarily dealing with the pharmacology, medical implications, social desirability/undesirability, or the legal problems of marijuana, and is the very reason that Dr. Tart's approach breaks new ground in this controversial area. His method has been quite simple and straightforward, yet it is one which has too long been ignored in modern behavioristic psychology in a misguided attempt to be "scientific" by avoiding subjective experience. Dr. Tart has asked persons who themselves have used marijuana what different kinds of experiences they have had. His instrument has been a carefully constructed questionnaire that has proved to be extremely useful in gathering a very large amount of data from the persons who should know best what the experience is like—those who have actually taken the drug. The personal account of the subject cannot be ignored despite some imprecision in measurement. Each individual person may use his own standards for interpreting the experience or measuring the intensity, but there is no substitute for a report by the person who has been there. Indeed, this experiential aspect of the effect, especially with psychedelic drugs, may in the long run prove to be the most valuable. Far

more important than laboratory conditions far removed from the actual social usage of marijuana is what happens to the person in his own consciousness, how he interprets this, and how it influences his actual life.

Another reason this book is a valuable contribution to our knowledge about marijuana is that it helps to answer a very important question often not even asked by many who are the most concerned about marijuana usage. This question is: Why do so many otherwise law-abiding people risk their freedom and reputation to use this illegal drug? The data in this book show consistent agreement that most of the subjective experiences reported by users—for example, sensory intensification of musical appreciation, gustatory enjoyment, and sexual activity—are extremely pleasurable. Dr. Tart has attempted to establish a subjective scale to help quantify such effects. Because pleasure is the reason most people use the drug, it should certainly be studied and not ignored in research on the effects of marijuana.

From a strictly scientific point of view, this research has great value by opening up new questions that are researchable. Once it has been established that certain types of subjective experience do in fact occur consistently, psychophysiological correlates can be measured, such as various EEG brain waves, pulse, blood pressure, and skin potential. Some of the positive effects reported might have practical clinical application, such as stimulation of appetite, decrease in depression, enhancement of refreshing sleep, and certain types of problem solving. Hopefully, Dr. Tart's work will stimulate future research to test these hypotheses.

Dr. Tart's pioneering effort points the way toward the future in other ways as well. This book is a creative step forward in better understanding the range of human consciousness. The method of studying actual subjective experience is an indispensable tool for future research into altered states of consciousness. There are important implications not only for the effects of marijuana, but also for research in hypnosis, sensory isolation, EEG feedback, and the major psychedelic drugs such as LSD, mescaline, and psilocybin. In the next twenty years there will certainly be a growing interest in altered states of consciousness triggered by all these approaches. It is important to remember that the experience, and not the technique, is what will motivate this interest. Better understanding of the effects of marijuana may lead to other methods, perhaps safer and less objectionable from a legal standpoint, for achieving similar effects.

This book should make an important contribution to man's seemingly irresistible urge to explore his own consciousness. Twenty years from now its value can be assessed from the perspective of the research that will follow. I would guess that Dr. Tart's work will be judged to have had considerable influence.

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On Being Stoned

Charles T. Tart, Ph. D.

A Fable

ONCE UPON A TIME, not so very long ago, there was a rich and powerful Kingdom called Middle America. It was progressive and beautiful, and its people were a contented lot.

The Kingdom was surrounded on three sides by (almost) impassable mountains, and on the fourth by a broad river perpetually shrouded with dense fog. There were legends that some citizens, called Travelers, had gone to places "outside" the Kingdom, but the solid citizens considered these as tall tales or crazy things; all that one needed was in the Kingdom, so why would anyone want to go "outside," even if such a thing were possible and safe?

The King and his Government took a more serious view, and long ago made Traveling unlawful because it was Dangerous. Special Constables policed the boundaries of the Kingdom.

For many years some of the impoverished citizens and outcasts had talked of Traveling to a land called Muggles, which they claimed was on the other side of the Foggy River; but these poor citizens were simply thrown in prison by the Constables, and nobody cared very much about them.

Then as time went on, more and more citizens talked about the joys of Traveling to the land of Muggles, and these citizens were Merchants, Princes, Solicitors, Tradesmen, and, especially, the Young. More Constables were hired, and the Ministers of the government warned the populace of the menace of Traveling; but still more and more citizens traveled.

Great outcries arose from the good citizens for something to be done. Some cried out that Traveling to Muggles was a menace that was sapping the strength of the Kingdom. Others cried out that those who traveled were sick in their minds and should be helped, whether they wanted help or not. Some, who claimed to be Travelers, raised their voices and said it was a good thing to travel to the land of Muggles.

Some said it was not the King's business whether a citizen traveled to Muggles or not.

In the midst of the Confusion and Outcry, some thoughtful citizens asked, "What say our Scholars? What can we make of this Traveling? How can we understand those who say it is Good and those who say it is Bad? How can we wisely spend the Kingdom's gold to Do Something when we are confused as to what is happening?"

The Scholars looked at their books and their papers, and quarreled among themselves. Some books said that Traveling to Muggles was Bad, and the Doctors wrote of sick people they had treated who had been to Muggles at one time or another. Some books said that it was Good, Ineffable, Beautiful, and the Ultimate Truth. Some books about Traveling to Muggles, written by citizens who had been there once or twice, were clearly Confused. Other books were clearly written by crazy people. Artists wrote of the paintings of Muggles. Philosophers wrote of the sublime philosophy of Muggles, but did not mention the paintings. Religious people wrote of the teachings of Muggles, but did not mention the paintings. What could one make of this? Perhaps the Crazies were mainly writing about craziness, the Philosophers mainly about philosophy, the Religious about teachings, and no one was saying much about Muggles at all?

As the outcry of the citizens rose higher, the King's Ministers dispensed gold to the Scholars, and commanded them to find out the Real Truth about Traveling to Muggles.

Now as any man knows, there are Scholars and Scholars. Some did one thing with their gold, others did other things.

The school of Scholars most in power at that time was known as the Externalist School. They knew that men may lie, and so reasoned that what a man says is of little importance, but what he does is Hard Data. The means of Traveling to Muggles was to immerse oneself in the Foggy River. As "swimming" was unknown in the Kingdom, this seemed an insane act that might lead to drowning; but the Scholars of the Externalist School set out to study it in their Laboratories. Skilled Craftsmen constructed large tanks, which were filled with water from the Foggy River. Ordinary citizens (those who claimed to have traveled to Muggles were considered too biased to use) were held under the water for various times and their behavior observed. Short immersions had little effect, but longer immersions caused Wild Movements, Increased Respiration, and Strange Sounds. Thus the Externalist Scholars produced the Hard Data on what Traveling to Muggles did to people.

Some said, "This is certainly true, but why do citizens risk the wrath of the constables for this? Perhaps there is more Truth to be found elsewhere?"

A few Scholars of other schools used experienced Travelers in their tanks of water and found very different results, but theirs is a minor tale, as there were so few of them.

This book is the work of a Scholar of Another School who believed that while men could lie, many men would also try to tell the Truth as best they could. He read the books of the Scholars and talked with many experienced Travelers, and asked himself "What could we find out if many experienced Travelers to the land of Muggles were all asked the same questions, instead of letting each talk only of the things he loves?" So he tested many experienced Travelers, and, after eliminating those few who readily told bizarre stories, he found there was Meaningfulness in what they said. Now this Scholar has made a Map of the whole land of Muggles, so perhaps new Royal Expeditions and Studies can find their way to the Important Places in Muggles and bring back Knowledge and, perhaps, Riches.

Introduction

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On Being Stoned

Charles T. Tart, Ph. D.

Introduction

I have long been impressed with the need so many people seem to have of occasionally altering their state of consciousness, of radically changing the way in which their minds function. Alcohol, prayer, meditation, sacred dances, fasting, revivals, hypnosis, drugs—these and many other techniques have all been used by people in various cultures for pleasure and insight, worship and diversion, work and healing. Yet practically all of our science and philosophy is based on what seems sensible to our ordinary state of mind, and the existence of these other states is largely ignored by being relegated to the realms of the abnormal and the illogical. It is only in the last few years that psychologists and other scientists have begun to pay serious attention to altered states of consciousness and to ask questions about what they are like, how they affect behavior, what function they have for the individual and his culture, and how they might supplement traditional methods of gaining knowledge.

In spite of the attention now starting to be focused on altered states of consciousness, we know very, very little about most of them.

When I began focusing my researches on altered states of consciousness some years ago, I found myself in a similar position to the scholar of the fable, who wanted to know about the land of Muggles.* It was clear that the mind could indeed function in non-ordinary ways, but beyond that fact things were not so clear. Some "travelers" told consistent stories about some of the states of consciousness they had experienced, and I could feel certain enough about them to plan "expeditions," research projects to investigate some aspect of that state in detail. For other states, the tales were wild and improbable, inconsistent, and clearly reflecting whatever ax the particular traveler had to grind.

The literature on marijuana was especially confusing. Even when it purported to be medical or

scientific literature, much of it was full of propaganda, pro or con. Lurid individual tales of marijuana intoxication contradicted the laboratory studies of its effects. For reasons detailed in Chapter 2, the individual anecdotes were often hopelessly confused by the personalities of the writers, and the conditions of the laboratory studies were so unusual as to have no applicability to the ordinary use of marijuana. How could I profitably explore particular features of this strange country of marijuana intoxication when the overall map of the landscape was so confused and useless? I might expend great effort on what was truly a trivial feature.

The study described in this book is an attempt to get an overall look at marijuana intoxication as it occurs in the ordinary world (insofar as California and America represent the ordinary world!). What happens to the minds of experienced users when they smoke marijuana? What do they experience? What are the frequent and infrequent, important and unimportant experiences? How do they relate to how "high" or "stoned" the user is? Are they affected by his overall drug experience his educational background, etc.? Knowing these general effects—the overall lay of the land—then we can concentrate our research efforts on the important aspects of marijuana intoxication.

The study that gathered this information is, as far as I know, unique in its approach. Staying with our analogy, I treated experienced marijuana users as explorers of the marijuana state and then systematically collected, compared, and analyzed their reports. Since it is an initial attempt at this sort of thing, it can be done in an even better fashion a second time around, and, ordinarily, I would like to have repeated the study with improvements before publishing this report.

But the times are not ordinary, and so I am publishing this without waiting for the replication that would make the figures a little more precise and eliminate an occasional mistake in the effects of some background factors. A certain amount of justifiable technical criticism will result and, hopefully, will help myself or others to carry out an improved version of this study. Because the times are not ordinary, however, I suspect a great deal of a-rational criticism of this book will also occur. Marijuana is not a subject being discussed in intellectual isolation, emotions about its use are heated, both pro and con, to put it mildly. Pressures to change existing laws are very high, and legislators ask for scientific studies of the effects of marijuana to base such changes on, so every study on this subject receives a great deal of partisan criticism or acclamation in addition to the usual scientific scrutiny. To those with a fixed position that marijuana use is harmful and marijuana users are deviates or mentally ill escapists of some sort, this book will be unwelcome. I have not argued for or against the legalization of marijuana, but the effects that experienced users describe are generally very interesting and pleasant. Thus some critics will see the tone of the book as "pro-pot," even though I have attempted to be neutral and simply describe results.

I am presenting this study, then, because the subject of marijuana intoxication is so important today and because the information contained herein will answer many questions about what it is like to be high on marijuana (and, therefore, why people use it) in a way that no other current studies will. Too, my knowledge of what most of the studies being funded by various agencies are like indicates that there are no studies going on now which will provide better answers to these questions. I regret to say that most of the new studies going on are subject to many of the same criticisms that make the older ones irrelevant to the real world, as discussed in Chapter 2.

Because of the importance of the subject and the uniqueness of this approach, I think this book will be useful or informative to three different audiences. First, researchers may use these findings as a guide to profitable research. Second, people who are curious about what being stoned on marijuana is like but

who do not use it themselves—parents, educators, physicians, legislators—will be able to get a good picture of what it is like and why people use marijuana in spite of the legal penalties. Third, marijuana users themselves will be able to compare their personal experience with that of users in general, with the result, according to many of the users who contributed to this study, that they will be able to experience more effects and acquire more control over their state.**

Again I stress that this is basically a scientific book; I have attempted to present objectively descriptions of what experienced users feel about marijuana intoxication, without arguing for or against marijuana use or letting my own feelings about marijuana distort the writing. I have feelings, of course. My own survey of the scientific and other literature puts me in agreement with Kaplan (1970) that the known dangers of marijuana use are very small, while the known social cost of the present legal structure—branding millions of Americans criminals, clogging the courts with victimless crimes, creating disrespect for the law among the young, and enforcing the laws at huge expense—is tremendously high. Thus I see some form of legalization-under-control of marijuana as socially desirable. I have, however, attempted to keep these personal feelings completely out of the book.

A tremendous amount of data is contained in this book. Although I have checked the manuscript against the computer data printouts in several ways to eliminate error and inconsistency, the sheer size of the undertaking makes it inevitable that an occasional error or inconsistency may be apparent to the diligent reader. I would appreciate his writing me about any such inconsistencies, so they may be corrected in a subsequent printing.

This study could not have been carried out except for the assistance of a number of people in the data collection, analysis, and write-up stages, all of whom I wish to thank; namely, Joan Crawford, Lois Dick, Dee Kindelt, Carl Klein, Arthur Hastings, Wanda Meyer, Mary Moore, Donna Sedgwick, Marlene Shinazy, Penny Smail, and my wife Judy. This research was supported by the United States Public Health Service grant MH16-810. All opinions expressed in this book are my own and do not necessarily reflect those of the above people or the Public Health Service.

Footnotes

*"Muggles" was one of the slang terms for marijuana when it was first introduced into this country in the 1930s. ([back](#))

**Because readers of these last two types are sometimes put off by numbers and statistics, I have disposed of all these complexities in a page of explanation following this section. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

A Note to the Non-Scientist Reader

In order to conveniently present exact findings to the researchers who read this book, there are lots of parentheses filled with numbers and simple statistics.

If you aren't interested in the *exact* findings, or if numbers and statistics turn you off, there's a simple way to avoid any problem: ignore them. Everything has been written in plain English, and the numbers confined to parentheses for just this reason!

If, on the other hand, you haven't a formal background in statistics but would like to know what the probability figures in the parentheses (such as " $p < .05$ ") mean, it all boils down to this: how do you know when a difference in the way two groups of people answer a question is a meaningful, *significant* difference, and how do you know when it results only from the random variation you get whenever you deal with people's responses?

You never know for *certain* which is which, but a statistical test is an objective way of being reasonably sure, one way or the other. Statistical tests use the known mathematical properties of numbers to let you decide when a difference is probably due to chance, and when a difference is so large that chance seems unlikely. The exact mathematics aren't of interest to the general reader, but only the outcome, the probability figure. If the outcome of a particular test could have happened by chance only five or fewer times in a hundred trials (conventionally expressed in this book as $p < .05$, probability equal to or less than $5/100$),* we begin to doubt that this is chance variation. It probably represents a real difference between the groups. If the probability is even smaller that the outcome is due to chance, say less than one in a hundred ($p < .01$) or less than one in a thousand ($p < .001$), we can feel quite certain that we are dealing with real, important differences.**

Thus in this book the lower the probability figure in parentheses, the greater the difference between the groups being compared.

Footnotes

*More exactly, the sign should be [less than *or equal to*] rather than simply $<$, but this simplification will be used throughout the text.

**Statistical tables available to me only go up to the .0005 level. When I use the notation $p << .0005$, the difference is even more significant; when I use $p <<< .0005$, it is *supersignificant*. For the technically minded, I use $p << .0005$ when chi square is greater than or equal to 50, and $p <<< .0005$ when chi square is greater than or equal to 100, with four degrees of freedom in each case.

Chapter 1

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 1. Marijuana

ONE OF THE MOST persistent and unusual aspects of human behavior, observable in all cultures and through all of history, is man's dissatisfaction with his ordinary state of consciousness and the consequent development of innumerable methods for altering it. Our normal pattern of thought and feeling, useful in many ways, never seems to be enough for some people.

The reasons for this search for better states of consciousness are many, ranging from desires for greater knowledge to religious, hedonistic, and power motives. The belief that our ordinary state of consciousness is of only utilitarian value and not suitable for insights into basic questions about the meaning of life has been one of the most important motives. Some men have been successful in achieving higher states of consciousness; others have failed. Techniques have been innumerable: religious ceremonies, meditation, hypnosis, self-hypnosis, asceticism, fasting, dancing, yoga exercises, and drugs, to name a few. Some of the men who have succeeded in altering their state of consciousness, such as the Buddha, are revered by hundreds of millions of people. Others have been outcasts of society or considered insane because their views were too different from those of their contemporaries. Still others have gone truly insane in the course of their search.

Our scientific understanding of altered states of consciousness is minuscule in comparison with what we do not know and the importance of these states. (For a survey of the scientific literature on them, see Tart, 1969.)

Drugs have been an important means of inducing altered states of consciousness throughout history. Cultures have embraced or rejected this means. Proponents have touted it as the shortcut to enlightenment, while critics, both ordinary men and those considered spiritual giants, have called it an

escape, a pseudo-enlightenment.

Our culture today is one of the most drug-oriented cultures in history; we go by the millions to our doctor (or our dealer) for pills to pep us up, calm us down, wake us up, put us to sleep, relax our tensions, make us forget, or enlighten us. As a whole our cultural attitudes toward drugs are irrational to the point of absurdity. We mightily praise some drugs whose detrimental effects are enormous and well known, such as alcohol, and condemn other drugs about which we know very little. Scientific knowledge about drugs has generally been of little consequence in affecting social attitudes and usage.

This book is an attempt to broaden our knowledge about one of the most widely used and poorly understood drugs in our culture today, marijuana.

THE PLANT

Marijuana is the term given to preparations of the flowering tops, leaves, seeds, and/or stems of the Indian hemp plant, *Cannabis sativa L.* The preparation, for eating or smoking, is commonly called marijuana, marihuana, Mary Jane, hemp, pot, grass, shit, and dope, with usage depending on fashions and subcultures.

Cannabis sativa grows wild all over the world and is a very hardy plant. It is extensively cultivated in many areas, and research of optimal techniques of cultivation has been extensive (Drake, 1970). The plant is desired for its fibers, which are used for rope, as well as for its drug value. Attempts to increase fiber content and decrease drug content of the plant by mutation have succeeded only in increasing the drug content (Warmke & Davidson, 1941-43, 1942-43, 1943-44).

The drug potency of the plant depends on the particular strain of plant, cultivation techniques, soil, and climate. Different parts of the plant have different concentrations of the drug. Much of the marijuana generally available in the United States today is what is called in India *bhanga*, and is the least potent mixture, made from poor quality plants or from the lower leaves of better plants. Stems and seeds are generally separated out from marijuana by users, as they contain practically none of the desirable ingredients of marijuana. The seeds are also widely reputed to contain substances that induce headaches if smoked.

A more potent grade of marijuana, termed *ganja* in India, consists of the flowering tops and upper leaves of carefully bred plants. The most potent marijuana preparation, generally termed hashish or, colloquially, hash (*charas* in India), consists only of the sticky resin scraped from the tops of mature and carefully bred plants.

Hashish is often treated as a separate drug, but there is no good scientific evidence to indicate that it is chemically different. By virtue of its containing far more active ingredients by volume, however, the user either can get intoxicated with much less hashish than ordinary marijuana or can get more intoxicated by using an equal amount. Whenever I refer to marijuana effects in this book, I am including those of hashish.

Techniques of Use

Marijuana is eaten or smoked. Most American users prefer smoking because (1) less marijuana is required for a given degree of intoxication; (2) effects begin within a few minutes after smoking and end within three or four hours, as compared to an hour or more for onset and a duration of six to twelve hours when eaten; (3) more precise control of the level of intoxication is possible, as the user can stop smoking when the desired level is reached; and (4) more aftereffects and unpleasant effects are associated with eating marijuana because of the possibility of overdose. Smoking is done by making a cigarette (commonly called a joint or reefer) or by using a pipe, often a waterpipe to reduce the harshness of the smoke. The smoke is held in the lungs as long as possible to maximize absorption.

Active Ingredient(s)

Marijuana is a complex substance and has long resisted analysis as to its active ingredients. The reader interested in the chemistry and pharmacology of marijuana should see Mechoulam (1970) and Wolstenholme (1965).

In the last few years one of the major active ingredients has been identified and named tetrahydrocannabinol (THC).^[1] Human subjects given synthesized THC under laboratory conditions report many effects similar to those reported for natural marijuana, and a number of workers feel that THC may be the only active ingredient in marijuana. Numerous studies of the effects of synthetic THC on animals and humans are being funded by the federal government. Experienced users, however, insist that different samples of marijuana differ somewhat in qualitative as well as quantitative effects; some marijuana has a much stronger sedative effect, some tends to make people very silly, and so on. This suggests that there are other active ingredients than THC in marijuana, and research should not concentrate too exclusively on THC, in spite of the pharmacological and medical convenience of working with a pure drug instead of a natural mixture (Weil, 1969).

Pharmacology

Little is understood of the chemical fate of marijuana once it is absorbed into the human body. Older research with marijuana extracts on animals, the usual method of establishing basic pharmacological information, has been fraught with methodological difficulties. Many physiological effects appear in animals that do not appear in humans, species differ markedly from one another, and different individuals of the same species often show opposite effects. It is not known whether the dosages used were really comparable to those used by humans. Ongoing research with synthetic THC may begin to add to our knowledge, but at present we know practically nothing about the pharmacological action of marijuana.

PHYSIOLOGICAL EFFECTS ON HUMANS

The most striking thing that can be said about the physiological effects of marijuana on humans is that there are practically no observable effects of consequence. Weil, Zinberg, and Nelson (1968) found that marijuana increases heart rate somewhat and causes a dilation of conjunctival blood vessels (somewhat bloodshot-looking eyes). They found no evidence of dilated pupils, even though law enforcement officers typically use this as a test for intoxication.

Marijuana seems to be a rather unique drug in having such profound psychological effects with virtually no readily observable physiological changes.

Effects on Human Performance

The performance capabilities of intoxicated users have been investigated in a number of older studies, but because of methodological shortcomings, discussed fully in Chapter 2, they have yielded little reliable information.

Two recent studies, both methodologically very good, found essentially no measurable changes in performance. Crancer and his colleagues (1969) tested *experienced* users for performance in a driving simulator. When intoxicated on marijuana, they were not significantly different in *overall* performance than under control (non-intoxicated) conditions, although there were significantly more speedometer errors. Speedometer errors have not been found to correlate with actual driving performance in normal drivers, however. When the same subjects were intoxicated on alcohol, they made large numbers of errors on almost all aspects of the driving simulation tests.

Weil and his colleagues (1968) found that *experienced* marijuana users showed no significant losses in performance on some simple motor and intellectual tasks; indeed, they sometimes showed a slight improvement when intoxicated. Naive subjects who had not smoked marijuana before the laboratory experiment did not get "high," i.e., felt none or few of the experiential effects of marijuana, but showed significant impairments on a variety of tasks.

I doubt that alterations of simple sensory and motor tasks will be found associated with marijuana intoxication. Subtle alterations may be found by sophisticated analyses, such as Weil and Zinberg (1969) found for speech patterns, but the effects of marijuana seem to be primarily on the more complex intellectual functions, as detailed in this book. These are probably detectable only by asking users about them and/or by administering psychological tests, which are sensitive to complex alterations of mental functioning.

Psychological Effects

In one sense this entire book is a description of the psychological effects of marijuana intoxication, so no attempt will be made to deal with them in this introduction.

Addiction

An addicting drug, such as heroin, generally requires the user to continually increase his dosage because of the tolerance he builds up to the drug, produces acute distress if the user does not get his dose at the regular time, and produces extreme distress, which can result in death or severe withdrawal symptoms, if the drug is completely taken away from the user.

Much nonsense has been promulgated in the past by narcotics agencies and medical groups about the addicting properties of marijuana. There is no evidence of addiction. Emphasis today is laid on the fact that marijuana produces a "psychological dependence." This is a nonsensical use of the English language, for psychological dependence simply means that people tend to repeat enjoyable experiences.

Experienced users can stop using marijuana at any time with no distress or physiological symptoms. Once they learn how to get intoxicated, they require less, not more, marijuana.

Occasional users who are mentally ill may use excessive amounts of marijuana or become temporarily dependent on it, but this says something about mental illness rather than marijuana.

Similarly, no reliable evidence exists that marijuana use causes users to try dangerous narcotics like heroin. Persons predisposed to narcotic addiction become addicted whether or not they have used marijuana. The vast majority of marijuana users never get involved with narcotics, even though the need to deal with pushers, who may also sell narcotics, gives them ample opportunity.

LEGAL STATUS OF MARIJUANA

The possession of marijuana or its extracts is a serious offense in every state of the United States and its territories. Penalties vary widely from state to state. Although reform movements are under way, the prescribed penalties in many states are still extremely harsh. Years of imprisonment are frequently mandatory for the possession of the smallest detectable amounts of marijuana.

Penalties for selling or giving away marijuana are even more severe. Since many users also buy marijuana as a favor for their friends, they are generally liable to these higher penalties.

The actual structure of the laws is exceptionally complex, and some will be changed shortly. By far the best review of existing laws and their social consequences has been made by Kaplan in his recent book, *Marijuana, the New Prohibition* (1970). Smith's (1970) book also contains excellent discussions of the social issues revolving around marijuana use.

EXTENT OF USE

In spite of the severe penalties attached to possession and sale of marijuana, use today is very widespread. Given the sorts of pleasurable effects reported later in this book, it seems likely that use will continue to increase.

No definite survey of incidence of use can be made because there is always a (realistic) tendency of wary users to deny their use. Nevertheless, a large number of surveys of drug use on college campuses have been made (Kaplan, 1970; Pearlman, 1968). It is now a rare college campus that does not have a significant number of marijuana users and on many campuses users themselves estimate over 50 percent of the students use marijuana occasionally, primarily at social events. An unpublished study that I carried out in collaboration with one of my graduate students, Carl Klein, found that from 1967 to 1968 the percentage of students who used marijuana at a conservative West Coast university doubled, and various formal and informal estimates of that population since have confirmed that a majority of the students have tried marijuana. (Further details of this study are presented in Chapter 28.) This seems typical. Drug-education programs sponsored by schools and government agencies are viewed with scorn and amusement by users since their own and friends' experiences with marijuana convince them that the instructors are ignorant or lying. This is an unfortunate effect, as the attitude may be generalized to warnings about drugs that really are dangerous, such as hard narcotics and amphetamines.

Marijuana use is by no means confined to college campuses. In a survey of young adults (eighteen and over) in San Francisco, Manheimer, Mellinger, and Balter (1969) reported that 13 percent had used marijuana at least once. Conservative estimates in the press usually figure that several million Americans have tried marijuana, although it is not clear how many use it with any regularity.

Difficult political, moral, and religious problems arise when an act generally condemned and illegal spreads at such a rapid rate. This book is not the place to go into them, but the interested reader will find some good discussions in Aaronson and Osmond (1970), Krippner (1968), and Kaplan (1970).

Leaving aside considerations of social and political problems, what sort of reliable, scientific knowledge do we have about the effects of marijuana? What do users experience that makes the risk of prison worthwhile?

The following chapter discusses the nature of marijuana intoxication and explains why previous scientific work has gained very little reliable knowledge about it. The remainder of the book describes the method and results of the present study as an attempt to answer the question of what marijuana smokers experience.

Footnote

1. Technically this is named 1-delta¹-*trans*-THC. Due to an ambiguity in the system for giving chemical names, it is sometimes referred to as 1-delta⁹-*trans*-THC in some literature. ([back](#))

Chapter 2

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 2. The Nature of Drug-Induced States of Consciousness

PEOPLE SELDOM do something without a rationale explicitly or implicitly guiding their actions. Although I have tried to avoid theorizing as much as possible in this book, there was a theoretical rationale that led to the initiation of the present study. The theory presented here is applicable to most altered states of consciousness, although this presentation focuses on marijuana intoxication. Application of this theory to more powerful psychedelics, such as LSD, mescaline, or psilocybin, should take account of the fact that an even greater range of effects is potentially available with these drugs than with marijuana.

The condition of being under the influence of marijuana—of being in a state of *marijuana intoxication*—is one of many altered states of consciousness potentially available to man (see Tart, 1969). But what exactly do we mean by a *state of consciousness*, and more specifically, what do we mean by the particular state of consciousness we call marijuana intoxication?

A simple answer to this is that marijuana intoxication is a reorganization of mental functioning that comes about from the ingestion of marijuana. For reasons explained in detail later, however, to define a state of consciousness in terms of its obvious initiating procedure, while "objective" and "operational," can be very misleading. Some people, for example, smoke marijuana and experience no discernible effects; are such people in the same state of consciousness as someone who smokes marijuana and says time goes slowly, sounds are more beautiful, and his body is filled with energy?

A state of consciousness is a hypothetical construct invoked to explain certain observed regularities in behavior and experience. That is, we start out by observing a number of people about whose functioning there is something presumably *different*. Each of these people reports experiences and exhibits behaviors

that are unique, a product of the individual's personality and the particular situations we observe him in. If, however, we can discern a certain common patterning of functioning in all of these people, a common pattern superimposed on their individual uniqueness, we may hypothesize something to explain this common pattern. This hypothesized something might be a common personality trait, belief system, physical attribute, or, in terms of our interest a common state of consciousness. Particularly, if we know that all the observed individuals ingested marijuana just before we began observing them, we will be tempted to say that the common pattern of functioning we observe is the result of their all being in a state of marijuana intoxication.

Note, however, that it is the empirically observed common pattern of functioning^[1] that is the crucial defining operation of the state of consciousness; the fact that they had all ingested marijuana serves secondarily to specify something we think to be a *cause* of the hypothesized state of consciousness.

What, then, are the properties of this hypothesized state of consciousness, marijuana intoxication? How do we discover these properties?

Clearly the way to answer this is to give marijuana to a number of people and observe what is common in their experience and behavior. Unfortunately, the observation process is much more complex and full of pitfalls than we would expect.

Much of our usual experience with the effects of drugs on consciousness misleads us into expecting fairly simple relationships. If, for example, you give a strong dose of barbiturates or other sedatives to a person, he almost always goes to sleep. Hence we describe the state of consciousness (or lack of it) induced by barbiturates as a barbiturate-induced sleep. There is little variability across subjects, and our observational process is simple.

With a psychoactive drug like marijuana, on the other hand, the variability across subjects is very high, and the observation process itself may systematically bias what we observe, as will be detailed in the next section. It may even turn out that different people might experience different states of consciousness from using marijuana, that is, the observed patterns of experience and behavior fall into *several* distinct patterns rather than a single pattern common to all individuals. We generally consider alcohol intoxication, for example, as a single state, yet on a second thought there are clearly some individuals who have very different experiences with alcohol from those the majority of us have. A drug may thus stimulate a reorganization of functioning, but the nature of the new pattern may be determined by factors other than the nature of the drug per se.

Let us consider in detail the question of why a given individual, taking marijuana (or any other psychoactive drug, for that matter) at a particular time and place, might experience the particular things that he does.

VARIABILITY OF DRUG-INDUCED STATES

Our common experience with many drugs inclines us to think along the line that "Drug A has effects X, Y, and Z." This is generally adequate for most drugs. Heavy doses of barbiturates make a person drowsy. Penicillin cures certain diseases. Amphetamines stimulate people.

When it comes to drugs whose effects are primarily psychological, however, the tendency to think that drug A has effects X, Y, and Z can be very misleading and introduces confusion. That type of

statement attributes certain sorts of invariant qualities to the chemical effect of the drug on the nervous system. When dealing with psychoactive drugs such as marijuana or LSD, however, both scientific research and the experience of users have made it clear that there are very few "invariant" qualities that are somehow inherent in or "possessed by" the drug itself. Rather, the particular effects of a drug are primarily a function of a *particular* person taking a *particular* drug in a *particular* way under *particular* conditions at a *particular* time.

Potential Effects Model

The conceptual scheme used in this book for understanding the variability of effects with psychoactive drugs may be called the *potential effects model*. Basically, the observable effects of a psychoactive drug such as marijuana are of three types. First are what might be considered *pure drug effects*, i.e., effects almost always manifested when a particular drug is taken, regardless of person, place, situation, and time. Such effects are probably due primarily to the chemical nature of the drug as it interacts with common characteristics of human body chemistry. With many psychoactive drugs, pure drug effects are only a small portion of the total effects possible.

Potential drug effects are effects that are made *possible* by the ingestion of a particular psychoactive drug but that will not manifest (become noticeable to the user or an observer) unless various non-drug factors operate in the proper manner; i.e., potential effects manifest only under certain conditions. These conditions will be discussed at length below. These potential effects constitute the majority of effects for a drug such as marijuana.

Insofar as potential effects constitute the bulk of effects for marijuana intoxication, it is misleading to talk about the effects of marijuana per se, as is commonly done. Rather, we must speak of the effects of marijuana on certain types of people under certain types of conditions. (A third category of effects under this model is not, properly speaking, drug effects at all, but *placebo effects*, or pure psychological effects. These are effects brought about by non-drug factors entirely. If the particular configuration of non-drug factors necessary to produce a particular placebo effect occurs frequently under conditions usually associated with taking a particular drug, the effect will probably be, erroneously, ascribed to the drug.)

Factors Controlling Potential Effects

We shall consider all of the current known classes of factors, which will determine how a particular individual reacts to a psychoactive drug at a particular time, before looking at the problem of variability from one time of drug intoxication to another.

Drug factors include the chemical composition of the drug, the quantity used, and the method of administration.

Marijuana has a very complex *chemical composition*. Some investigators feel that THC is the only active chemical of importance; others feel there may be other active chemicals or chemicals that, while not active in isolation, may modulate the effect of the THC. For marijuana use outside the laboratory, the possibility of significant adulteration exists. These adulterants may have no effect themselves, simply reducing the potency of the marijuana, or they may modify the intoxicated state as when marijuana has been soaked in opium or LSD. Certain active adulterants are valued by some users, disliked by others. As users generally test samples of marijuana offered for sale, they often have an opportunity to reject marijuana with adulterants that produce undesirable effects.

Authoritative figures on the extent and type of adulteration of marijuana cannot be obtained, but most users feel it is usually rare for marijuana in the United States to be actively adulterated. [2] The more powerful psychedelics purchased illicitly, on the other hand, are usually significantly adulterated (Cheek, Newell, and Joffe, 1970).

The *quantity* of marijuana taken at a given time is important in determining effects, but not as important as we might expect. Experienced users have a great deal of control over the effects (see Chapter 17), and can sometimes increase or decrease their level of intoxication at will.

An important consideration with respect to *quantity* and *method of administration* of the drug used at a particular time is whether the user himself has control of the method and quantity. Marijuana users typically smoke marijuana and control their level of intoxication as desired by the amount they smoke. Many users consider smoking the ideal method of administration for this reason. Eating marijuana usually requires about three times as much marijuana to reach a given level, takes effect more slowly, lasts longer, is more variable in effects, and is much more frequently associated with overdoses and unpleasant effects. For some users, eating marijuana or taking a capsule in the laboratory produces some anxiety in and of itself, because they know they will have less control of the level of intoxication.

Long-term factors affecting a particular period of intoxication include the culture (and subculture) of the user, his particular personality characteristics, his physiological characteristics, and the skills he has learned for controlling his intoxicated state in earlier drug use.

Cultural background is a very important factor about which little is precisely known. Attitudes toward various drugs vary tremendously from culture to culture, and this prevailing cultural climate may have a strong effect on the user. Classical Islamic culture, for instance, prohibits the use of alcohol but sanctions marijuana use. Our American culture as a whole believes marijuana produces undesirable and dangerous effects, and this knowledge may very well influence an individual user at times, in spite of subcultural support of marijuana smoking. In our culture, feelings of paranoia (e.g., fear that there may be a policeman watching) are frequent and normal, although experienced users generally treat them rather objectively rather than getting concerned about them in a maladaptive fashion.

Personality affects marijuana reactions. Users commonly believe, for example, that authoritarian people, who are not open to new ways of perceiving and thinking, either get no effects at all from smoking marijuana or have very unpleasant effects. They try to maintain their ordinary way of perceiving and thinking against the drug effects. There is a large psychological literature on the way in which personality factors affect reactions to a wide variety of psychoactive drugs other than marijuana.

Overall *physiological functioning* shows very similar patterns in healthy individuals; i.e., their bodily reactions to a given drug are similar enough to not be important. For some drugs and/or for some individuals, however, unique physiological factors might cause special reactions. I know of no solid

information on this for marijuana, but it should be kept in mind as a potential source of variability.

Learned drug skills are particularly important in marijuana intoxication. A neophyte commonly must use marijuana several times before becoming aware of its effects; he must learn to recognize certain subtle effects that indicate he is intoxicated (see, e.g., Becker, 1953). With increasing experience and contact with other marijuana users, the neophyte learns of other effects that he may try to experience himself and of techniques for controlling his intoxication experience (see Chapter 17). He may learn to reproduce many of the usual effects of intoxication without actually using marijuana, as in "contact highs" (feeling intoxicated just by being with intoxicated companions) or "conditioned highs" (feeling intoxicated to some extent by the action of preparing to use marijuana).

Immediate user factors include several factors that assume particular values for hours to days before using a drug, such as mood, expectations as to what will happen, and desires for particular happenings.

Mood is particularly important with a drug like marijuana, as many users report the intoxicated state amplifies whatever mood they were in before taking the drug (see Chapter 16). If they were happy, they may become very happy; if they were sad, they may become particularly gloomy. An experimental study that picked student subjects just before exams, for example, might find that marijuana depressed people. *Mood* interacts with *expectation*, the user's beliefs about what the drug can and will do to him. This, in turn, derives from what he has heard about the drug, the situation he will be in, and his own past experience.

The user's *desires* may or may not be congruent with his expectations; he may want to have insights about himself or find a new appreciation of beauty, but he may expect that the drug will not do this, or will make such an experience unlikely, given the circumstances.

The experiment or situation includes the immediate factors surrounding the taking of the drug, such as the physical setting and social interactions. In the experimental situation, both the formal instructions and the implicit demands given a subject can strongly influence the user-subject's reactions.

The *physical setting* in which the drug is taken can have important effects. If it is cheerful, warm, esthetically pleasing, it may help create a positive mood in the intoxicated state with consequent effects on a variety of other drug phenomena. If the physical setting is cold, sterile, or ugly, negative emotions may be amplified. Effects that only manifest if the user relaxes his control would not manifest in a setting that makes the user insecure. Experienced drug users may attempt to turn inward and ignore unpleasant aspects of the physical setting, with varying degrees of success.

Social events include all interactions with companions, experimenters, other subjects, and casual droppers-in. A major way of controlling marijuana intoxication is the direction of attention; interactions with others also direct attention, and this can have a major effect on what the user experiences and how he behaves. Strangers, people the user does not trust, manipulative people, and the like can produce strong negative, paranoid reactions. Warm, cheerful, enthusiastic, interested people have an opposite effect.

The *formal instructions* given in an experimental situation ("We are here in order to study X by doing Y") further shape the user-subject's expectations as to what will and should happen, provide norms for behavior, and a goal to be sought. All reports of experiments specify the formal instructions to the subjects; they are indispensable to understanding the results. Unfortunately, most experimental subjects now know that experimenters frequently lie to them or mislead them with instructions, implying that the

subjects are dumb, unimportant, or untrustworthy. This does not make for an honest experimenter-subject relationship, and may encourage the subject in turn to lie or mislead the experimenter.

This brings us to the problem of the *implicit demands* of the experimenter, what Orne (1959, 1962) has called *demand characteristics* and Rosenthal (1966) has called the problem of *experimenter bias*. Briefly, when psychologists and psychiatrists began copying the methods of the physical sciences, they took up the idea of the *neutral observer*, whose presence did not itself affect the experiment. It is now clear, however, that an experimenter, in addition to his formal instructions, which are available for public assessment, makes all sorts of covert, implicit demands on his subjects to perform in a certain manner. These demands are *not* open to public examination and so cannot be fully evaluated for their effect on any given experiment. Particularly, the experimenter frequently has an a priori belief or hypothesis as to how an experiment *should* turn out, and this belief can be covertly communicated to the subjects. Since subjects are there to "help science," they often modify their behavior or experiences—unconsciously, semiconsciously, or consciously—to do the "right" thing (or the "wrong" thing if they are in a negative mood). I believe we shall see a major reformulation of the methods of the social and psychological sciences in the next decade as we realize that experimenters *interact* with subjects, that they are themselves one of the variables in the experiment, and that science is a *human* activity. The bases for this change are nicely summarized in Kuhn (1962), Lyons (1971), Maslow (1966), Polanyi (1958), and Rosenthal (1966).

Most of the scientific literature on LSD demonstrates the effect of experimenter bias. Researchers who believed that LSD was a "psychotomimetic" constantly reported psychotic-like reactions among their subjects. Researchers who believed LSD was mind-expanding or psychedelic saw these beliefs confirmed. Both groups were partially right. What they did not realize was that they had unconsciously acted in ways to make their beliefs come true. They both demonstrated *some* of the potential effects of LSD, but were mistaken in thinking they had demonstrated pure drug effects or invariant effects.

Selective Amplification, Inhibition, Interaction

None of the above factors affects the intoxicated state in isolation. Some may be important at one time, others unimportant. Users may choose to concentrate on some of these factors, amplifying their effect, or try to inhibit others, with varying degrees of success. Some of the factors may interact at a given time. A cold and sterile setting, an angry or unfriendly experimenter, and a poor mood on the subject's part can all combine to produce negative effects beyond the subject's ability to control.

The ranges and combinations of these important factors are enormous, which means that the variety of drug intoxication effects is correspondingly large. We know little about exactly *how* important some of these are, or *how* they interact. Some *extreme* values of these factors, however, do produce known effects.

For example, suppose we wanted to know how to produce a pleasant marijuana experience or an unpleasant one. [Table 2-1](#) summarizes some extreme values of controlling factors that will maximize the probability of a "good trip" or a "bad trip." If all the controlling factors take one or the other of the extreme values, success in manifesting the potential effects that constitute a "good" or "bad" trip is highly likely. If some factors take on "good trip" values and others "bad trip" values, the outcome is

uncertain.

Feedback Modification of Intoxication

It should be stressed that the user is not a passive object to which a certain configuration of controlling factors can be applied and, as a consequence, certain results will automatically manifest. The user is monitoring his own state of consciousness; he may deliberately seek to intensify the effects of certain factors and diminish those of others in order to obtain effects he considers desirable.

This applies both to specific effects and the level of intoxication. If a room is depressing, the (free) user will leave it. He may select music that will remind him of (and thereby induce) certain experiences, or he may seek out companions more intoxicated than himself in order to raise his level of intoxication by means of a "contact high" (see Chapter 17). The effects of all controlling factors are constantly subject to modification by the actions of the user.^[3]

Variability over Time

Any or all of the above controlling factors may vary from one period of intoxication to the next, and many are likely to vary considerably over longer time periods. While long-term factors may generally stay relatively constant for a given user, they can change; as when the user associates with a new subculture. For example, many students who have used marijuana extensively get interested in meditation and, once associated with a formal meditative discipline, are often told that the "spiritual" experiences they have had with marijuana are unreal and diversionary, so that they no longer value such sorts of experience.

The increasing skill in control and wider range of possible effects as a drug user becomes more experienced are particularly important. A given user taking marijuana for the tenth time is, in many ways, a very different person from when he took it for the first time.

THE LEVEL OF INTOXICATION

In the previous discussion, we have treated marijuana intoxication as something that is simply present or absent; but, in fact, it may be present in various degrees, from the lowest degree possible for a user to recognize that he is intoxicated, up to the maximum level of intoxication he may obtain. Variation in level from time to time constitutes another source of variability, as well as being of interest in its own right.

In studying drug-induced states of consciousness, it is tempting to assume that the level of intoxication is specified by the dosage of the drug, and this has been done in most laboratory studies.

With respect to marijuana (and other psychedelic drugs), however, comments of users indicate that dosage is only an approximate, and sometimes quite fallible, guide to level of intoxication. Neophytes may ingest very large quantities of marijuana without feeling any effect. Experienced users generally report they can become very intoxicated on quantities of marijuana that are small compared to what they originally required. Further, not only will using the same amount of marijuana from the same supply result in different degrees of intoxication for a user at different times, many users have special techniques for raising or lowering their level of intoxication by psychological means.

Users commonly evaluate the potency of marijuana offered for sale by smoking a fixed quantity of it and rating the level of intoxication thereby attained. In the present study I formalized this procedure by asking users to rate, on the basis of their extensive experience, the *minimal* level of intoxication necessary to experience various intoxication effects. That is, certain effects may be experienced at all levels of intoxication, others in the moderate and high levels, others only at the high levels. The minimal-level model, then, assumes there is a threshold level of intoxication below which a certain effect cannot usually be experienced and above which it can be experienced (assuming other conditions are right for a potential effect). Once this minimal level is passed, the effect is potentially available at all higher levels. For example, slowing of time is practically never reported at very low levels of intoxication, but is usually reported at moderate and higher levels. This model is further discussed in Chapter 24.

The theoretical rationale for self-reporting of depth of an altered state of consciousness may be found in detail elsewhere (Tart, in press). Briefly, in the course of his marijuana use, a user finds that certain phenomena become available when using more marijuana and that the progression of phenomena with increasing dose follows a fairly regular sequence through most of the times he has become intoxicated. In the future he can then examine what is happening to him, survey the phenomena he can and can't experience, and estimate his degree of intoxication from this. [4] I have found this kind of self-estimation of level to be extremely useful in the study of hypnosis (Tart, 1970a), and Frankenhaeuser (1963) has found estimates of intoxication correlate very highly with dosage levels for nitrous oxide intoxication. [5]

STUDYING MARIJUANA INTOXICATION

In spite of all the sources of variability and uniqueness discussed above, we still commonly talk of marijuana intoxication as a state, implying that there is a relatively common pattern superimposed on the varied manifestations that result from using marijuana. Our present information as to what that pattern is, is very poor.

We presently have two sources [6] of information about marijuana. On the one hand, we have individual anecdotes of marijuana users. These are valuable but cannot be generalized very reliably. We don't know how much of what is reported is a product of marijuana intoxication and how much of the individual writer. On the other hand, we have clinical and laboratory experiments. These are as limited in applicability to the state of marijuana intoxication in general as are the anecdotal accounts, for the reasons detailed in the next section; the laboratory or clinic is an unusual constellation of conditions, which accentuates certain potential effects and inhibits others in a way that is atypical of the general use

of marijuana.

The ideal study of the nature of marijuana intoxication should proceed in a number of stages. First, we must determine the *range* of effects; i.e., what are *all* the various effects supposedly associated with marijuana intoxication?

Second, since it is impractical to study everything at once, we must determine which of these effects in the total range are *important*. We may determine importance on theoretical grounds, which will vary with our own background and beliefs; or we may, somewhat more objectively, decide to study the frequent effects and let the rarer ones wait.

Third, we may set up controlled experiments to investigate each important effect in isolation. What causes it? How does it relate to dosage? Do different personality types experience it with important variations? Is it adaptive or nonadaptive for certain individuals?

Fourth, we may study the relationships between important effects. Must effect X always appear before effect Y? Does B inhibit A? Does investigator M always observe effects N. O. P and investigator Q always observe effects R. S. and T? Why?

Finally, all this knowledge may be put together for a general theoretical understanding of what marijuana intoxication is. As with any scientific theory, this understanding will then be judged on its informational usefulness (does it "make sense" and order the observations conveniently?) and its ability to predict further observations (i.e., if it orders all presently known facts elegantly and can't handle the next new fact, it's not very good).

In steps three and four, it is important to remember the restricting effects of the laboratory; i.e., the gain in precision of observation may be offset by the narrowing of the range of potential effects observed and the distortions caused by experimenter bias. However, if we know the range and importance in advance, from steps one and two, we can compensate for the restrictions of the laboratory to a great extent; we will be careful not to overgeneralize and misapply laboratory findings.

THE SCIENTIFIC LITERATURE ON MARIJUANA

There is a vast medical and scientific literature on marijuana, dating back over half a century. The reader interested in perusing this should consult Gamage and Zerkins' *A comprehensive guide to the English-language literature on cannabis* (1969).

It is traditional in a scientific book for the author to thoroughly review all other scientific literature on the subject. I shall not do this, for this literature represents work that is generally methodologically unsound, so no solid conclusions can be drawn from it.

Most of this literature rather uniformly attributes almost every human ill imaginable to marijuana intoxication. It is rather reminiscent of the medical literature on masturbation in the last century. As a first methodological warning sign, the intelligent reader might wonder why the practice of marijuana smoking is so widely indulged in if all its effects are negative?

More formally, let us consider the literature in two categories, the medical literature and the experimental literature.

The medical literature to date on marijuana consists primarily of clinical observations of patients identified as marijuana smokers by physicians treating them. Because marijuana was used before the

patient came to the physician, marijuana is considered the cause of the disease. The logic of this is fallacious. Cause and effect cannot be established simply because one thing precedes another unless all other preceding events can be eliminated as possible causes. For example, various medical disorders prevalent among people of underdeveloped nations where marijuana smoking is widespread are attributed to its use. We could equally well reason that the medical conditions in underdeveloped nations lead to marijuana smoking, or that they have nothing to do with it. Thus practically all the medical literature on marijuana is useless, being moralizing under the guise of medicine.

This is a particularly regrettable situation. It seems a priori likely that prolonged use of any drug would have some effects on the body (good or bad), and we very much need factual medical knowledge of marijuana's effects.

The experimental literature on marijuana, with an occasional and notable exception, represents research carried out under a set of circumstances that are almost certain to produce results that have practically no applicability to the normal use of marijuana; i.e., they emphasize certain potential effects that are atypical of our society's normal use of the drug.

Some of the most notable atypicalities of the experimental research to date are as follows.

Control of the drug has been in the hands of the experimenter. The subject usually had to take one of a number of unknown substances in an unknown dosage. This can produce a good deal of anxiety and an intensified need for control and defense. As discussed earlier, marijuana users prefer to control their own level of intoxication. (User control of dosage could be allowed, even if it is somewhat less convenient for the experimenter.) Note also that subjects in many laboratory studies of marijuana have been given what are, judging by the effects reported in Chapter 11, overdoses, i.e., dosage levels they would not choose for themselves because of the probability of unpleasant symptoms and loss of control.

Physical setting has usually been a hospital or laboratory, typically ugly and impersonal. The social sciences generally, in their pursuit of "objectivity," have adopted cold and impersonal settings in order to gain it. In reality this gains a particular set of limiting conditions, not objectivity. Scientists are just beginning to become aware of how physical settings affect people (Sommer, 1969).

Social setting often paralleled the physical setting. Experimental personnel tended to be impersonal, evasive in answering questions, and manipulative of the subject. There were seldom the sort of people the experienced user would have chosen for companions. They were often typical of our culture in that they considered drug use "bad" or "sick."

Learned drug skills were typically non-existent in that *naive* subjects were almost universally used because their reactions were supposedly "uncontaminated." Thus much of subjects' reactions in such experiments represented coping activities of naive people under stress in an unknown situation. The effects of coping may have been much more prominent than many drug effects and may have been mistaken for them. Studying adaptation to drugs is fine and necessary *if* the experimenter realizes that that is what he is studying, a realization rare in the literature.

Implicit demands, difficult as they are for a reader of the literature to judge, often seem to have been negative in that "sick" or "maladaptive" reactions were expected. Aside from the unknown degree to which such demands might have been communicated by the verbal interaction of the experimenter with his subjects, such practices as keeping psychiatric attendants nearby, locking the subject in a room and keeping him under surveillance, and having subjects sign legal release forms prior to the experiment, seem sufficient to communicate strong expectations of adverse effects to subjects.

Orne and Scheibe (1964) carried out a classical study demonstrating that demand characteristics of

sensory deprivation experiments might be responsible for many of the effects supposedly resulting from the "drastic" treatment of depriving a person of sensory stimulation for prolonged periods. Because the procedure in so many sensory deprivation experiments parallels that in laboratory studies of marijuana and other psychedelic drugs, it is worth reporting this study in some detail.

Two groups of normal male college students, naive as to what sensory deprivation was about, took part in the experiment. The experimental group reported individually to the hospital where the experiment was to be held and were greeted by an experimenter dressed as a physician. The experimenter interviewed the subject about his medical history, including dizziness, fainting spells, and so forth. A tray of drugs and medical instruments, labeled "Emergency Tray," was clearly visible in the background. No reference was made to it unless a subject asked about it, in which case he was told that this was one of the precautionary measures taken for the experiment and that he had nothing to worry about.

Instructions for the four-hour experimental period, termed "sensory deprivation," were given. They included the fact that a physician was always available should anything untoward develop, and pointed out that if the subject couldn't take it, he could push a button, labeled "Emergency Alarm," to summon assistance.

The subject then had his blood pressure and pulse taken to further reinforce the "medical" atmosphere and was asked to sign a form that released the sponsoring organization, all affiliated organizations, and their personnel from legal consequences of the experiment.

The actual experimental treatment, spending four hours in a small, well-lighted, comfortably furnished room, had nothing to do with sensory deprivation. Except for the observation window through which the subject could be observed, it was essentially a normal room and all that happened to the subject was that there was no one to talk with for four hours.

A second group, the control subjects, were greeted by the same experimenter but he wore ordinary business clothes and acted in a less officious manner. There was no "Emergency Tray" in the interview room, nor was a medical history taken. The subject was told he was a control subject for sensory deprivation studies. The procedures typical of such studies were described to him, such as white noise on earphones, translucent goggles to block out all patterned vision, soft beds to reduce touch sensations, and rules prohibiting physical movement. There was no "Emergency Alarm" button in the experimental room.

Each control subject then spent four hours in the experimental room; experimental conditions were thus the same except for the demands.

Both groups were interviewed after the experimental period and given various psychological tests.

The experimental group showed a number of significant changes on the psychological tests typical of those found in sensory deprivation studies. Further, this group reported many more classical sensory deprivation effects than the control group, including more perceptual aberrations, feelings of intellectual dulling, unpleasant emotions, spatial disorientation, and restlessness. Thus many of the effects commonly attributed to a "powerful" treatment, sensory deprivation, can be obtained by the implicit demands in experimental instructions.

I fear that the reader who is not himself a physician or psychologist (i.e., who accepts such experimental conditions as "normal") will find the above description of experimental conditions rather ludicrous. How can we expect to find anything but unpleasant and unusual reactions under such circumstances? I regret to say that such conditions have been standard for almost all the research that has

been done on marijuana intoxication or studies of other psychedelic drugs.

Indeed, practically all the conditions outlined in [Table 2-1](#) as maximizing the probability of a "bad trip" are standard conditions in laboratory studies of marijuana. This was not a result of deliberate malice on the part of earlier investigators, of course, but stemmed from inadequate knowledge of the importance of non-drug factors and from the pervasive belief in "pure" drug effects.

Future experimental studies of marijuana intoxication should note the importance of the many controlling factors discussed above and report their values in particular studies. If this is done, we may begin to round out our overall picture of marijuana intoxication. Further, these controlling factors should be systematically varied. Different environments, varying from cold and sterile to warm and esthetically pleasing along various dimensions, can be tried. Experimenters and experimental personnel can be deliberately selected in terms of their personal attitudes toward drug use in order to assess how important this parameter is, and so on.

On a very practical note, political pressure is now very strong for scientists to produce better knowledge about the effects of marijuana in order to guide changes in legislation. If experimental results are to be socially relevant, priority must be given to studies carried out under conditions comparable to the ordinary use of marijuana today. Overdosing a naive person under very stressful conditions is not very relevant to answering questions about the dangers of marijuana, for an overdose of multitudes of common substances under stressful conditions can produce adverse effects. Experimental research *can* be both valid and relevant. I hope it will be.

The previous scientific literature on marijuana intoxication, then, generally represents sets of conditions under which an extremely limited range of potential effects is likely to emerge. This set of potential effects is quite unrepresentative of the effects ordinarily associated with marijuana intoxication. The old research literature can be of some scientific value in detailing the effects of marijuana on people under conditions of high stress.

THE PRESENT STUDY

The present study is intended to begin to provide answers to the first, second, and fourth questions discussed earlier under the general question of how do we scientifically study marijuana intoxication. That is, it is intended to investigate: (1) the range of effects associated with marijuana intoxication under its usual conditions of use; (2) the importance of such effects in terms of which effects are frequent and which infrequent; and (3) the relationships of these effects to level of intoxication, to some important background factors, such as education, and the relationships of some of the effects to each other.

By asking experienced users to report on various intoxication effects in the course of their last six months' marijuana experience, all the various controlling factors, which determine potential effects, will have obtained most possible values many times, so the range can be determined.

By knowing these sorts of things about the ordinary use of marijuana, we may then estimate whether a given experimental study's results may be generalized to non-laboratory conditions, and, more importantly, we may plan future experimental studies from this base to be relevant to normal marijuana use.

Also, because of the lack of scientific information about the entire range of marijuana effects, the data

of the present study provide a unique kind of information about the experiential effects of marijuana intoxication that cannot be obtained elsewhere. They are of considerable interest to the reader who simply wants to know "What do people experience when they use marijuana?" and to the marijuana user who would like to compare his experiences with those of others.

It should again be emphasized that the present study is itself limited; the marijuana users studied were mostly young college students or rather well-educated older users, and the results should not be glibly generalized beyond such groups. I hope that this study will serve as a stimulus to better and broader studies that will supersede it, both general studies and intensive laboratory research.

SUMMARY

Most psychological effects of psychoactive drugs such as marijuana are primarily *potential* effects; i. e., the drug action makes certain experiences and actions possible *if and only if* various non-drug factors are just right.

This means there is a tremendous range of experiences possible with marijuana, depending on conditions.

Previous experimental and medical studies of marijuana have been carried out under such an unusual and restrictive range of conditions that their results have little applicability to the ordinary use of marijuana in our culture today.

The present study, by inquiring about intoxication experiences of many experienced users over a long period, provides information on nearly the total range of potential effects, because the many controlling factors have varied over most possible configurations in that time.

This study thus provides basic data on the range of intoxication experiences, their relative frequency or rarity, their relationship to level of intoxication, and the effects of various background factors on them. This information provides an answer to the question "What is it like to be high on marijuana?" and provides experimental and psychological guidelines for making future experimental research more relevant and profitable.

Note that the method of the present study can provide valuable data on the *general* effects of marijuana intoxication in experienced users, but it is not suited to investigate questions about individual differences among users. Some users, for example, might experience primarily cognitive alterations while others might experience primarily sensory enhancements. Individual differences are an important topic for future study.

Footnotes

1. Note that a pattern of functioning is not the same thing as the observed effects per se. Different restructurings of mental functioning may lead to the same overt effect in some cases, the report that one event followed rapidly after another could stem either from a change in experienced time rate or from

falling asleep between events. Relationships between observed effects determine the overall pattern.

[\(back\)](#)

2. Ironically, users generally feel that increased government crackdowns on marijuana usually result in more adulteration as dealers attempt to pass off the poor quality marijuana then available as higher quality material. [\(back\)](#)

3. The great importance of the user's modification of his effects was strikingly (and humorously) demonstrated to me some years ago when, as a graduate student, I participated in an experimental study in which psilocybin (a psychedelic drug similar to LSD) was administered. I had to take a "symptom check list" type of test, sort a bunch of cards into true and false piles. Each card had a phenomenon on it, such as "I feel dizzy." As I started to sort these, it became clear that, by reading the card several times, I could make the effect manifest. So if I read a card that said, "My palms are sweating green sweat," I would decide that that would be interesting to experience, and, sure enough, in a few seconds I could see green sweat on my palms! If I read a negative effect, such as "I feel anxious and afraid," I would immediately toss that card in the false pile, and the effect wouldn't happen. [\(back\)](#)

4. For example, one of my informants, an engineer, reports that he can scale his level of intoxication on a ten-point scale by whether or not certain phenomena are available. He uses *zero* as non-intoxicated; *one* as a level where he feels a little different but nothing is clear enough for him to be sure he is intoxicated; *two* as the lowest degree of clear intoxication manifested by a full feeling in his head, clearer and more beautiful sounds, and calmness; *five* for the level where he first experiences time slowing down; *eight* for clear shortening of the memory span; and *ten* for the maximum level of intoxication, where he has large visual distortions and may begin to feel ill. [\(back\)](#)

5. A simplifying assumption underlying the present study is that there is *one* state of consciousness, marijuana intoxication, common to all users and that it vanes in a continuous fashion. It is possible that there are several states across individuals and/or that there may be qualitative alterations in patterns large enough to be called a different state of consciousness for a given individual (Tart, in press). The latter possibility cannot be properly investigated with the present data. [\(back\)](#)

6. The user has a third source of information, his own experiences, and may consider our other two sources quite secondary to this. If he is interested in understanding the nature of marijuana intoxication in a general sense, however, he should realize that his own experience is limited just as the other two sources are; namely, it is a selection from the total range of potential effects determined by his own personality characteristics and life situation. [\(back\)](#)

Table

TABLE 2-1
VALUES OF VARIABLES FOR MAXIMIZING PROBABILITY OF "GOOD" OR "BAD TRIP"

[\(back to text\)\(second instance\)](#)

VARIABLES	GOOD TRIP LIKELY	BAD TRIP LIKELY

Drug	Quality	Pure, known.	Unknown drug or unknown degree of (harmful) adulterants.
	Quantity	Known accurately, adjusted to individual's desire.	Unknown, beyond individual's control.
Long-term factors	Culture	Acceptance, belief in benefits.	Rejection, belief in detrimental effects.
	Personality	Stable, open, secure.	Unstable, rigid, neurotic, or psychotic.
	Physiology	Healthy.	Specific adverse vulnerability to drug.
	Learned drug skills	Wide experience gained under supportive conditions.	Little or no experience or preparation, unpleasant past experience.
Immediate user factors	Mood	Happy, calm, relaxed, or euphoric.	Depressed, overexcited, repressing significant emotions.
	Expectations	Pleasure, insight, known eventualities.	Danger, harm, manipulation, unknown eventualities.
	Desires	General pleasure, specific user-accepted goals.	Aimlessness, (repressed) desires to harm or degrade self for secondary gains.
Experiment or situation	Physical setting	Pleasant and esthetically interesting by user's standards.	Cold, impersonal, "medical," "psychiatric," "hospital," "scientific."
	Social events	Friendly, non-manipulative interactions overall.	Depersonalization or manipulation of the user, hostility overall.
	Formal instructions	Clear, understandable, creating trust and purpose.	Ambiguous, dishonest, creating mistrust.
	Implicit demands	Congruent with explicit communications, supportive.	Contradict explicit communications and/or reinforce other negative variables.

[\(back to text\)\(second instance\)](#)

Chapter 3

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 3. Method of the Study

THE PRESENT STUDY had a variety of origins, all centered around my long term interest in altered states of consciousness. For several years I had read many anecdotal accounts of what it was like to be intoxicated on marijuana,[\[1\]](#) talked with many students and acquaintances (hereafter referred to as pilot subjects and informants) about what being intoxicated was like, and tried to do some theorizing that would make some sense and order out of the many phenomena reported. What little sense I have been able to make out of things in terms of theorizing has been presented in [Chapter 2](#). This theorizing also made it clear that a systematic look at the overall phenomenology of altered states of consciousness was vital. The present study is an initial systematic look for one state of consciousness, marijuana intoxication.

For several years I took systematic notes on various phenomena reported for marijuana intoxication, and, based on these, a large questionnaire was made up. The questionnaire used the current language of marijuana users ("heads") as much as possible. It was distributed with a covering letter that was intended to be friendly and to induce cooperation among users both in filling out the questionnaire and in passing questionnaires along to other users. The text of the letter is given below.

To: ANYONE WHO HAS SMOKED MARIJUANA
MORE THAN A DOZEN TIMES

I usually start a letter with "Dear So-and-so," but somehow greetings like "Dear Marijuana Smoker," "Dear Head," "To whom it may concern," or anything else like that sound pretty bad, so I'm skipping the greeting and getting right down to the point.

One of my main research interests as a psychologist is the area of altered states of consciousness. I am particularly interested in investigating the psychological effects of marijuana, both for their intrinsic interest and for comparison with other altered states of consciousness. Reading the (scant) scientific literature on marijuana is disappointing, for most everything is on the order of, "Gee whiz, I smoked (or ate) grass, and I saw all sorts of pretty pictures which can't be described, and gee whiz, etc., etc., etc." That's very nice for a start, but not very specific!

From preliminary talks with people who smoke marijuana, it is obvious that there are many and varied effects, and that it would be of great psychological interest to know what they are. Scientists, as a whole, know practically nothing about the experience of smoking marijuana. You do. The ideal way to expand our knowledge about these effects would be to have people smoke it under a variety of conditions, with known amounts and qualities of grass, and then report on it. Even a rudimentary knowledge of the legal situation, though, tells you genuine laboratory research on marijuana is virtually impossible.

So I'd like to enlist your help as an expert; you've been there and, I hope, you would like to see us really know something about marijuana experiences on a scientific level, instead of just an anecdotal level. Enclosed is a questionnaire. It has a few basic questions about how much you've used marijuana, other drug experiences, and so on, to get a little background. Then the main part consists of over two hundred statements about possible experiences during the marijuana high that have been selected from preliminary surveys. I would like you to fill out the questionnaire and rate each of the described experiences in terms of how frequently it happens to you and how stoned you have to be to experience it. This is explained more fully in the questionnaire.

If you will help by carefully filling in this questionnaire and by passing more of these questionnaires on to other heads, what will you accomplish? The following kinds of questions can be answered from analyzing this data. What sorts of experiences occur when stoned, with what frequency? How are they related to how stoned you are? What kinds of differences are there between individuals? Are there several different patterns of going up, or does everybody go up the same way? How is the marijuana experience related to experience with other drugs? How is it related to how long people have been smoking? Are there certain more basic factors that account for a lot of the specific experiences? And many other things.

O.K., I'm going to learn a lot, and so will the scientific community when the results are published. What will you learn? The same thing. I don't like the kind of research (of which there is too much today) where the all-knowing scientist manipulates his stupid subjects. You're acting as the expert, the explorer, and you should be able to learn a lot for your trouble in helping me. Now, I can't get your name and mail you anything (that would run the paranoia level too high!), but it is common practice in science to send reprints of research results to anyone who requests them. If you will drop me a card in about a year (it takes that long to analyze everything and get it published), I will send you a copy of the results. No need to be paranoid on that, as I will get lots of reprint requests from people who have nothing to do with this study.

While we're on the subject of paranoia: you are able to help in this study on the basis of your *past* experience. I am *not* advocating that anyone smoke marijuana or do anything illegal in order to be able to fill out this questionnaire, but naturally you don't want to put your name on it! Note also that it is not

illegal to fill out a questionnaire. The questionnaire comes with a stamped, return envelope so you can return it to me anonymously. The data from the questionnaires will be punched on IBM cards, and the original questionnaires destroyed as soon as possible.

The way these questionnaires are being distributed also insures your anonymity. I don't know any marijuana smokers by name, so I am simply putting these questionnaires out in places where marijuana smokers may have a chance to pick them up, and just handing them to people who might or might not know smokers, until this finally reaches you, with me having no idea of the route. In turn, please take as many questionnaires from whatever source you get this as you think you can pass on to other marijuana smokers. The more returns I can get, the more revealing this research will be.

I'm asking for about an hour or two of your time. In return, you will eventually know a lot more about the psychological effects of marijuana, and the scientific community will learn even more (considering the starting level); hopefully this knowledge will eventually result in more rational attitudes toward marijuana use.

If you can't fill this out, through lack of time or experience, please pass this material and any other sets of it you have along to someone who can.

Many thanks!

Sincerely yours,
CHARLES T. TART, PH.D.

Because most users experience a variety of intoxication phenomena by the third or fourth time they use marijuana, I selected the cutoff of a dozen uses to define an "experienced" user. As noted in Chapter 4, all the users who returned the questionnaire were far above this minimal cutoff.

THE QUESTIONNAIRE

The questionnaire consisted of three parts: (1) instructions; (2) background information questions (reported on in Chapters 4 and 5) covering such things as age, sex, occupation, education, history of drug use, and so forth; and (3) 220 descriptions of effects the users might have experienced. (The questionnaire is reproduced in full in [Appendix B.](#))

Instructions for Filling Out the Questionnaire

The following instructions were attached to each questionnaire:

Do *not* put your name on this questionnaire or otherwise identify yourself.

The first two pages of the questionnaire are self-explanatory questions about your background, how much you've used pot, and your experiences with other drugs.

The rest of the questionnaire consists of statements describing a wide variety of

experiences people have reported having while stoned. These descriptive statements have been taken from a wide variety of different people's accounts and it is unlikely that any single person has experienced all of the things described.

The statements are grouped into categories, such as Vision Effects, Hearing Effects, changes in Space-Time Perception, and so on. Some descriptive statements are relevant to more than one such category, but they are only listed under one, in order to keep this questionnaire as short as possible.

Each statement describes a particular kind of experience, for example, "I can see more subtle shades of color." The sense of each statement is that whatever effect is described, it is considerably stronger or somehow different when stoned than if you were experiencing it straight. That is, some of the things described can be experienced to some degree when straight but are reported to be much more intense or different when stoned. Even if the statement does not include the phrase "than when straight," this comparison is implicit in all the statements.

For each descriptive statement, you are to make two ratings.

The first is how frequently you have experienced that particular effect when stoned, judging against all the times you have been stoned in the last six months. [2] Circle the answer category that most closely describes how often you experience that effect. The categories, reproduced under each description, are:

Never = you have never experienced this effect.

Rarely = you've experienced it at least once, but it's not at all frequent.

Sometimes = you experience it between about 10 percent and 40 percent of the time.

Very Often = you experience it more than about 40 percent of the time.

Usually = if you experience it practically every time you get stoned.

These rating categories are approximate, so while you should use your best Judgment you need not try to count over all your experiences!

The second rating to make for each descriptive statement is one of *how* stoned you have to be to experience it (if you have experienced it at all; if you haven't, don't rate this for that statement). That is, there is an assumption that some sorts of things can be experienced if you're just a little stoned, while other things can't be experienced unless you're very stoned. There is a minimal degree of "stonedness" that you have to be at to experience a particular effect. The "How Stoned?" scale under each descriptive statement runs from Just, which is the smallest degree to which you could be stoned and know that you were stoned, to Maximum, which is the most stoned you've ever been after smoking a lot of high quality pot.

It is possible to think about the "How Stoned" rating as relating to the amount of pot you smoke (or eat), but this is only a rough parallel because of the variations in the quality of pot. Thus this rating scale is defined in terms of your own perception of how stoned you have to be to experience the described effect, and you are asked to make five discriminations of your degree of stonedness, with Just and Maximum at the low and high ends of the scale, and Fairly, Strongly, and Very Strongly as intermediate points.

To take an example, the first descriptive statement is, "I can see new colors or more subtle shades of color than when I'm straight." You might have this happen to you about

half the times you get stoned (ignoring for the moment how stoned you are over all these times in the last six months), so you would circle the Very Often category. Then, thinking about how stoned you have to be to experience it, you might feel that it doesn't happen to you unless you're very stoned, so you'd circle the Very Strongly category. Thus you would be saying that you can't experience (or haven't experienced) this when you've been just stoned, or fairly stoned, or even when strongly stoned; but when you're very strongly stoned or maximally stoned you can experience the change in color perception.

It may be that you've experienced a particular effect at several degrees of "stonedness," but what you're rating here is the minimal level of stonedness you must be to experience it.

There is one other category on the "How Stoned" scale, marked LSD. You are to circle this category *only* if you have experienced that effect after having taken one of the very powerful psychedelic drugs like LSD, DMT, DET, mescaline, peyote, psilocybin, or STP. Thus there will probably be a number of things described that you've never experienced with pot but have with one of the more powerful psychedelics (if you've had any of the more powerful psychedelics).

There are a few questions where the two scales "Frequency" and "How Stoned" don't apply, and space is left for a descriptive answer.

There are a number of experiences that occur when stoned for which the opposite also occurs frequently; e.g., sometimes colors may be more intense and sometimes they may be duller. A bracket has been put in the left-hand margin whenever two questions are linked this way. Thus, you might find colors get brighter sometimes at a minimal degree of Very Stoned, and also that colors get duller frequently at a minimal degree of Just.

Finally, space has been left at the end for you to describe any effects you get from being stoned that haven't been mentioned in this questionnaire. In making up this questionnaire it was attempted to mention *everything* that people may have written about as happening while stoned, but some things have undoubtedly been missed, so this is your chance to complete the list!

Please rate the statements as accurately as you can. Whenever you feel that the way the statement is phrased doesn't quite fit your experiences, feel free to write in an explanation. If a statement makes no sense at all to you, put a ? beside it and skip it. It is understood that many of the experiences of being stoned are difficult to express in words!

Answer this questionnaire while straight, and when it is complete, seal it in the attached return envelope (do not put a return address on it!) and mail.

The envelope is already addressed and stamped.

It is so commonplace and trite on psychological questionnaires to say "Thank you" that I hesitate to say it, but I really do appreciate your filling this out!

Possible Effect Descriptions

[Figure 3-1](#) shows part of the first page of the actual questionnaire. Each possible effect statement

(referred to simply as "question" or "item" from now on) was presented in this way, with a few exceptions, described later.[\[3\]](#)

FIGURE 3-1. FORMAT OF THE QUESTIONNAIRE

VISION SENSE:

1. I can see new colors or more subtle shades of color than when I'm straight.

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Vy Strongly	Maximum	LSD

2. Colors get duller, not as vivid.

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Vy Strongly	Maximum	LSD

3. There is a sensual quality to vision, as if I were somehow "touching" the objects or people I am looking at.

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Vy Strongly	Maximum	LSD

4. When I look at pictures they may acquire an element of visual depth, a third dimensional aspect that they don't have when straight.

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Vy Strongly	Maximum	LSD

5. The world looks flat; it lacks the third dimension of depth.

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Vy Strongly	Maximum	LSD

6. I see fringes of colored light around *people* (not objects), what people have called the "aura."

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Vy Strongly	Maximum	LSD

7. I see fringes of colored light around *objects* (not people), what people have called the "aura."

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Vy Strongly	Maximum	LSD

VALIDITY PROBLEMS

For the present study to produce valid, accurate information about the nature of marijuana intoxication, we must feel reasonably certain that the possible effect descriptions mean what they seem to mean and that the respondents answered without bias or error, i.e., that they were careful in giving their answers and did not deliberately distort their answers in any fashion.

In wording the possible effect descriptions, I compromised between using standard English and drug-culture argot. I used the latter only when it was clear, as "stoned" or "high" for intoxicated. I avoided other argot terms like "far out," which have come to be used so ambiguously as to be worthless for communication. Thus the possible effect descriptions generally seem clear as to what they mean. For those few which may be unfamiliar to non-drug users, I have included brief explanations and/or references at appropriate places in the text.

A second language difficulty is that there are a variety of effects that users insist cannot be put into words, even approximately. These have necessarily been left out of the present study.

What about careless answering, or deliberate bias in answering designed to create an overly favorable picture of intoxication?

Three steps were taken to reduce this problem. First, the sympathetic tone of the covering letter and instructions hopefully reduced the need for the users' justifying themselves. Second, my promise to get results back to them made accurate reporting favor the users' self-interest. Third, a validity scale, described in the next section, was used to eliminate overly careless or bizarre questionnaires from the analysis.

While eventual replication of the present results by others is the final test of validity, the above steps, plus my knowledge of marijuana intoxication acquired from pilot subjects and informants, gives me confidence that the present results are reasonably accurate.

Validity Scale

Fourteen of the 220 items constituted a validity scale. These were descriptions, scattered randomly through the questionnaire, of "possible effects" which I had never heard of or had heard of only extremely rarely, which seemed extremely unlikely to occur, and (one) which had been used in studies of hypnosis as a validity item (Orne, 1959).

No single improbable answer can necessarily disqualify a questionnaire, because the respondent may actually have experienced an improbable effect. The a priori decision was made to disqualify any questionnaire with six or more positive responses on the validity scale, as this would be an extremely improbable occurrence, warranting suspicion.

The 14 items of the validity scale, together with the percentages of the 150 final respondents^[4] rating each frequency category, are shown in [Table 3-1](#). The a priori rules for counting an answer as a point on the validity scale are indicated by the boxes around certain response categories for each item. For example, if a user answered item 26 by circling Very Often, it would count a point on the validity scale, but not if he circled Never, Rarely, or Sometimes.

For the 150 questionnaires used for analysis, the mean validity scale score was only 1.5, so the final group of users did not show a bizarre patterning of answers on this scale, and we may presume they

were careful in filling out their questionnaires.

DISTRIBUTION OF QUESTIONNAIRES

Because of the severe legal penalties attached to the possession, use, or sale of marijuana it was important to assure the users' anonymity in order to get any returned questionnaires. The distribution technique consisted of my handing large stacks of questionnaires to students and acquaintances whom I thought might be marijuana smokers and/or who might have friends who were marijuana smokers, and asking them to keep passing them on to other users. This worked very well. Many times students walked into my office and asked for more to pass out. In this way I had no names of anyone and could not even tell if the people I thought were smokers actually filled out a questionnaire. Users who completed the questionnaire simply put it in the attached, stamped return envelope and mailed it to me.

Data Reduction

All properly filled out and acceptable questionnaires returned by a cut-off date several months after distribution were coded onto IBM cards and magnetic tape for later processing at the computer centers of the University of California at Davis and at Berkeley.

SUMMARY

A large questionnaire was constructed on the basis of readings and informal interviews with marijuana users. It was distributed, along with a sympathetic covering letter, in a fashion that ensured anonymity of the respondents. Only experienced marijuana users were asked to fill out and return the questionnaire.

For each of more than two hundred possible intoxication effects, the user was asked to rate how frequently he had experienced that effect in the last six months of use and the minimal degree of intoxication necessary to experience it.

TABLE 3-1 VALIDITY SCALE ITEMS

[\(back to text\)](#)

PERCENTAGE OF USERS ANSWERING: (a)

Q NO.	ITEM	Nvr	Rly	Smt	VyO	Uly
26	I have difficulty hearing things clearly, sounds are blurry and indistinct.	61%	23%	13%	1%	1%
42	I salivate quite a lot when stoned.	44%	30%	13%	5%	5%
54	Objects seem to tilt toward the left.	80%	10%	3%	1%	1%
57	The force of gravity seems to alternate between pushing me up and pushing me down.	56%	14%	17%	5%	5%
72	When there is any trembling in my body, the upper half of my body trembles much more than the lower half.	69%	7%	10%	5%	3%
87	My scalp itches a lot if I have smoked too much grass.	80%	13%	6%	1%	1%
97	My non-dominant hand (left if you're right-handed and vice versa) becomes partially paralyzed, unusable.	86%	9%	2%	1%	0%
102	I tremble a lot in my hands for a while <i>after</i> having been stoned.	71%	20%	7%	0%	1%
104	Smoking grass makes me cough hard while inhaling and holding my breath.	14%	42%	32%	9%	2%
132	My mind goes completely blank for long periods (15 minutes or more) even though I'm not asleep...	56%	27%	13%	2%	0%
166	I almost invariably feel bad when I turn on, regardless of how I felt before I turned on.	47%	36%	9%	1%	1%
180	I have lost control and been "taken over" by an outside force or will, which is hostile or evil in intent, for a while.	79%	14%	4%	0%	0%
181	I have lost control and been "taken over" by an outside force or will, which is good or divine, for a while.	63%	16%	9%	5%	1%
187	When stoned I lose most of my sense of ego identity and usually take on the identity of my like-sexed parent (father for males, mother for females).	79%	10%	7%	0%	1%

(a) A given row may not add to exactly 100% because of users' skipping that item and/or rounding errors. The scored direction for counting on the validity scale is given in **bold-face** responses.

Footnotes

1. Well-written anecdotal accounts may be found in Andrews and Vinkenoog (1967), Anonymous (1969), Bloomquist (1968), de Ropp (1967), Ebin (1961), Goode (1969), Hollander (1967), Rosevear (1967), Simmons (1967), and Solomon (1966). [\(back\)](#)
2. The experience of the last six months is used rather than *all* your experience to cut down inaccuracies due to memories' fading. It may be that there are changes in how frequently you experience various things as you get more experience in being stoned, but this can be analyzed for in comparing the responses of new heads and old heads. If, however, you haven't been stoned very much in the past six months, use *all* your experiences for estimating frequencies. [\(back\)](#)
3. In retrospect, I believe I should have used a 7- or 10-point scale for frequency and intoxication levels, as I had forgotten the tendency of people to avoid extreme categories on any scale. [\(back\)](#)
4. A number of returned questionnaires were rejected because of high validity scale scores or other reasons, as discussed in Chapter 4. Validity score data on rejected users are not included in [Table 3-1](#). [\(back\)](#)

[Chapter 4](#)

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 4. One Hundred and Fifty Experienced Marijuana Users

APPROXIMATELY 750 QUESTIONNAIRES were sent out. Of those returned by the cutoff date several months later, three were rejected because of high scores on the validity scale, as explained earlier, and several others were rejected because the respondent indicated that he had been intoxicated with marijuana *while* he was filling out the questionnaire. A number of partially completed questionnaires were also returned with notes that they were just too long for the user to complete. Verbal comments by students around campus also indicated that the primary reason they had not completed the questionnaire was its length. One hundred and fifty usable questionnaires were left. Thus the 150 respondent users are a verbal lot, sufficiently motivated to help science that they would fill out a lengthy questionnaire.

As the data below will indicate, this is primarily a young, student population. How representative it is of any other specific population is unknown.^[1] As the primary purpose of the present study was to discover the major experiential effects of marijuana intoxication, to study the effects of some important background variables, and to specify the *range* of phenomena, rather than produce exact figures for a specified population, this lack of knowledge about the generality of the present sample is not a serious drawback. Again, however, the reader should be cautioned against overgeneralizing the exact figures presented later.

Some further comments should be made about generalization of the effects in this study to other populations. In terms of the model for drug intoxication effects presented earlier, it is clear that the intellectual level, social learnings and expectations, and values of a given population may strongly affect what they will experience during marijuana intoxication. The present sample is highly educated (in college or already graduated) and intelligent, is coping successfully with modern American culture (by virtue of most being in college or holding down a Job), and thus may be fairly representative of what Americans who have made a fair adaptation to the Establishment may experience when intoxicated with marijuana. It probably is poorly representative of what happens when slum dwellers, depressed minority groups, or people in different cultures use marijuana, or what happens when the mentally ill use marijuana. Remember, too, this is an experienced group, so the effects reported are not applicable to those who are just beginning to use marijuana.

IMPORTANT BACKGROUND VARIABLES

Area of Residence

The residential area of the users was determined by inspection of the postmark on the returned questionnaire. The users were from California for the most part (67 percent), some from the East Coast of the United States (11 percent), and the remainder from various miscellaneous or undetermined locations.

Age

Age was distributed as shown in Table 4-1. The vast majority of the users were in the 19-30 age range.

**TABLE 4-1
AGE DISTRIBUTION**

AGE RANGE	PERCENTAGE OF USERS
16 or younger	1%
17-18	10%
19-20	23%
21-22	22%
23-24	16%
25-30	15%
31-40	7%
41-50	5%
51 and older	1%

Occupation

Occupation was classified into six categories, shown in Table 4-2. The majority (67 percent) of the users were students, with academics and mental health professionals being the next largest classifications.

**TABLE 4-2
OCCUPATION**

OCCUPATION	PERCENTAGE OF USERS
Students	67 %
Academics, Teachers	7 %
Mental Health Professionals	6%
Professionals, other	5 %
Non-professional	15%
Unclassifiable	1 %

Note—The percentages in this table do not add up to exactly 100% due to rounding errors and/or some users' skipping the question.

Sex, Marriage, Offspring

It was possible to identify 49 percent of the respondents as men and 27 percent as women. However, on a number of questionnaires in the first distributions, the blank for sex of the respondent had been inadvertently left off, so 23 percent of the users could not be classified. Of the whole group, 71 percent were single, 19 percent were married or living with a semi-permanent mate, 8 percent were divorced, and 1 percent were widowed. Most (81 percent) had no children.

Educational Level

Table 4-3 shows the educational level of the users. This is a highly educated group, the vast majority having at least some college training and 21 percent having some graduate education.

Political Affiliations

Table 4-4 presents the political affiliations of the users. Most indicated no affiliation or Democrat.

**TABLE 4-3
EDUCATIONAL LEVEL**

EDUCATIONAL LEVEL	PERCENTAGE OF USERS
High school	6%
College, 2 years or less	35%
College, 4 years or less	37%
MA degree or some graduate training	13 %
PhD, EdD, or MD degree or graduate training beyond the MA level	8%
Unclassifiable	1 %

**TABLE 4-4
POLITICAL AFFILIATION**

POLITICAL AFFILIATION	PERCENTAGE OF USERS
Democrat	24%
Republican	5%
Left-wing	5%
Right-wing	0%
Miscellaneous	23%
No political affiliation indicated	43%

Religious Affiliation

Religious affiliation is presented in Table 4-5. Most users did not give any affiliation. Of those who did, the psychedelic churches (i.e., those advocating the use of psychedelic drugs as part of their sacraments) such as Timothy Leary's League for Spiritual Discovery, and various Oriental religions, such as Subud, were almost as frequent as traditional affiliations.

**TABLE 4-5
RELIGIOUS AFFILIATION**

RELIGIOUS AFFILIATION	PERCENTAGE OF USERS
------------------------------	----------------------------

Protestant	11 %
Catholic	4%
Jewish	11 %
Oriental, mystical	5%
Psychedelic churches	7 %
No affiliation	60%

Arrests

One question asked whether the users had ever been arrested and, if so, for what and whether they were convicted. Twenty-five users (17 percent) indicated they had been arrested, and the various offenses are summarized in Table 4-6.

TABLE 4-6
ENCOUNTERS WITH THE LAW

TYPE OF OFFENSE	NUMBER OF USERS	
	ARRESTED	CONVICTED
Political and Nuisance Offenses	6	3
Traffic Violations & Parking Tickets	5	4
Drunkenness or Illegal Possession of Alcohol	3	3
Miscellaneous Misdemeanors	4	1
Third-degree Burglary	1	0
Possession of Marijuana	5	2
Selling Marijuana	1	1

The category "Political and Nuisance Offenses" includes being arrested for participating in civil rights demonstrations, loitering, and trespassing.

Five of the users had been arrested for possession of marijuana, and one for selling marijuana.

All in all, the users are a generally law-abiding lot except for their use of marijuana.

Personal Growth

The users were asked, "*Do you regularly practice any sort of meditation or other non-drug discipline for spiritual or personal growth? If so, what?*" The responses are tabulated in Table 4-7. Irregular or non-disciplined

practices labeled "meditation" or "contemplation" by the users were put in the "informal meditation" category here.

**TABLE 4-7
GROWTH PRACTICES**

DISCIPLINE	PERCENTAGE OF USERS
Informal meditation	16%
Formal meditation, oriental form	13%
Formal meditation, occidental form	3%
Conventional psychotherapy	2%
New therapies (encounter, Gestalt, etc.)	5%
Other disciplines	5%
None	57%

Note.—The percentages in this table do not add up to exactly 100% due to rounding errors and/or some users' skipping the question.

Marijuana Use

A number of questions dealt with the overall use of marijuana by the group. Responses to "*How long have you been smoking pot or hash?*" are presented in the first column of Table 4-8. Most of the users have smoked marijuana from one to two years, but some have used it for more than eleven years. If we take the midpoint of each category (assume fifteen years for the eleven-plus category), this group of users represents a total of 421 years of marijuana use.

The users were asked their average frequency of use in all the time they had used marijuana. Users with less than six months' experience were instructed to skip this question. Monthly or Weekly use are the modal patterns in this group, as shown in Table 4-9. By an approximation, described fully in Chapter 5, these figures may be combined with length-of-use figures to give an estimate that this group of 150 users has used marijuana approximately 37,000 times altogether.

Asked for their frequency of use in the preceding six months (the time base over which effects were to be rated), the users replied as shown in the second column of Table 4-9, with Monthly and Weekly use still being the modal responses. The Total and Last Six Month frequencies of use do not differ significantly from each other. The respondents use marijuana about as often now as they ever did.

TABLE 4-8

USE OF MARIJUANA AND ALCOHOL

LENGTH OF USE	MARIJUANA PERCENTAGE OF USERS	ALCOHOL PERCENTAGE OF USERS(a)
</=6 months[b]	3%	3%
</=1 year	21%	2%
</=2 years	34%	7%
</=3 years	19%	14%
</=4 years	6%	11%
</=5 years	4%	10%
6 to 10 years	5%	17%
11 years or longer	6%	21%
Never used alcohol		13%
No response	2%	3%

(a) The percentages in this column do not add up to exactly 100% due to rounding errors and/or some users' skipping the question(s).

(b) </= means less than or equal to.

TABLE 4-9
FREQUENCY OF USE OF MARIJUANA AND ALCOHOL

FREQUENCY OF USE	MARIJUANA		ALCOHOL	
	TOTAL PERCENTAGE OF USERS	LAST 6 MOS. PERCENTAGE OF USERS	TOTAL PERCENTAGE OF USERS	LAST 6 MOS. PERCENTAGE OF USERS
Occasionally	7%	11%	33%	40%
Once/month or more	35%	28%	34%	26%
Once/week or more	40%	42%	21%	12%
Almost every day or more	16%	19%	2%	7%
No response	3%	1%	11%	15%

Note.—The percentages in some columns of this table do not add up to exactly 100% due to rounding errors and/or some users' skipping the question(s).

Other Drugs

The users were asked how often they had used various major psychedelic drugs *before* starting to use marijuana, *after* starting to use marijuana, and during the last six months. Table 4-10 presents this data. The category "psychedelics" was presented on the questionnaire as including LSD, mescaline, peyote, psilocybin, DMT (dimethyltryptamine), and DET (diethyltryptamine). Other drugs are listed separately.

TABLE 4-10
FREQUENCY OF USE OF OTHER DRUGS

DRUG	BEFORE USING MARIJUANA			AFTER USING MARIJUANA			IN LAST SIX MONTHS		
	TIMES USED			TIMES USED			TIMES USED		
	0	1-5	6+	0	1-5	6+	0	1-5	6+
Psychedelics	76%	15%	3%	27%	38%	31%	51%	33%	11%
Exotic Psychedelics:									
STP (DOM)	49%	3%	0%	45%	7%	0%	45%	7%	0%
MDA	49%	3%	0%	46%	5%	1%	45%	7%	0%
PEACE	48%	3%	0%	46%	4%	1%	44%	6%	1%
Amphetamines or Methedrine									
(orally)	58%	8%	6%	35%	22%	15%	42%	15%	15%
(injection)	51%	3%	0%	47%	4%	3%	50%	3%	0%
Hard Narcotics	30%	1%	1%	25%	5%	3%	25%	7%	0%

Note.—The percentages in this table do not add up to exactly 100% due to rounding errors and/or some users' skipping the question(s).

With chi-square analyses of the distributions, the respondents have used major psychedelic drugs and oral amphetamines^[2] more frequently since starting to use marijuana ($p < .001$ for each comparison). Contrary to popular myth, use of hard narcotics is quite low and does not show a statistically significant increase from before to after marijuana use.

Psychedelic Drugs and Marijuana

The users were asked, "*Do you think your experiences (if any) with any of these other psychedelic drugs have affected or changed the quality of your experiences with pot? If yes, how?*" Twenty-eight percent of the users replied that there had been no change in their marijuana experiences as a result of taking other drugs, 26 percent that normal marijuana phenomena were more vivid or could be experienced more easily, 12 percent that new experiences were possible on marijuana that were not available before, and 3 percent that their marijuana experiences were not as satisfactory or enjoyable any longer. Differences in marijuana effects between users and

non-users of psychedelic drugs will be investigated in detail in later chapters.

Marijuana and Alcohol

The 150 users were asked, for comparison purposes, "*How long have you been drinking alcoholic beverages in sufficient quantity to change your consciousness (i.e., drinking to get 'tipsy' or drunk rather than just having a little wine or beer with meals for the taste)?*" The second column of Table 4-8 presents their replies. The respondents have clearly been using alcohol to alter their state of consciousness much longer than marijuana ($p < .001$), a difference that may represent desirability, but more likely represents the easier availability of alcohol to young people at the time the respondents were growing up.

The users were also asked about their frequency of use of alcohol for changing their state of consciousness, and this data is presented in the third and fourth columns of Table 4-9. For both total use and usage in the last six months, marijuana has been used more frequently ($p < .001$ in each case).

To further investigate feelings of preference for marijuana and alcohol for altering consciousness, the users were asked, "*If pot were as available legally as alcohol, about what percentage of the time would you choose alcohol to alter your state of consciousness rather than pot?*" Table 4-11 shows that the users generally would choose marijuana in a free-choice situation. Supporting this is a suggestive tendency ($p < .10$) for the respondents to be using alcohol less frequently in the last six months than in their total alcohol-drinking career.

**TABLE 4-11
USE OF ALCOHOL RATHER THAN MARIJUANA**

PERCENT OF TIMES ALCOHOL WOULD BE CHOSEN RATHER THAN MARIJUANA	PERCENTAGE OF USERS
0%, Never	43%
</=25%	37%
</=50%	13%
</=75%	2%
</=100%	3%

Note.—The percentages in this table do not add up to exactly 100% due to rounding errors and/or some users' skipping the question.

SUMMARY

In general, we may describe our 150 users as a predominantly young, highly educated group of California college students, with a high interest in self-improvement (meditation or therapy), considerable experience with other psychedelic drugs, and little experience with narcotics. Most of them used marijuana once a week or

more during the six-month period covered by this study.

Footnotes

1. It is my personal impression from informal and teaching contact with many students that the sample, while rather avant garde for 1968, would be fairly typical now. A Gallup poll taken as this book went to press reported that 42 percent of college students polled said they had used marijuana, compared with only 5 percent when the same question was asked in 1967 (see *Newsweek*, January 25, 1971, p. 52). ([back](#))

2. In retrospect, asking about oral amphetamines was poorly done, as the question does not distinguish the typical college student who uses low doses to help himself study from the high-dose user who wishes to radically alter his state of consciousness. ([back](#))

Chapter 5

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 5. Methods of Analysis

ALL OF THE CHAPTERS in Part II, Phenomenology of Marijuana Intoxication, are organized along the same general plan, for the convenience of the reader. I shall outline the basic plan, give definitions of terms, and present descriptions of methods here.

BASIC PLAN

General Format

Each chapter consists of the results of potential effect descriptions (questions, items) dealing with a single area, such as vision, thought processes, etc. Within each chapter are subgroupings of related questions.

For each question I have given: (1) the actual wording used in the questionnaire; (2) the percentage^[1] of users responding in each of the frequency of occurrence and minimal level of intoxication categories; and (3) differences in the effect related to the background variables when such differences were statistically significant.

When the wording of a question does not completely explain the nature of the effect, I have added explanatory comments, based on my interviews with pilot subjects and informants. Many effects deal with

areas of knowledge that are not generally well known even among scientists, such as those concerning meditation or ostensible paranormal phenomena, so I have given literature references to guide the reader seeking more understanding. I have tried to avoid speculation and interpretation as much as possible and to stick to the basic findings.

Each chapter also contains a section on additional effects, a ranking of effects according to increasing minimal levels of intoxication, a summary of background factors modulating the effects, and a general summary.

Terminology

It is impossible to write about these phenomena in a readable style without using descriptive adjectives. To avoid the ambiguity usually inherent in quantity adjectives, I have used a standard set of them, which are defined in Table 5-1. Whenever other adjectives than those defined are used, I am speaking generally rather than describing the exact form of the data.

To illustrate: if an intoxication effect is described as "very characteristic" and "primarily beginning to occur at Moderate levels," this indicates that more than 50 percent of the users rated this effect as occurring Very Often or Usually when they have been intoxicated in the last six months, and my judgment of the distribution of responses on minimal levels of intoxication is that the Moderate ("Fairly Stoned") level is the most representative[2] level indicated.

**TABLE 5-1
DEFINITION OF TERMS**

TERM	DEFINITION
-------------	-------------------

Frequency of Occurrence Terms

"Rare"	>/=75% indicate <i>Never, Rarely</i>
"Infrequent"	>/=50% indicate <i>Never, Rarely</i>
"Fairly Frequent"	</=50% indicate <i>Sometimes, Very Often, Usually</i> [a]
"Common"	>/=50% indicate <i>Sometimes, Very Often, Usually</i>
"Very Common"	>/=75% indicate <i>Sometimes, Very Often, Usually</i>
"Characteristic"	50% indicate <i>Very Often, Usually</i>
"Characteristic"	Bottom third of distribution
"More Characteristic"	Middle third of distribution
"Very Characteristic"	

"Most Characteristic"

"Extremely Characteristic"

Top third of distribution

Levels of Intoxication Terms

"Low"

Questionnaire term *Just*

"Moderate"

Questionnaire term *Fairly*

"Strong"

Questionnaire term *Strongly*

"Very Strong" ("Very High")

Questionnaire term *Very Strongly*

"Maximum" ("Very High")

Questionnaire term *Maximum*

a. *Infrequent* and *Fairly Frequent* are not always identical in practice because of variable numbers of users skipping particular questions.

Linking

Many pairs or sets of question called for statistical comparison because of obvious similarity or because they described converse effects. This was always done by a chi-square test of the distributions. I have usually presented graphical results when they would be illustrative, as well as the probability figures.

Many other links exist that I have not analyzed in the text. The reader interested in particular comparisons may perform such analyses himself from the percentage data presented for each item. Only slight errors will result from using percentages rather than the raw data I worked from.

Background Variables

The background information on the first page of the questionnaire was used to divide the users into a number of groups, and every question was subjected to a chi-square analysis for differences in the distributions among the groups. Only significant ($p < .05$) differences are presented in the text.

The groups compared were as follows:

Males versus *females*. Forty-nine percent of the users were men, 27 percent women. The remainder were not used in male-female comparisons because this question was inadvertently left off some of the questionnaires.

Older and *younger* users were defined as those 25 years of age or older versus those from 16 to 24.

Educational Level was compared for the *College-educated* (at least some college up to and including bachelor's degree or equivalent) versus the *Professionals* (graduate training or master's or doctor's degrees). The users with only a high school education were too few (6 percent) to constitute a group for valid analysis and so were omitted from the educational level comparison.

Frequency of use of marijuana in the last six months was broken into three groups: the *Occasional* user ("occasional" or "less than once/month" on the questionnaire), the *Weekly* user ("once/week or more"),

and the *Daily* user ("almost every day or more"). With a three-way classification, it was found that some of the frequency and intoxication level categories had to be combined to avoid having too many cells with low expected frequencies for the chi-square tests,^[3] so all analyses with three-way classifications were done against frequencies of Never, Rarely/Sometimes, and Very Often/Usually. Similarly, levels were uniformly condensed into Just, Fairly/Strongly, and Very Strongly/Maximum.

Because a given degree of marijuana use in the last six months might mean different things for one user who had followed that pattern for ten years and for another who had used it for just one year, a three-way analysis was also made for *total marijuana use*. Categories were *Heavy Total* users, *Moderate Total* users, and *Light Total* users. These categories were obtained in the following way. Using the number of uses per month as a basic unit, the self-rated frequency of use over the user's whole use-history was assigned the value of 20/month ("almost every day or more"), 8/month ("once/week or more") or 2/month ("once/month or more" plus "occasionally"). Total length of time in years that the users had used marijuana was weighted as 1 for one year or less, 2.25 for three years or less, and 6 for more than three years.

The combinations of these weightings are shown in Table 5-2. They fell into three natural groupings, which were designated the Heavy (21 percent of the users), Moderate (44 percent), and Light (32 percent) Total users. A few users did not provide enough information to be classified.

Users and Non-users of Psychedelics were classified on the basis of whether they had *ever* used LSD, mescaline, peyote, psilocybin, dimethyltryptamine (DMT), diethyltryptamine (DET), STP (2, 5dimethoxy-4-methylamphetamine), MDA (3, 4-methylene dioxy-amphetamine) or PEACE (a street drug supposed to contain phencyclidines, such as we legitimately market under the trade name Ketamine or Sernyl). Seventy-two percent of the users had tried at least one of these powerful psychedelic drugs at least once.

TABLE 5-2
DIVISION FOR TOTAL MARIJUANA USE:
WEIGHTING FACTORS

FREQUENCY OF USING MARIJUANA IN TOTAL USE PERIOD	LENGTH OF TIME MARIJUANA HAS BEEN USED		
	ONE YEAR OR LESS	THREE YEARS OR LESS	FOUR OR MORE YEARS
Almost every day	20	45	120
Once a week or more	8	18	48
Once a month or more or occasionally	2	4.5	12

Light Total Use: figures in *italics*
Heavy Total Use: figures in **boldface**

The final background analysis, dealing with commitment to personal growth, divided the users into

Meditators, the *Therapy and Growth Group*, and *Ordinary Users*. Meditators were so classified if they indicated that they *regularly* practiced some form of meditation. They comprised 16 percent of the users. The Therapy and Growth group were those who indicated they had been in regular psychotherapy (2 percent) or the new growth-oriented therapies (5 percent), such as Gestalt therapy (Perls, Hefferline, & Goodman, 1951) or encounter groups (Schutz, 1967). Ordinary users may have tried meditation exercises or the like occasionally, but did not indicate any regular, systematic approach to personal growth as the other two groups did.

Additional Effects

This section includes any further phenomena, volunteered by the users at the end of the questionnaire, that were not already covered in one of the regular questions. These have not been included in any tabulations or analyses, and are added in each chapter to further indicate the range of effects.

Levels of Intoxication

Except when there are too few effects of a given type to warrant it, each chapter has all the effects discussed ordered by the representative minimal level of intoxication. Categories are the five divisions of level of the questionnaire (Just, Fairly, Strongly, Very Strongly, Maximum) and levels halfway between these. Relevant effects from other chapters also appear in the graphs.

Within each level, effects are ordered in terms of the arithmetic mean of the intoxication levels reported, from lowest at the bottom to highest at the top. *Within* a level, chi-square tests of the distributions practically never reach significance. Overall differences in levels for the phenomena of a particular chapter were tested by a chi-square test using the lowest level (by arithmetic mean) effect within each level category as the entry for that level. They were usually extremely significant.

Variations in type style are also used in these graphs to indicate the frequency of occurrence of an effect. Characteristic phenomena are in bold capital letters, common are in bold lower case, infrequent (fairly frequent is combined with infrequent here) in small capitals, and rare phenomena are set in capitals with lower case letters. Thus if one wants to know what is very likely to happen at various levels for a given category of phenomena, one can look only at the characteristic or common effects (in boldface). If one wants to flesh this out with what may also happen if psychological factors assume the correct values, all the phenomena may be looked at.

I have occasionally inserted question marks after particular phenomena on the graphs, indicating that comments of informants raise some doubts as to its fitting into the minimal level model, i.e., it may cease to be available after some higher level.

Modulating Factors

Each chapter contains a table summarizing the effects of all significant background factors. I have combined the categories of frequency of use of marijuana in the last six months, total marijuana use, and psychedelic drug use into a single category of *more drug experience* for convenience here. The reader who needs these separated can go back to the original item descriptions in the text.

Almost all background variables had relatively linear effects. Where they did not, the text in this section mentions the fact, and they are not included in the table.

Statistical Notes

In addition to the various statistical considerations mentioned above, it should be realized that about 5 percent of the significant differences reported herein are due only to chance, i.e., are not really reflecting a genuine effect. In the many thousands of comparisons made in this large mass of data, 5 percent will come out at the .05 level of probability by chance alone. I debated on whether to try to eliminate these false positives, but the only way would be by the criterion of whether the differences "made sense" to me. Rather than impose my judgment on the data, I have let it stand. As the main purpose of this study is to stimulate research rather than provide final answers on the nature of marijuana intoxication, these occasional false positives will be weeded out by lack of confirmation in future studies.

Footnotes

1. I have generally used percentages rather than actual numbers for clarity of presentation, All statistical tests, however, were performed on the raw data to avoid the slight rounding errors involved in using percentages. ([back](#))

2. While it would have been possible to assign the intoxication levels the values 0, 1, 2, 3, and 4 and use the arithmetic mean as the average value, I did not want to make the questionable assumption of equal intervals between categories. Also, many of the distributions were highly skewed, so I would judge the most representative intoxication level as half-way between two of the defined levels. In practice, a correlation between my judgments and arithmetic means would be extremely high. ([back](#))

3. The technical question of how many cells in a chi-square table can have expected frequencies below a certain value is still hotly debated in the psychological literature. Rather than arbitrarily combine the data on every question in ways to eliminate low expected values, I have used the uniform rules above, plus the rule, used only rarely, that in any chi-square table with more than four cells having expected frequencies of less than five I would combine whichever end category eliminated the largest number of low cells with the adjacent category, i.e., Never or Just with Rarely or Fairly, etc. If this was not sufficient, the analysis was thrown out. Allowing as many as four cells to have low expected values is a fairly liberal position, but seemed appropriate in an initial exploration of an important area. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 6. Vision

MAN IS PRIMARILY a visual animal, both in terms of vision's being his primary and generally most efficient way of perceiving his environment, and in terms of visual styles' influencing his thinking, imagining, and conceptualizing. Changes in visual experience while intoxicated on marijuana are thus of particular interest. We shall first consider phenomena related to visual perception of the external world, then those related to visual imagery and hallucinations.

PERCEIVING THE EXTERNAL WORLD

Form and Organization

A very characteristic effect of marijuana intoxication is increased perceptual organization ("meaningfulness"): *"I can see patterns, forms, figures, meaningful designs in visual material that does not have any particular form when I'm straight, that is just a meaningless series of shapes or lines when I'm straight"* (6%, 6%, 29%, 37%, 19%).^[1] The modal minimal level of intoxication for this is Strongly (3%, 25%, 37%, 17%, 5%). The College-educated experience this more frequently than the Professionals ($p < .05$).

A common effect that also reflects this increased perceptual organization of the visual field is *"Things*

seen are seen more sharply in that their edges, contours stand out more sharply against the background" (13%, 13%, 31%, 30%, 11%). The contrary effect, "My vision tends to be somewhat blurry; if I try to examine something visually, I can't focus as sharply as when straight" (32%, 29%, 25%, 9%, 3%) occurs much less frequently ($p < .001$), as shown in Figure 6-1. Blurriness of vision is associated with higher levels of intoxication (1%, 13%, 18%, 21%, 11%) than sharpening (6%, 41%, 24%, 10%, 2%), as shown in the figure ($p < .001$).

Visual blurriness is reported somewhat more frequently by women than by men ($p < .05$), and is reported as occurring at lower minimal levels of intoxication by Occasional users in comparison to Weekly or Daily users ($p < .05$, overall).

A fairly frequent effect that also illustrates reorganization of the visual field is "The face of another person will change even as I watch it, so he keeps changing from one different person to another" (36%, 21%, 23%, 11%, 6%).

This is a high-level effect (2%, 3%, 11%, 19%, 17%), although many (47 percent) users did not rate level. Users of Psychedelics experience it more frequently than Non-users ($p < .01$). Meditators experience it more frequently than Ordinary Users ($p < .05$), with neither group significantly differing from the Therapy and Growth group.

Color

Like form, color is an important aspect of visual organization, and perceptual changes here are common: "I see new colors or more subtle shades of color than when I'm straight" (10%, 18%, 30%, 19%, 21%). The contrary effect, "Colors get duller, not as vivid," is rare (62%, 23%, 8%, 3%, 1%), as shown in Figure 6-2 ($p < .001$). Color perception is enhanced at low levels of intoxication (17%, 31%, 27%, 7%, 4%). Most users (67 percent) could not rate the minimal level for color dulling (6%, 13%, 6%, 5%, 3%), and this distribution of levels does not differ significantly from that reported for color enhancement.

The Therapy and Growth group tends not to see new colors as frequently as the Meditators and

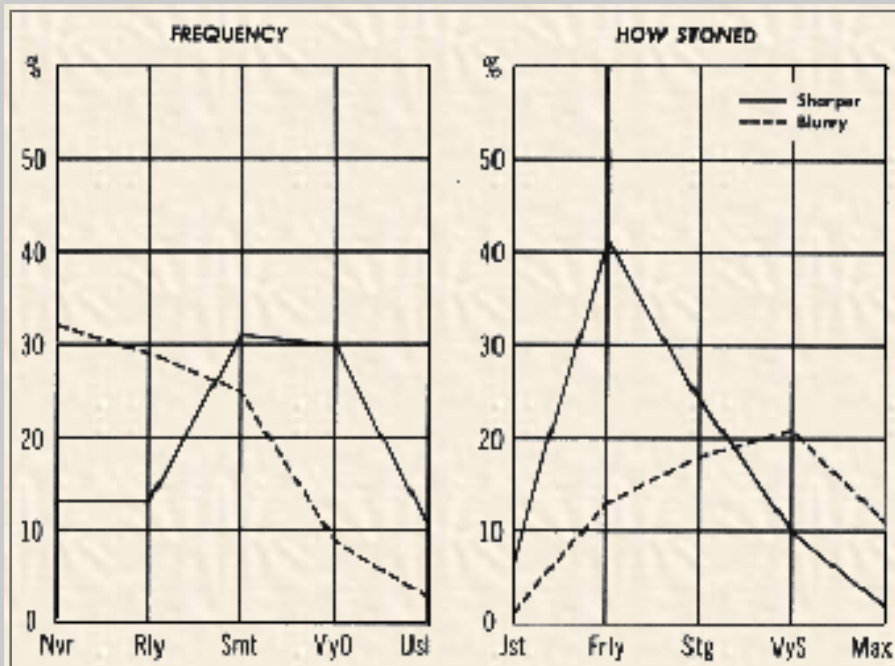


Figure 6-1. PERCEIVED FOCUS OF THE VISUAL FIELD

Note.—In interpreting the "How Stoned" graphs, note that the percentage of users plotted at each level is the percentage indicating that level as their minimal level of intoxication for experiencing that particular effect. Thus, a drop in the curve with increasing minimal level of intoxication does not mean that fewer users experience that effect at higher levels, but that fewer give a higher level as their minimal level for experiencing that effect.

Ordinary Users ($p < .05$, overall). The Professionals have to be more intoxicated than the College-educated for colors to get duller ($p < .05$).

Depth

An important element of visual organization is the dimension of perceived *depth*. Four items deal with changes in perceived depth. We shall describe each separately before considering their interrelationships. A common effect is *"When I look at pictures they may acquire an element of visual depth, a third-dimensional aspect that they don't have when straight"* (13%, 12%, 34%, 23%, 15%), which begins in the low-middle range of intoxication (4%, 26%, 32%, 12%, 7%). One of my informants, known for his excellent phenomenological description of marijuana intoxication (Anonymous, 1969), describes how dramatic this can be: if, while intoxicated, you look at a color photograph or picture postcard of a scene with natural depth in it, and look with one eye through a pin-hole close enough to the picture so that its borders cannot be seen, the two-dimensional representation will suddenly turn into three dimensions, as if you were looking at the actual scene.

A converse and rare depth effect is *"The world looks flat: it lacks the third dimension of depth"* (55%, 27%, 9%, 5%, 1%). Most users (61 percent) did not rate the intoxication level for this (4%, 8%, 15%, 7%, 5%).

A fairly frequent depth effect is *"Visual depth perception changes, so that near objects seem much nearer and far objects seem much further away"* (32%, 19%, 29%, 11%, 5%), what might be called a *magnification of visual depth*. This is reported as occurring in the higher intoxication levels (1%, 14%, 25%, 17%, 6%).

The visual depth magnification effect seems to be a long-term effect, persisting steadily over time, compared to an infrequent effect that might be termed a *visual depth jiggle*: *"Objects or people may seem to get visually nearer or further as I look at them without their actually moving at all"* (39%, 23%, 21%, 10%, 5%). Many users (46 percent) did not rate the intoxication level for this (2%, 9%, 17%, 19%, 7%), although it is generally perceived at higher levels. Experience with using marijuana modulates this effect, whether factored in terms of total use or frequency of use in the last six months. Both Moderate Total users and Weekly users need to be more intoxicated for this experience than Light or Heavy Total users in the one case ($p < .05$) or Occasional or Daily users in the other case ($p < .01$).

All four of these intoxication effects on visual depth perception are compared in Figure 6-3. The illusion of depth in flat pictures and the general magnification of depth both occur more frequently than the world's appearing flat or the depth's changing even as the user looks (jiggling) ($p < < .001$), and the jiggling of perceived depth requires a higher intoxication level ($p < .02$).

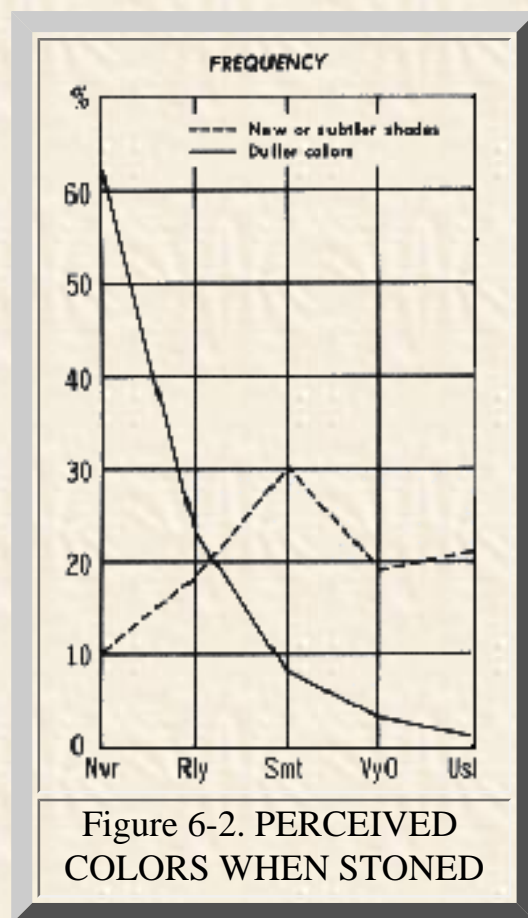


Figure 6-2. PERCEIVED COLORS WHEN STONED

Centrality

Two common phenomena represent an increased centrality of vision, enhancement of the focused object at the expense of peripheral objects: *"Things outside the center of my visual field, things in the periphery of my vision look different when I'm not looking directly at them than when I look directly at them. E. g., I might see a door as open when I'm not looking directly at it, but when I look directly at it, it is closed"* (19%, 21%, 32%, 19%, 7%) and *"My visual perception of the space around me is changed, so that what I'm looking at is very real and clear, but everything else I'm not focusing on visually seems*

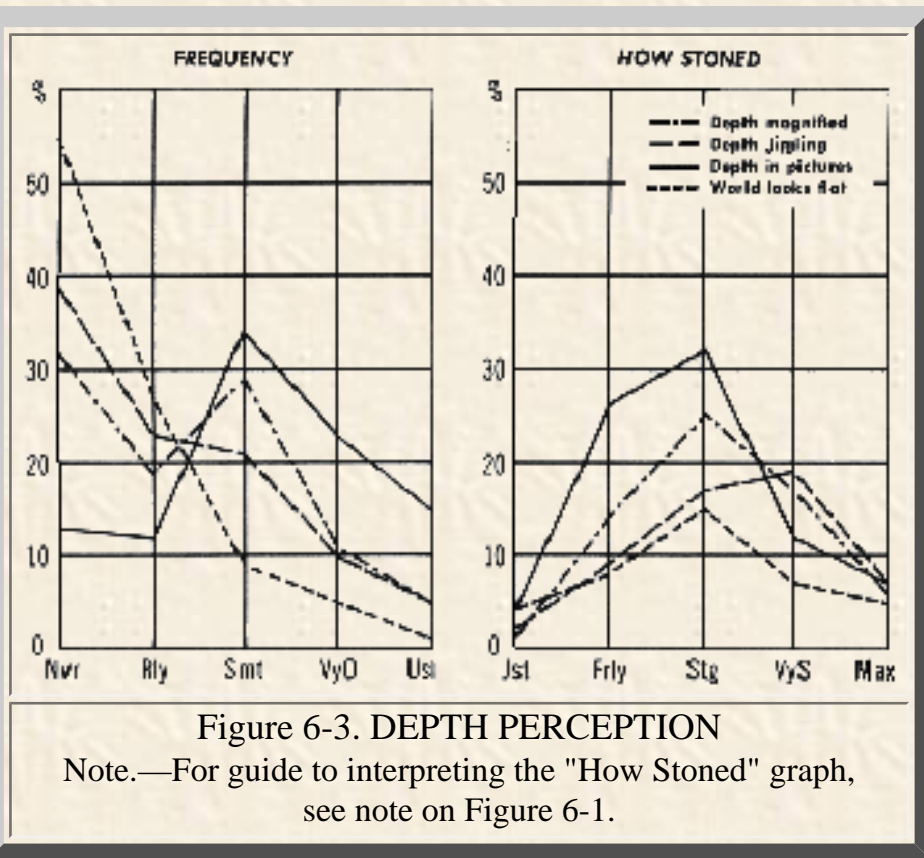
further away or otherwise less real or clear" (23%, 15%, 27%, 19%, 13%). Both have a modal level of intoxication of Strongly (3%, 23%, 29%, 17%, 5% and 4%, 17%, 25%, 17%, 6%, respectively). Neither the frequency of occurrence nor level of intoxication distributions differ for these effects.

Several background factors affect whether things in the periphery change. Younger users and Non-users of Psychedelics report this phenomenon as occurring more frequently ($p < .05$, $p < .01$, respectively) compared to Older users and Users of Psychedelics. Further, Users of Psychedelics are more variable in their ratings for this than Non-users ($p < .05$) and generally require higher levels of intoxication.

With respect to increased centrality of vision, Daily and Weekly users must be more intoxicated than Occasional users ($p < .05$, overall).

Sensuality, Aliveness

Another common phenomenon is *"There is a sensual quality to vision, as if I were 'touching' the objects or people I am looking at"* (22%, 16%, 31%, 19%, 9%), which occurs at higher levels of intoxication (5%, 14%, 23%, 25%, 5%). This is reported more frequently among the College-educated than among the Professionals ($p < .05$). This effect is also reported most frequently among the Heavy Total users (modal frequency category is Very Often/Usually), next most frequently by the Moderate Total users, and least frequently by the Light Total users ($p < .01$ for the Heavy-Moderate, $p < .01$ for the Heavy-Light comparison, Moderate-Light not differing significantly). Further, the Moderate and Light Total use groups report higher minimal levels of intoxication for this than the Heavy group ($p < .05$, overall).



The final infrequent effect on perceiving the external world is *"Everything I look at seems to vibrate or pulse, as if it had a life of its own"* (23%, 31%, 29%, 8%, 7%), which occurs at the higher intoxication levels (1%, 5%, 15%, 23%, 19%). Users of Psychedelics report a higher level of intoxication (mode at Maximum) for this than Non-users ($p < .05$).

VISUAL IMAGERY AND HALLUCINATION

Imagery

A very characteristic phenomenon is enhanced visual imagery: *"If I try to visualize something, form a visual image, I see it in my mind's eye more intensely, more sharply than when straight"* (12%, 3%, 22%, 25%, 35%). This begins occurring in the low-middle ranges of intoxication (13%, 33%, 24%, 11%, 3%).

A specific illustration of this is the common effect, *"I have more imagery than usual while reading; images of the scenes I'm reading about just pop up vividly"* (15%, 11%, 24%, 27%, 15%), which also occurs at the lower levels of intoxication (13%, 33%, 22%, 4%, 2%). The Weekly users have to be somewhat more intoxicated to experience this than the Occasional users ($p < .05$), with a suggestion that the Daily users do not have to be as intoxicated as the Weekly users ($p < .10$). While the general enhancement of visual imagery occurs more frequently than visual imagery accompanying reading ($p < .01$), the distribution of levels of intoxication does not differ significantly.

A related phenomenon, described fully in Chapter 15, *"When thinking about things while stoned, there are visual images that just automatically go along with thinking,"* a very common effect, which occurs at Moderate levels of intoxication.

Auras

Two frequent phenomena stand midway between perceptual alteration of real phenomena and hallucination: *"I see fringes of colored light around objects (not people), what people have called the 'aura'"* (46%, 21%, 20%, 8%, 1%), and *"I see fringes of colored light around people (not objects), what people have called the 'aura'"* (50%, 23%, 19%, 5%, 1%).^[2] Many users (57 percent, 59 percent, respectively) did not rate the level of intoxication for this, but for those who did, it was generally rated in the highest ranges (1%, 4%, 15%, 10%, 13%, and 3%, 2%, 9%, 12%, 15%, respectively).

Seeing an aura around *objects* is somewhat more common in the Younger group than in the Older group ($p < .05$); more common in Heavy Total users of marijuana than in Moderate ($p < .05$) and Light Total users ($p < .05$); more common in Users of Psychedelics than in Non-users ($p < .05$). Seeing auras around *people* is also more frequent in Users than in Non-users of Psychedelics ($p < .001$).

Hallucination

Pure visual hallucination is an infrequent phenomenon: *"With my eyes open, I can see things that aren't there, i.e., for which there is no real visual basis. E.g., if you look at stains on a wall and see a design, that's an illusion; you are altering something there. This question deals with seeing something when there's nothing there, such as seeing a pattern or object on a perfectly blank wall"* (33%, 23%, 27%, 7%, 9%). Although many (45 percent) users did not rate intoxication level, when it does occur this is a high-level phenomenon (1%, 6%, 10%, 20%, 18%). It is reported more frequently in the Younger Group ($p < .01$), and more frequently in the Heavy and Moderate Total use groups compared to the Light Total use group ($p < .05$ overall).

ADDITIONAL EFFECTS

A number of users wrote in additional visual effects in the final part of the questionnaire.

Three users mentioned stroboscopic effects on vision: (1) "Old-time movie effect, where people move in phases as in a movie running too slow" (Sometimes, Strongly); (2) "I see in frames like a movie, only slowed down" (Rarely, Strongly); and (3) "Vision distorted as if seeing world with big strobe light flickering overhead" (Sometimes, Maximum).

"I see movement in things that I focus on, a matchbook cover with a geometrical design shifted like a light show movie; the more stoned, the bigger they are of movement" (Sometimes, Fairly).

"I find a continuum which starts with things' being two-dimensional and progressing to deep three-dimensional. I find I can stop anywhere on it" (Usually, Maximum).

"I can see the texture of the air in little swirling dots" (Usually, Just).

"Things inanimate, like a pile of clothes, seem to come to life;" (Sometimes, Strongly).

"Much more fun to watch color TV or newscasts" (Sometimes, Fairly).

"Am able to see mythical, angel-like creatures, which seem to be personal spirits" (Rarely, Maximum).

"Figure-ground shifts become more frequent and easier to control when stoned" (Sometimes, Strongly).

"I get more, and more pronounced, afterimages" (Rarely, Strongly).

"Aesthetic perception augmented re Cezzane [sic]: see interview with Allen Ginsberg, Paris Review #37" (no specification of frequency or levels).

LEVELS OF INTOXICATION FOR VISUAL PHENOMENA

The grouping of visual phenomena by intoxication levels is presented in Figure 6-4 and is highly significant ($p \lll .0005$). At the lowest levels, vision may sharpen up, patterns may appear, and colors may be affected. Further up, visual imagery is enhanced, and vision may become more central with depth magnified. Between Strongly and Very Strongly intoxicated, a sensual quality is frequently added to vision, and the external visual world may become unstable, with blurring and jiggling in depth. As one goes higher, vision may pulse, faces may change, auras may appear around objects, and at the highest

level the maximal alteration of the visual world may occur with hallucinations and auras around people.

[3]

FIGURE 6-4. INTOXICATION LEVELS, VISUAL PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
<div style="border: 1px solid black; padding: 5px;"> <p><i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare</p> </div>			AURAS AROUND PEOPLE HALLUCINATIONS FACES CHANGE PULSING OF VISION AURAS AROUND OBJECTS	
		BLURRINESS JIGGLING OF DEPTH SENSUAL QUALITY TO VISION		
		DEPTH MAGNIFIED MORE CENTRALITY OF VISION Flat quality to the world PERIPHERAL VISION CHANGES		
		PATTERNS, MEANING IN AMBIGUOUS MATERIAL THIRD DIMENSION ADDED TO PICTURES VISUAL IMAGES AUTOMATICALLY ACCOMPANY THOUGHT VISUAL IMAGERY MORE VIVID NEW SHADES OF COLOR VIVID IMAGERY WHILE READING		
	colors get duller CONTOURS GET SHARPER			

MODULATING FACTORS

Table 6-1 summarizes the effects of background factors that have relatively linear effects. Imagery automatically accompanying reading and visual jiggle appear to have a curvilinear relationship to drug experience, occurring more frequently and at lower levels of intoxication with moderate experience than

with little or much experience.

In general, more drug experience goes with sensuality and unusual visual experiences, and with more intoxication required for the possibly undesirable effects of blurriness and pulsing of vision.

TABLE 6-1
EFFECTS OF BACKGROUND FACTORS ON VISION

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequent: Sensuality of vision Auras, objects Auras, people Hallucinations Face changes More intoxicated for: Blurriness Pulsing of vision Peripheral vision changes More centrality of vision	Less frequent: Peripheral vision changes Less intoxicated for: Sensuality of vision
Older		Less frequent: Peripheral vision changes Auras, objects Hallucinations
More educated	More intoxicated for: Colors duller	Less frequent: Patterns in ambiguity Sensuality of vision
Males		Less frequent: Blurriness
Meditation	More frequent: Face changes	
Therapy & Growth		Less frequent: New colors

SUMMARY

In general, the specific changes in visual perception brought about by marijuana intoxication may be seen as particular manifestations of a general change in what we might call the *visual pattern-making process*. It is common to assume that we passively "see" what is out there, that the qualities of the visual world are inherent in the physical properties of objects and space. Modern psychological investigations have made it clear that seeing is a very active and complex process in which we *construct* the visual world from the flux of visual sensations reaching us. That is, patterns, forms, objects, recognizable people, etc. exist in our minds as a construction from visual data. We are so used to doing this automatically that it seems as if the visual world were given. This active nature of visual perception is true of all sensory modalities.

The patterns that are formed from visual data are organized into a degree of complexity and familiarity that is optimal for surviving in the world around us. Detecting a potential predator concealed in some bushes has survival value; seeing a potential predator in every ambiguous visual input is not conducive to survival of the organism. Thus we may conceive of some optimal level (actually a dynamic range)^[4] of patternmaking activity, of organization of ambiguous (and not so ambiguous) visual data into meaningful percepts. Raise this level too high and we have illusion or hallucination. Lower this level too much and we have stupidity.

Marijuana intoxication seems to raise the level a fair amount, more so with increasing levels of intoxication. Thus patterns form from ambiguous material, contours are sharpened, central visual phenomena are enhanced at the expense of peripheral phenomena, depth is magnified and more subtle shades of color are perceived. With eyes closed, visual imagery is enhanced.

Such a raising of level of the patterning mechanism is a two-edged sword. On the one hand, it may genuinely result in perceiving useful patterns and meanings that would have been overlooked. On the other hand, meaning may be falsely attributed to phenomena that have no such meaning. Many users seem to be aware of this combined advantage-disadvantage of marijuana intoxication and to compensate for it by requiring more data than usual before making a judgment or carrying out a consequent action. Others naively accept everything seen while intoxicated as true. This same dual aspect of raising the level of patternmaking activity applies, of course, to all sense modalities and cognitive processes.

Whether the proportion of naiveté and sophistication is any different from that of ordinary people in everyday life is a moot question.

Footnotes

1. For all items, frequency of occurrence data is always presented in the order Never, Rarely, Sometimes, Very Often, Usually, and intoxication level data in the order Just, Fairly, Strongly, Very Strongly, Maximum. These will not always add up to 100 percent because of variable numbers of respondents' skipping various questions and/or rounding errors. ([back](#))

2. Readers interested in this rather exotic effect may see Ellison (1962) and Kilner (1965). Most of the writing on this subject is mystical, but the above references do attempt some objective treatment of the phenomenon. ([back](#))

3. In general, intoxication effects that are two levels or more apart in this type Of graphical plot will be different enough to reach statistical significance. ([back](#))

4. The "optimal" level is quite situation-specific; depth jiggle, for example, may be quite amusing and

enjoyable during a relaxed evening at home (safe conditions) but might be a pronounced disadvantage while working at some crucial task that required very accurate depth perception. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 7. Hearing

MAJOR EFFECTS

Acuity

The most characteristic effect of marijuana intoxication is an auditory one: *"I can hear more subtle changes in sounds; e.g., the notes of music are purer and more distinct, the rhythm stands out more"* (1%, 0%, 4%, 25%, 70%), which is experienced very often or usually by almost all users and occurs at a low level of intoxication (27%, 51%, 17%, 3%, 0%).

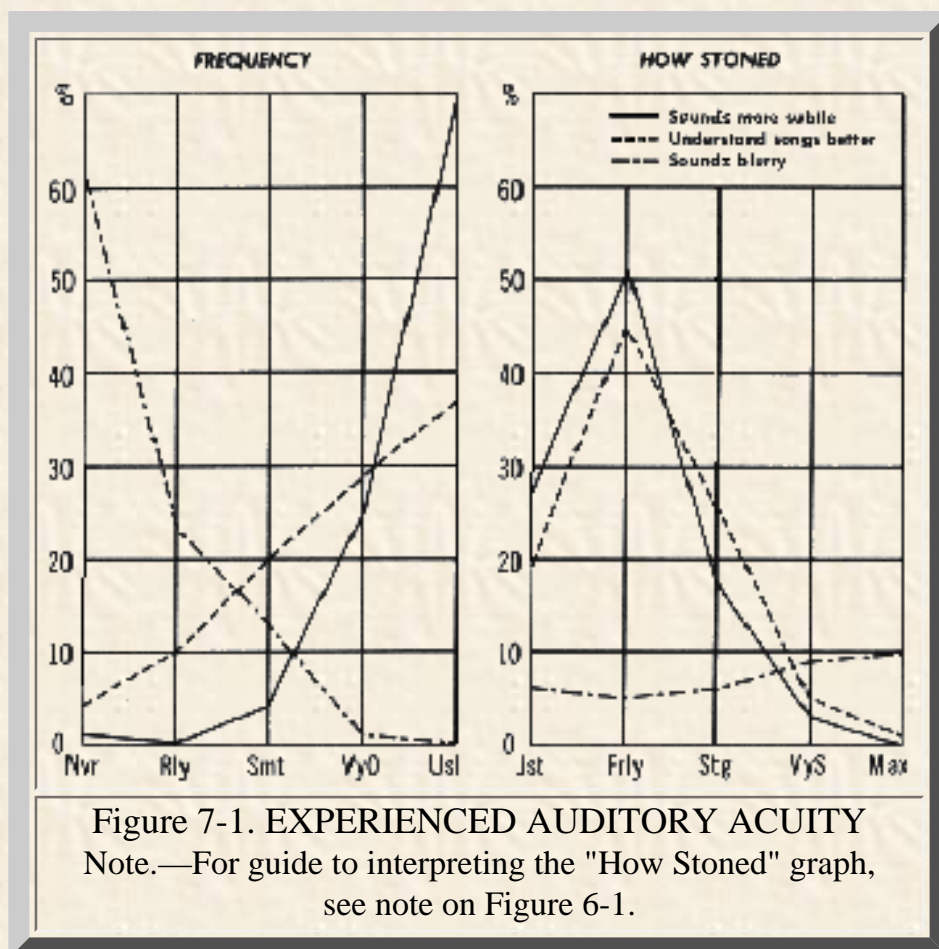
Two other items also deal with perceived auditory acuity. A very characteristic effect is *"I can understand the words of songs which are not clear when straight"* (4%, 10%, 20%, 29%, 37%), which also occurs at the lower levels of intoxication (19%, 45%, 25%, 5%, 1%). This is an experience clearly relevant to understanding rock music, which seems incomprehensible to many ordinary people. A rare effect on auditory acuity is *"I have difficulty hearing things clearly; sounds are blurry and indistinct"* (61%, 23%, 13%, 1%, 0%), a very high level effect (6%, 5%, 6%, 9%, 10%, but note that 64 percent could not rate this). The interrelationships between these three acuity effects are plotted in Figure 7-1. Hearing more subtle changes in sounds occurs more frequently than understanding the words of songs better ($p < .001$); and the latter effect, in turn, occurs more frequently than blurring of sounds ($p < .001$). Subtle changes in sounds and understanding songs have the same distribution of levels of intoxication, but the level for sound blurring is much higher than either of these phenomena ($p < .001$ in both cases).

One of the acuity phenomena is affected by background variables. Moderate Total use of marijuana is more frequently associated with understanding the words of songs better than Heavy Total use ($p < .05$), even though this is a very frequent phenomenon with Heavy Total users (mode at Very Often/ Usually), with a suggestion ($p < .10$) that Light Total users also understand the words of songs better more frequently than Heavy Total users but do not differ from Moderate Total users. Users of Psychedelics also experience this more frequently than Non-users ($p < .01$).

Sound and Space

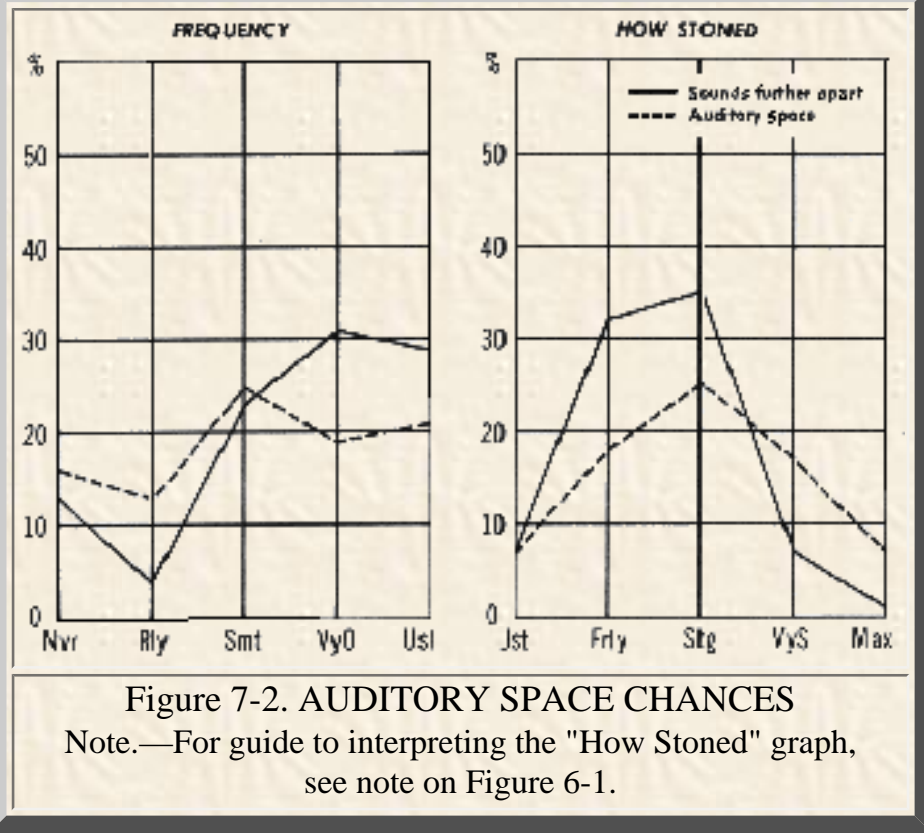
Another very characteristic effect also relates to the user's perception of music: *"When listening to stereo music or live music, the spatial separation between the various instruments sounds greater, as if they were physically further apart"* (13%, 4%, 23%, 31%, 29%), which occurs at Moderate levels of intoxication (7%, 32%, 35%, 7%, 1%). A more extreme effect on the relation of sound to space, occurring less frequently ($p < .01$) and at higher levels ($p < .001$), as shown in Figure 7-2, is *"With my eyes closed and just listening to sounds, the space around me becomes an auditory space, a place where things are arranged according to their sound characteristics instead of visual, geometrical characteristics"* (16%, 13%, 25%, 19%, 21% and 7%, 18%, 25%, 17%, 7%). One user offered a rich example, which happened to him when listening to stereo music on headphones: "Ordinarily I tend to hear high sounds as located further up in my head than low ones, and, with stereo, the sounds move back and forth along an axis between my ears, giving a two-dimensional display. When I'm stoned, the sounds also move back and forward in my head, depending on their quality, so I experience a beautiful three-dimensional sound space. Overtones and complex notes 'twist' the space in an indescribable way."

Several background factors affect the experience of auditory space. Users of Psychedelics experience auditory space somewhat more often ($p < .05$) than Non-users. The College-educated need to be somewhat more intoxicated than the Professionals to experience it ($p < .05$). The Moderate Total users need to be more intoxicated than either the Light Total users ($p < .05$) or the Heavy Total users ($p < .05$), with the Light and Heavy Total users both peaking sharply at the Fairly/Strongly level. Meditators tend to rate all intoxication levels about equally and average a lower minimal level, while ordinary Users and the Therapy and Growth group peak sharply at the Fairly/Strongly level ($p < .05$, overall).



Auditory Imagery

A common effect is imagery enhancement: *"If I try to have an auditory image, hear something in my mind, remember a sound, it is more vivid than when straight"* (16%, 7%, 26%, 27%, 20%), which occurs at Moderate levels of intoxication (9%, 33%, 27%, 7%, 3%). The Meditators and the Therapy and Growth group experience it less often than the ordinary users ($p < .01$, overall), as do the older users ($p < .05$). Further, Meditators report a somewhat higher level of intoxication for this experience than the other two groups ($p < .05$, overall).



Hearing Your Own Voice

One source of sound commonly heard to change by marijuana users is their own voices: *"The sound quality of my own voice changes, so that I sound different to myself when I talk"* (15%, 19%, 27%, 17%, 19%), mostly at the Strong level of intoxication (5%, 18%, 31%, 19%, 7%). Comments by my informants indicate that this is probably a perceptual change, not an actual change in voice quality. It occurs more frequently among the Younger group ($p < .05$).

Synesthesia

One of the most exotic phenomena associated with drugs is synesthesia, the experience of another sensory modality than the one actually stimulating the person. Visual sensation in conjunction with auditory stimulation is a common effect of marijuana: *"Sounds have visual images or colors associated with them, synchronized with them"* (20%, 23%, 33%, 16%, 7%). It occurs at high levels of intoxication (1%, 10%, 25%, 19%, 19%). Males report having to be more intoxicated to experience synesthesia than females ($p < .05$).

ADDITIONAL EFFECTS

A number of users offered additional effects on hearing.

Two mentioned ringing sounds: (1) "Ringing in my ears" (Sometimes, Very Strongly), and (2) "There's a loud buzz sound, like airplane motors, filling the air" (Sometimes, Maximum).

"When I listen to certain kinds of music (especially serious music) when stoned, it becomes incredibly more sensual and profound" (Sometimes, Maximum).

"When listening to music, my mind can become completely absorbed by sound to the extent that my body is writhing, but entirely disconnected from my mind" (Sometimes, Very Strongly).

"While chanting *mantras*, rhythmic continuity is more sensuous and secure" (no specification of frequency or level).

"Admiration for the intrinsic knowledge musicians and composers have of the effect of their sounds on people's total being" (Very Often, Fairly).

FIGURE 7-3. INTOXICATION LEVELS, AUDIO PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;"> <i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare </div>				
			Sounds blurry	
			SYNESTHESIA, VISUAL-AUDITORY	
		QUALITY OF OWN VOICE CHANGES		
		SPACE BECOMES AN AUDITORY SPACE		
		GREATER SPATIAL SEPARATION BETWEEN SOUND SOURCES		
		AUDITORY IMAGES MORE VIVID		
		UNDERSTAND THE WORDS OF SONGS BETTER		
		HEAR MORE SUBTLE CHANGES IN SOUND		
Just	Fairly	Strongly	Very Strongly	Maximum

LEVELS OF INTOXICATION FOR AUDITORY PHENOMENA

Figure 7-3 orders the various auditory effects by level of intoxication. Overall differences are very significant ($p \lll .0005$). Experiential enhancement and enrichment of sounds appears at the very low levels of intoxication and progresses to vivid auditory images and changes in space perception in accordance with sound in the middle ranges of intoxication. Synesthesia may appear above this, and the

rare effect of sounds' becoming blurry and indistinct may appear at the next-to-highest possible level.

MODULATING FACTORS

Table 7-1 summarizes those background factors that have a relatively linear effect.

TABLE 7-1
EFFECTS OF BACKGROUND FACTORS ON HEARING

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequent: Auditory space More intoxicated for: Auditory space	Less frequent: Understanding words of songs better
Meditation	More intoxicated for: Auditory imagery better	Less frequent: Auditory imagery better Less intoxicated for: Auditory space
More educated		Less intoxicated for: Auditory space
Older	More frequent: Auditory imagery better	Less frequent: Own voice changes
Males	More intoxicated for: Synesthesia	

Although several background factors have a relatively linear effect on the phenomenon of experiencing space as an auditory space, total marijuana use has a curvilinear effect. Moderate Total users have Very Strongly/Maximum indicated as the minimal level almost as frequently as Fairly/Strongly, while the Light and Heavy Total users peak sharply at Fairly/Strongly.

Overall, auditory effects are infrequently affected by background factors.

SUMMARY

In general we may note that effects on sound perception are some of the most characteristic effects of

marijuana. Every effect here but one was at least common; one (subtle changes in sounds) was the most characteristic effect found in the entire study, and many others were characteristic. Further, all of these effects were perceived as emotionally pleasant or cognitively interesting, leading to greatly enhanced enjoyment of sound and music. The only exception was the blurring of sounds, which was one of the rarest effects in the study, occurring primarily at very high levels of intoxication, and was never experienced at all by most users.

The earlier discussion (Chapter 6) about perception as an active pattern-making process is applicable here, as it is to all sensory modalities. A primary experiential effect of marijuana intoxication is to make slight, ordinarily unnoticed nuances of sounds into *meaningful* variations. The question of whether this would produce a verifiable increase in auditory acuity by objective standards (say, in understanding the words of songs better) is quite intriguing.

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 8. Touch, Temperature, Taste, and Smell

TOUCH AND TEMPERATURE

MAJOR EFFECTS

A very characteristic effect of marijuana intoxication is "*My sense of touch is more exciting, more sensual, when stoned*" (4%, 9%, 21%, 31%, 34%), which occurs at the lower-middle levels of intoxication (9%, 35%, 37%, 9%, 3%). Meditators experience this at a lower level ($p < .01$, overall).

A variant of this effect, also characteristic, is "*Touch sensations take on new qualities that they don't have when straight*" (5%, 9%, 30%, 30%, 25%), with the minimal necessary level of intoxication again being primarily in the Fairly and Strongly range (9%, 37%, 30%, 13%, 4%). Meditators show a lower and more variable level of intoxication for this ($p < .05$, overall).

Two linked common phenomena help to specify these new touch qualities: "*Some surfaces feel much smoother, silkier than when straight*" (11%, 10%, 39%, 25%, 13%), and "*Some surfaces feel much rougher, more irregular than when straight; the roughness or graininess forms interesting patterns*" (14%, 13%, 37%, 25%, 11%), which are reported with essentially the same frequency. The minimal level of intoxication for both is the Fairly-Strongly range (5%, 36%, 31%, 9%, 3% and 5%, 29%, 31%, 13%, 3%, respectively). The College-educated experience increased roughness more frequently than the Professionals ($p < .01$), and the College-educated need to be somewhat more intoxicated to experience

either smoothness ($p < .05$) or roughness ($p < .01$).

Tactual Imagery

An enhancement of tactual imagery is common: *"I can experience vivid tactual imagery, imagine what things feel like and feel their texture very vividly in my mind"* (19%, 20%, 27%, 24%, 9%). Heavy Total users experience this most often, Moderate Total users next most often, and Light Total users least ($p < .05$, overall). This effect occurs at Strong levels of intoxication (3%, 19%, 31%, 17%, 7%).

Temperature

A sense ordinarily included with touch is temperature. A common effect is *"The temperature of things, their warmth or coldness, takes on new qualities."* (19%, 12%, 32%, 25%, 12%), which occurs in the middle ranges of intoxication (3%, 21%, 35%, 16%, 3%). This is reported more frequently by the College-educated than by Professionals ($p < .01$).

Weight

Another common effect closely related to touch is the kinesthetic sense of the weight of objects: *"Objects seem heavier, more massive, when I lift them when stoned"* (21%, 21%, 29%, 15%, 11%). The opposite effect, *"Objects seem lighter, less massive, when I lift them"* (31%, 30%, 24%, 5%, 3%) is infrequent, as shown in Figure 8-1 ($p < .001$). The modal levels of minimal intoxication for both effects are Fairly to Strongly, and do not differ from one another (7%, 26%, 25%, 15%, 1% and 5%, 17%, 22%, 12%, 3%, respectively), although many (41 percent) users did not rate the level on objects seeming lighter.

Women and Non-users of Psychedelics experience increased massiveness of objects somewhat more frequently than men and Users ($p < .05$ for each comparison). The Professionals need to be somewhat more intoxicated than the College-educated to experience this increased heaviness ($p < .05$).

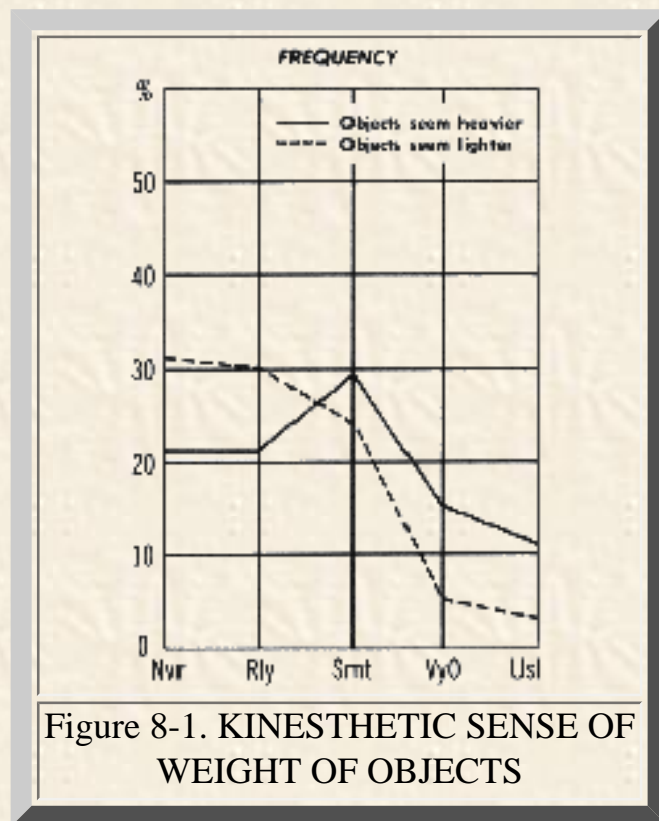


Figure 8-1. KINESTHETIC SENSE OF WEIGHT OF OBJECTS

ADDITIONAL EFFECTS

"Touch becomes more erotic with friends than usual" (Sometimes, Strongly).

"Sensation increases with amount and then becomes less pleasurable and more physically objectionable" (Usually, Just).

"When I am starting to get stoned, I feel a tingling at the end of my fingertips" (Usually, Strongly).

"Touching of objects and areas (walls, etc.) with eyes closed brings many enjoyable and fantastic experiences to my mind" (Usually, Strongly).

"When being touched, I feel that figures are being described in space rather than 'on' my skin" (Sometimes, Fairly).

"My skin feels exceptionally sensitive" (Usually, Fairly).

"Much prefer hot weather to cold, since cold is especially uncomfortable when stoned" (Very Often, Strongly).

LEVELS OF INTOXICATION FOR TOUCH PHENOMENA

All the effects of marijuana intoxication on touch may occur in the Fairly to Strongly range, with no significant differences between the two adjacent levels, so they are not plotted.

MODULATING FACTORS

The relatively linear effects of several background factors are summarized in Table 8-1.

TABLE 8-1
EFFECTS OF BACKGROUND FACTORS ON TOUCH

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequent: Tactile imagery	Less frequent: Objects seem massive
More educated	More intoxicated for: Objects seem massive	Less frequent: Surfaces feel rough New temperature qualities Less intoxicated for: Surfaces feel smooth Surfaces feel rough

Males		Less frequent: Objects seem massive
Meditation		Less intoxicated for: New touch qualities Touch more sensual

TASTE

MAJOR EFFECTS

The second most characteristic quality of marijuana intoxication is *"Taste sensations take on new qualities that they don't have when straight"* (3%, 3%, 15%, 29%, 49%). This occurs at Low levels of intoxication (17%, 49%, 22%, 5%, 1%). Not too surprisingly, then, an extremely characteristic effect of marijuana is *"I enjoy eating very much and eat a lot"* (1%, 5%, 18%, 31%, 44%), which also occurs at low intoxication levels (22%, 44%, 26%, 4%, 1%). Users of Psychedelics report this as occurring less frequently than Non-users ($p < .05$).

Taste Imagery

As with other senses, sensory imagery is a common experience (15%, 15%, 37%, 17%, 16%): *"If I try to imagine what something tastes like, I can do so very vividly"* occurs at Moderate minimal levels of intoxication (11%, 31%, 29%, 11%, 1%), with Meditators reporting this less frequently than Ordinary Users or the Therapy and Growth group ($p < .05$, overall). Users of Psychedelics and Meditators do not have to be as intoxicated for this experience ($p < .05$ in each case).

Sweets

The data confirm a popular belief that marijuana smokers like sweets: *"I crave sweet things to eat, things like chocolate, more than other foods"* is a common effect (16%, 26%, 25%, 15%, 17%), which occurs at Low levels of intoxication (11%, 41%, 23%, 5%, 0%). The Light and Heavy Total users peak

sharply at Fairly/Strongly on level of intoxication here, while the Moderate Total users are more variable ($p < .05$).

Components of Taste

A fairly frequent effect is *"Tastes become divided into several components, instead of an overall taste. E.g., a bite of bread may taste salty on one part of your tongue and sour on another part at the same time"* (43%, 15%, 25%, 11%, 5%). Although many (47 percent) users did not rate this for level, it is an effect occurring at fairly strong levels (3%, 12%, 20%, 15%, 3%). It is interesting to raise the question whether this is an actual perception of the several discrete tasting organs in the mouth functioning separately instead of their usual blending together, or whether it is imagery added to taste sensations.

Miscellaneous Taste Phenomena

An infrequent phenomenon is *"There is an exceptionally long time delay between starting to chew food and the time the taste actually reaches my consciousness"* (49%, 18%, 15%, 10%, 3%), which occurs at Strong levels of intoxication (1%, 11%, 19%, 13%, 3%, noting that 55 percent did not rate this). This delay is more frequent among Non-users of Psychedelics ($p < .01$). We may be dealing more with a time phenomenon than a taste one here, perhaps a differential delay between "outside" sensory input (taste) and internal feedback of what the body is doing (chewing).

Because it has frequently been noted that marijuana produces dryness of the mouth, the item *"I salivate quite a lot when stoned"* was included in the questionnaire as a Validity Scale item. As it may be that some users do indeed salivate a lot, however, the data on it are presented here for what they are worth to future investigators. This effect is infrequent (44%, 30%, 13%, 5%, 5%) and rated at Moderate levels (10%, 17%, 17%, 3%, 2%, with 51 percent not rating). Light and Moderate Total users have Never as their modal frequency of occurrence, with Heavy Total users having Rarely/Sometimes as the mode ($p < .01$, overall). A question to consider, then, is: Does long, heavy marijuana use alter the dryness usually considered an invariable physiological effect?

The final phenomenon of taste investigated is also infrequent: *"If I belch, I retaste the food in my stomach, and it tastes very good"* (51%, 17%, 15%, 6%, 3%). It also occurs at Moderate levels of intoxication (8%, 15%, 11%, 3%, 1%). It occurs more often with Heavy Total users ($p < .05$, overall) and with Meditators ($p < .01$, overall).

ADDITIONAL EFFECTS

"When eating, the texture and temperature are important" (Texture: Very Often, Strongly; Temperature: Very Often, Fairly).

"Throat dry and special taste that lingers (I don't think it's the taste of grass, but rather the sense of taste when stoned: most foods taste the same, anyway, when stoned)" (Usually, Fairly).

"Want to have cigarette (tobacco), but don't enjoy it" (Usually, Strongly).

LEVELS OF INTOXICATION FOR TASTE PHENOMENA

Figure 8-2 shows various taste phenomena by level of intoxication. Overall differences are highly significant ($p \ll .0005$). Starting at the Fairly intoxicated level, there is an enhancement of taste and increase in appetite. Somewhat higher, taste imagery may be enhanced. Above that there may be a time delay between chewing and tasting, and at the level midway between Strongly and Very Strongly tastes may break into components.

FIGURE 8-2. INTOXICATION LEVELS, TASTE PHENOMENA

Just Fairly Strongly Very Strongly Maximum

Type size code:
CHARACTERISTIC
 COMMON
 INFREQUENT
 Rare

TASTE BROKEN INTO COMPONENTS
 TIME DELAY BETWEEN CHEWING AND TASTING
 TASTE IMAGERY ENHANCED
 SALIVATE A LOT
 RETASTE FOOD WHEN BELCHING
 CRAVE SWEET THINGS
 NEW QUALITIES TO TASTE
 ENJOY EATING AND EAT VERY MUCH

Just Fairly Strongly Very Strongly Maximum

MODULATING FACTORS

The background factors having relatively linear effects are summarized in Table 8-2, namely, Drug Experience and Meditation. Both those with more drug experience and Meditators would seem to be more involved with tasting and eating generally.

A craving for sweet things in preference to other foods is common but affected by total marijuana use in a non-linear fashion; Light and Heavy Total users both indicate Fairly/Strongly as a modal level of intoxication for this, but the Moderate use group, while also having a mode at Fairly/Strongly, also

frequently indicates Just and Maximum as minimal levels for experiencing this.

TABLE 8-2
EFFECTS OF BACKGROUND FACTORS ON TASTE

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequency: Retaste food when belching Salivate a lot	Less frequency: Delay between chewing and tasting Enjoy eating, eat a lot Less intoxicated for: Vivid taste imagery
Meditation	More frequency: Retaste food when belching	Less frequency: Vivid taste imagery Less intoxicated for: Vivid taste imagery

SUMMARY OF TASTE EFFECTS

In general, we may say that the main perceived effect of marijuana on taste is enhancement of taste qualities and (a consequent?) increase in appetite. As one informant put it, "On pot every man becomes a gourmet; good food tastes remarkably good, crappy food is awful!" This effect might be put to practical medical use where a patient is seriously underweight.

SMELL

MAJOR EFFECTS

Although smell is a relatively neglected sense in modern man, some alterations in smell sensations are reported by marijuana users.

A common experience is "*Smells become much richer and more unique when stoned*" (13%, 17%, 35%, 23%, 12%), which occurs at Moderate levels of intoxication (5%, 30%, 33%, 14%, 3%). This occurs more frequently among Heavy Total users of marijuana and Users of Psychedelics than among Light or Moderate Total users ($p < .05$, overall) or Non-users of Psychedelics ($p < .05$).

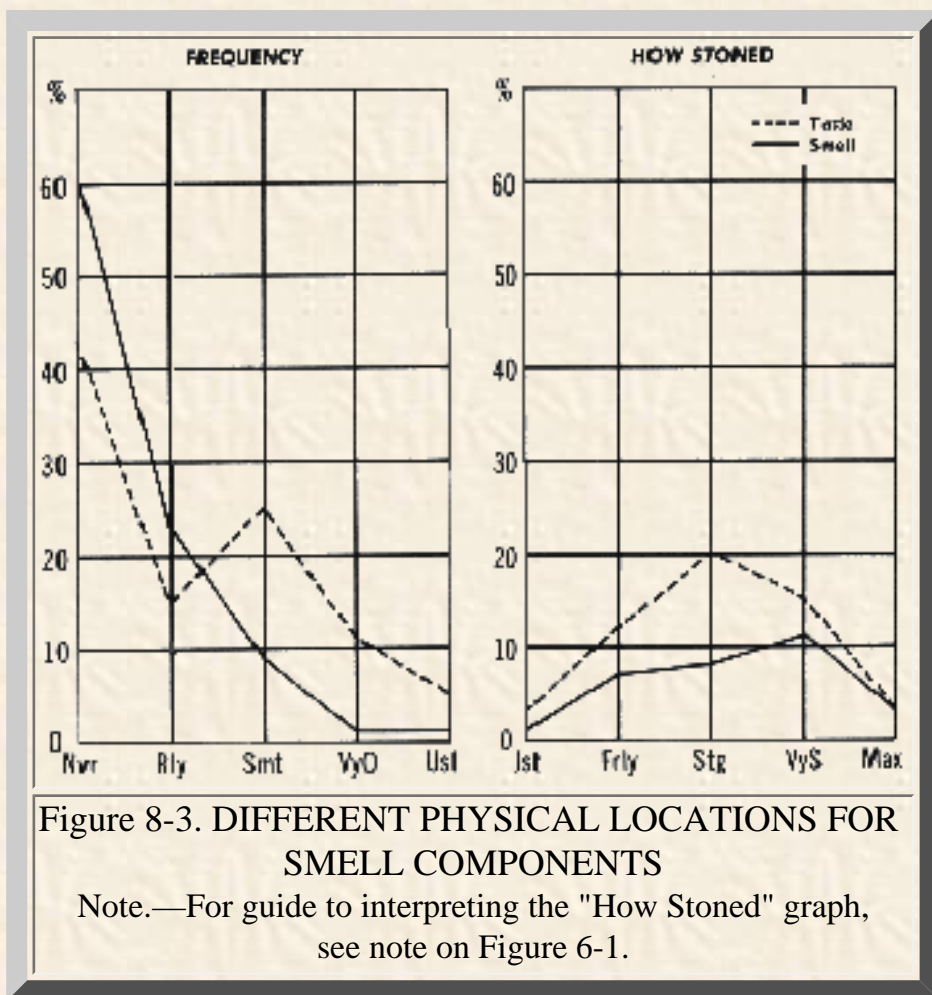
An almost synonymous common experience is "Smell sensations take on new qualities that they don't have when straight" (15%, 13%, 45%, 15%, 11%), which also occurs at Moderate levels (3%, 31%, 33%, 17% 1%). This also occurs more frequently among Heavy Total users of marijuana ($p < .05$, overall).

Smell Imagery

Smell imagery enhancement is fairly frequent: "If I try to imagine what something smells like, I can do so much more vividly than when straight" (31%, 24%, 29%, 7%, 5%), which occurs at Strong levels of intoxication (3%, 18%, 25%, 13%, 3%).

Smell Components

A rare effect is "When I smell something, different components of the smell seem to register at different physical locations in my nose" (61%, 23%, 9%, 1%, 1%), which occurs at higher levels of intoxication (1%, 7%, 8%, 11%, 3%, with 69 percent not rating). It is interesting to compare this with the experience of taste being broken down into different locations in the mouth (see page 83); this is done in Figure 8-3. This effect occurs more frequently with taste than smell ($p < .001$), but levels of intoxication do not differ significantly.



LEVELS OF INTOXICATION FOR SMELL PHENOMENA

Intoxication levels for olfactory phenomena all run from midway between Fairly/Strongly to midway between Strongly/Very Strongly, with the differences in levels not significant.

MODULATING FACTORS

The two qualities of smell alteration affected by background factors are smells' becoming more unique and richer, and smells' taking on new qualities, both of which occur more frequently among users with more drug experience.

SUMMARY OF SMELL EFFECTS

In general, the main perceived effect of marijuana intoxication on the sense of smell is an experiential enhancement, making smells richer and more unique.

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 9. Space and Time

SPACE

EXPERIENCES, EVENTS, do not just *happen*; they happen to a *person* at a *place* at a *time*. This chapter will deal with many important changes in the perception of and orientation to the matrix of space and time during marijuana intoxication. Some 11 items specifically dealt with this in the questionnaire, and another 11 items from other sections are clearly relevant, as well as all the effects on Memory discussed in Chapter 14. The question of the *person* who experiences things in the space/time matrix will be dealt with in Chapter 18.

PERCEPTION OF SPACE

Distance

The third most characteristic effect of marijuana intoxication is "*When I walk someplace, my experience of the distance covered is quite changed (e.g., not being aware of the space between, just seeming to suddenly be there or, conversely, feeling that it takes an immense number of steps to cover the distance)*" (1%, 3%, 18%, 45%, 33%). The minimal level of intoxication is generally Low to Moderate (7%, 27%, 41%, 19%, 3%). The Therapy and Growth group and the Meditators have to be less intoxicated for this ($p < .01$, overall) than the ordinary user.

Even when the user is not moving about himself, distances change: "*Distances between me and things or me*

and other people seem to get greater; they are further away" (13%, 15%, 44%, 17%, 9%) is a common effect, which, occurs at Moderate to Strong levels of intoxication (3%, 17%, 27%, 19%, 8%). The converse effect, "Distances between me and other things or people seem to get shorter; they are closer" is also common (23%, 20%, 43%, 7%, 3%) as a mid-range effect (4%, 17%, 27%, 19%, 3%). As shown in Figure 9-1, distances' seeming greater occurs somewhat more frequently ($p < .01$), but levels of intoxication for these linked effects do not differ significantly.

The college-educated need to be somewhat more intoxicated than the Professionals for distances to seem shorter ($p < .05$).

Spatial Orientation

Spatial orientation may be completely lost temporarily: "I get so lost in fantasy or similar trips in my head that I completely forget where I am, and it takes a while to reorient after I come back and open my eyes" is common (15%, 22%, 37%, 19%, 8%) but occurs mainly at the very high levels of intoxication (1%, 3%, 20%, 33%, 24%). This is reported as occurring less often by the Daily users ($p < .05$, overall). Two related phenomena, dealt with fully in Chapter 11, are "I have lost all consciousness of my body during fantasy trips, i.e., gotten so absorbed in what was going on in my head that my body might as well have not existed for a while" and "I have lost all consciousness of my body and the external world and just found myself floating in limitless space (not necessarily physical space)." The experience of floating in limitless space is infrequent and is reported as occurring significantly less frequently than losing consciousness of the body per se during fantasy ($p < .001$) or losing consciousness of the body sufficiently to need to reorient ($p < .05$). None of the three phenomena differ significantly in levels of intoxication, all being very high-level phenomena. The latter two items are probably variants of the same phenomenon.

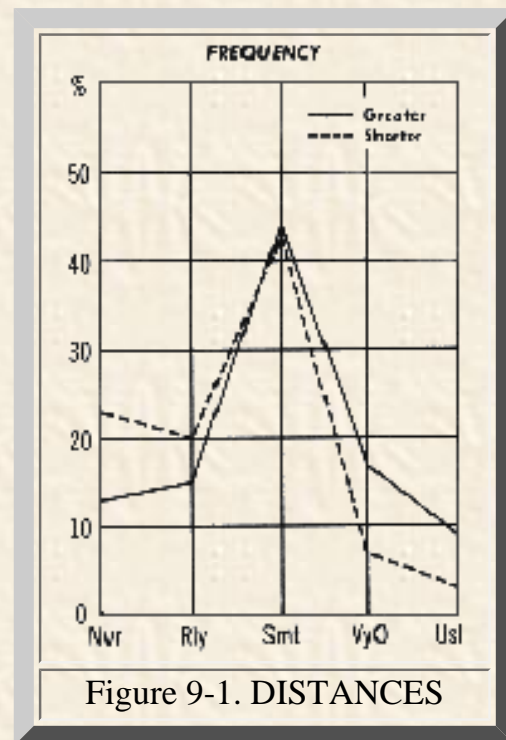


Figure 9-1. DISTANCES

Quality of "Empty" Space

An infrequent but rather dramatic phenomenon is "The space or air around me takes on a solid quality; it is no longer 'empty' space" (41%, 21%, 26%, 7%, 2%), which occurs at relatively high levels of intoxication (0%, 3%, 15%, 19%, 13%) for those who could rate it. My informants indicate that this phenomenon may take a visual form, with the air or space taking on faint, vibrating colors, or a "tactual" form in that the air or space "feels" solid even though there is no visual change; space, rather than being a nonperceptible abstraction, becomes an immediate experience. The Weekly users report this most often (mode at Rarely/Sometimes), with both Occasional and Daily users having a modal occurrence rate of Never ($p < .05$, overall). The Meditators experience it more frequently than the Therapy and Growth group or the ordinary users ($p < .05$, overall). The Professionals need to be more intoxicated than do the College-educated to experience the air becoming solid ($p < .05$).

Related Phenomena

Related phenomena of space, dealt with in other chapters, are the visual effects of Chapter 6, such as pictures' acquiring a third dimension, the world's looking flat, visual centrality, and visual jiggle; and the auditory restructuring of space, greater separation between sound sources, and space becoming an *auditory* space, dealt with in Chapter 7.

SPACE PHENOMENA AND LEVELS OF INTOXICATION

Figure 9-4 presents the various perceived alterations of space by levels of intoxication. The overall differences in levels are highly significant ($p \lll .0005$). At the lowest levels of intoxication no changes in space are generally reported. At Moderate levels, distances frequently change, and sound sources seem further apart. As one goes higher, visual qualities of space may become less important as organizing factors, and perceived space may be unstable (jiggle); and at the very highest levels of intoxication, awareness of ordinary space may disappear completely, with the user lost in fantasy or floating in a purely mental space.

TIME

PERCEPTION OF TIME

Passage of Time

One of the most characteristic effects of marijuana intoxication is "*Time passes very slowly; things go on for the longest time (e.g., one side of a record seems to play for hours)*" (1%, 3%, 21%, 43%, 31%). The effect begins to occur at Moderate levels of intoxication (4%, 29%, 37%, 21%, 4%). The only background variable modulating this characteristic effect is total marijuana use; Heavy Total users must be more intoxicated to experience this ($p < .05$, overall).

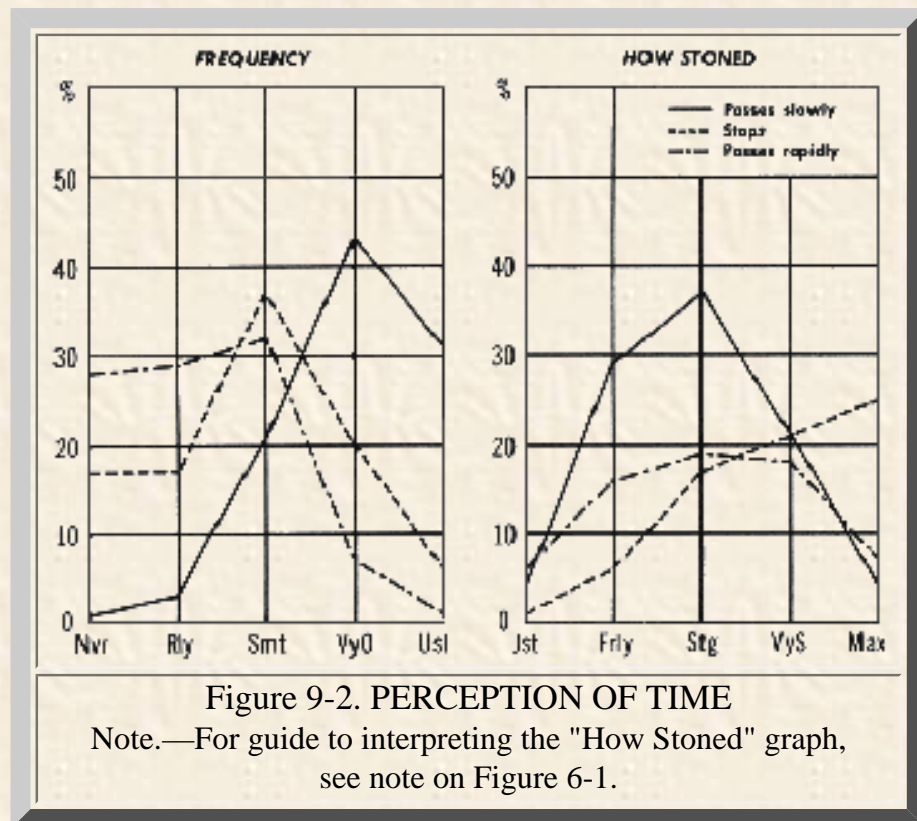
An even more radical alteration of time is the common effect, "*Time seems to stop; it's not just that things take longer, but certain experiences are outside of time, are timeless*" (17%, 17%, 37%, 20%, 6%). Priestley (1964) has dealt with this phenomenon and calls it the experience of archetypal time. It generally does not begin to occur until very high levels of intoxication are reached (1%, 6%, 17%, 21%, 25%). It is reported as occurring more frequently by Females ($p < .05$). Non-users of Psychedelics experience it at higher levels of intoxication than Users ($p < .05$).

The converse of time's slowing or stopping is "*Time passes very rapidly; things finish almost before they seem to have gotten started,*" an infrequent effect (28%, 29%, 32%, 7%, 1%) of the middle levels of intoxication (6%, 16%, 19%, 18%, 7%). Females experience this more frequently than Males ($p < .05$), and Heavy Total users more frequently than Light or Moderate Total users ($p < .05$, overall). The Therapy and Growth group must be more intoxicated to experience time as passing rapidly than the Meditators ($p < .01$) or the Ordinary Users ($p < .01$).

The interrelationships between time passing rapidly, slowly, or stopping are shown in Figure 9-2. Time passing slowly is more frequent than time stopping ($p < .001$), and time stopping occurs more frequently than time passing rapidly ($p < .001$). While the distributions of minimal levels of intoxication do not differ significantly for time passing slowly or rapidly, the experience of time stopping occurs at higher levels of intoxication ($p < .001$ for either comparison).

An aspect of time passing more slowly has already been presented in the phenomenon of a long delay between chewing something and tasting it (see chapter 8); this delay phenomenon occurs far less frequently ($p < .001$) than a general slowing of time, but at approximately the same level of intoxication.

Time stopping—archetypal time—was also investigated with respect to shift in identity in the item *"Some events become archetypal, part of the basic way Man has always done things..."*, which is dealt with fully in Chapter 18. It occurs about as frequently as time stopping, but at lower levels of intoxication ($p < .01$).



Events and the Passage of Time

Not only is it characteristic of marijuana intoxication for time to seem to pass more slowly; it is common for events to fit more smoothly into this slowed time: *"Events and thoughts flow more smoothly; the succession of events in time is smoother than usual"* (12%, 16%, 38%, 20%, 11%). This begins to occur at Moderate levels (8%, 30%, 31%, 13%, 1%). The Therapy and Growth group has to be more intoxicated to experience this increased smoothness of flow ($p < .05$, overall).

The converse common effect, *"Events and thoughts follow each other jerkily; there are sudden changes from one thing to another"* (13%, 23%, 35%, 19%, 5%) occurs at significantly higher ($p < .001$) levels of intoxication (6%, 13%, 34%, 19%, 7%), as illustrated in Figure 9-3.

Meditators experience jerkiness in the flow of time less often than ordinary users ($p < .05$) or than the Therapy and Growth group ($p < .05$). Users of Psychedelics need to be more intoxicated to experience this jerkiness ($p < .05$).

Here-and-Now-ness

Two time phenomena may be alterations in the perception of time per se or possibly consequences of some of the changes described above. A characteristic effect is "I give little or no thought to the future; I'm completely in the here-and-now," and a related very common effect is "I do things with much less thought to possible consequences of my actions..."; both are dealt with fully in Chapter 15.

Déjà Vu

"While something is happening, I get the funny feeling that this sequence has happened before, in exactly the same way. Even though I logically know that it couldn't have happened before, it feels strange, as if it's repeating exactly (this is called a *déjà vu* experience and should not be confused with a false memory)" is a common experience (21%, 23%, 37%, 16%, 3%), which occurs at the middle level of intoxication (4%, 16%, 27%, 20%, 7%). While this is a phenomenon of memory by conservative standards, it would certainly influence a user's view of the nature of time. Some users, for example, interpret *déjà vu* as evidence for reincarnation. Similarly ostensible precognition (see page 100), while occurring rarely, could also strongly influence a user's view of the nature of time.

In terms of a human experience, and particularly a marijuana user's experience, the common physical view of time as an impersonal abstraction flowing along at a constant rate, with only the present being real, is inadequate, for some people may experience: (1) the past and future as being as real as the present at times; (2) the rate of time flow changing radically; (3) time stopping (archetypal time); and (4) events fitting smoothly or jerkily into the flow of time.

Note also that all memory effects (Chapter 14) are relevant to time effects, but they will not be discussed here.

LEVELS OF INTOXICATION FOR TIME PHENOMENA

Figure 9-4 presents various time phenomena ordered by levels of intoxication. The overall ordering is highly significant ($p \lll .0005$). As with space, there are no alterations of time commonly occurring at the very low levels of intoxication, but beginning between Fairly and Strongly, time is usually experienced as slowing. Going a little higher, the user is quite likely to feel much more in the here-and-now and may give less thought to the consequences of his actions. At higher levels actions take on an archetypal quality, and at the highest levels time may seem to stop, in that actions seem somehow removed from time, not a part of the inevitable flow.

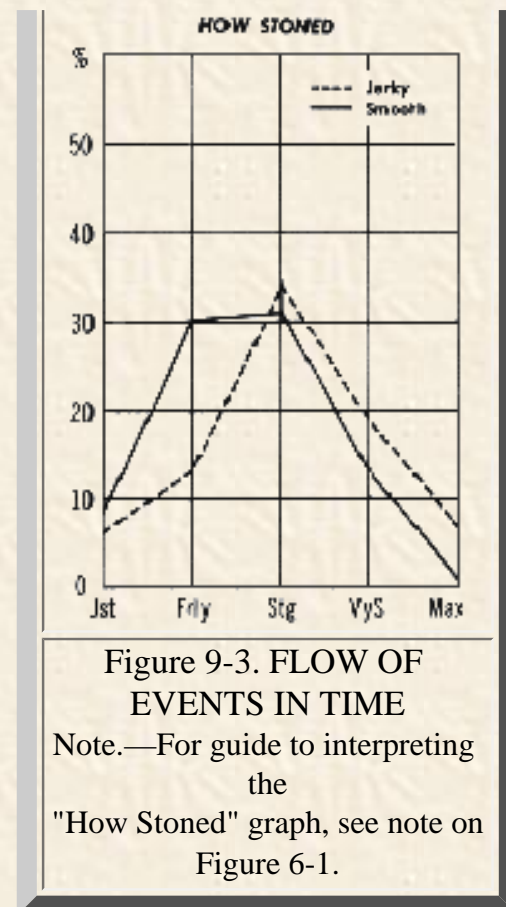


FIGURE 9-4. INTOXICATION LEVELS, SPACE AND TIME PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
<p><i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare</p>				
				FLOAT IN LIMITLESS SPACE
				TIME STOPS
				LOST IN FANTASY, NEED TO REORIENT
				Precognition
				AIR, SPACE BECOMES SOLID
				ACTIONS HAVE ARCHETYPAL QUALITY
				VISUAL JIGGLE
				DEJA VU
				DELAY BETWEEN CHEWING AND TASTING
				FLOW OF EVENTS IRREGULAR, JERKY
				TIME PASSES MORE RAPIDLY
				THINGS APPEAR DIFFERENT IN PERIPHERAL VISION
				MORE CENTRALITY TO VISION
				VISUAL WORLD LOOKS FLAT
				DISTANCES SEEM SHORTER
				SPACE BECOMES AN AUDITORY SPACE
				LESS THOUGHT TO CONSEQUENCES OF ACTIONS
				MORE IN THE HERE-AND-NOW
				DISTANCES SEEM GREATER
				TIME PASSES MORE SLOWLY
				PICTURES ACQUIRE AN ELEMENT OF DEPTH
				DISTANCE IN WALKING CHANGED
				EVENTS FLOW MORE SMOOTHLY
				GREATER SEPARATION BETWEEN SOUND SOURCES

Just	Fairly	Strongly	Very Strongly	Maximum
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ADDITIONAL EFFECTS

"Time moves discontinuously" (Usually, Strongly).

"The world is more real" (Usually, Fairly).

LEVELS OF INTOXICATION FOR SPACE AND TIME PHENOMENA

Space and time form a tightly interwoven matrix in experience, so in some ways the division of space and time phenomena in the above discussions has been artificial. Figure 9-4 presents both space and time phenomena by level of intoxication, a significant overall ordering ($p \lll .0005$).

As the marijuana user becomes moderately intoxicated, the space/time matrix of experience seems to change; distances he moves around in change in size, time slows down, and sound begins to have some structuring effect on the space/time matrix. As he becomes strongly intoxicated, a variety of effects on his visual perception of the space of the world around him may occur, typically of the sort that involve him more in the space/time matrix (here-and-now-ness, centrality of vision, distances affected by his interest in objects). Moving into the high levels of intoxication, space may take on a structure or texture rather than being an abstract thing, and actions may take on an archetypal quality as the ordinary character of time becomes less binding on experience. He may sometimes become so lost in inner thoughts and fantasies that it takes some time to reorient to where he is. At the highest levels, time may seem to stop, actions to be out of the framework of physicalistic time, and he may also completely lose touch with the ordinary space/time continuum and experience floating in limitless space.

In general, the higher in level of intoxication one goes, the less binding the ordinary space/time matrix is on experience. One methodological difficulty created by this is that the descriptions of experiences at high levels can become less adequate, for language was evolved within the context of a quite rigid space/time matrix.

MODULATING FACTORS

A summary of the effects of various linearly-acting background variables is presented in Table 9-1. The effect of these background variables is quite complex.

Frequency of use has a curvilinear effect on the experience of air or space as taking on a "solid" quality; Weekly users have a modal report of Rarely/Sometimes, while the mode for both Daily and Occasional users is Never.

TABLE 9-1
EFFECTS OF BACKGROUND FACTORS ON SPACE AND TIME

BACKGROUND FACTORS	EFFECTS

<p>More Drug Experience</p>	<p>More frequent: Time flows rapidly Space becomes an auditory space Precognition Actions archetypal;</p> <p>More intoxicated for: Time flows slowly Jerkiness of events Visual centrality Space becomes an auditory space</p>	<p>Less frequent: Delay between chewing and tasting Totally in here-and-now Lose track, need to reorient Lose consciousness of body during fantasy</p> <p>Less intoxicated for: Less thought to consequences of actions Time stops</p>
<p>Meditation</p>	<p>More frequent: Air, space solid</p>	<p>Less frequent: Jerkiness of events</p> <p>Less intoxicated for: Totally in here-and-now Walking distance changed Space becomes an auditory space</p>
<p>Therapy & Growth</p>	<p>More intoxicated for: Events flow smoothly</p>	<p>Less intoxicated for: Walking distance changed</p>
<p>More educated</p>	<p>More intoxicated for: Air, space solid</p>	<p>Less intoxicated for: Space becomes an auditory space Distances seem shorter</p>
<p>Males</p>	<p>More intoxicated for: Actions archetypal</p>	<p>Less frequent: Time stops Time flows rapidly</p>
<p>Older</p>		<p>Less intoxicated for: Float in limitless space</p>

SUMMARY

A major set of perceived effects of marijuana intoxication is the alteration of the space/time matrix in which all experience is set. This characteristically takes the form of increased attention to the present at the expense of the past and future (here-and-now-ness). Spatial dimensions may alter, and such alteration is affected by sound, music, and the user's attention. At the high levels of intoxication, experiences are increasingly less structured by the ordinary physical space/time matrix. At the highest levels, time may seem to stop, the user may

experience archetypal time, where he is part of a pattern that man has always been part of, and he may temporarily lose consciousness of the ordinary space/time framework altogether, thus having experiences, which are inadequately communicated by language.

Chapter 10

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 10. Ostensible Paranormal Phenomena (ESP)

PHENOMENA PURPORTING to be paranormal in nature—i.e., involving the transmission of information (extrasensory perception, ESP) or power (psychokinesis, PK) across space or time when known physical carriers would not be operative—were often reported in pilot interviews with marijuana users, so a number of questions were devoted to this in the main study. A questionnaire study can only deal with *ostensible* paranormal phenomena, i.e., with phenomena that the experiencers themselves judge to be paranormal. Whether such phenomena would appear to be genuinely paranormal in terms of laboratory standards is unknown; judging by previous studies of self-reported ESP instances (Anonymous, 1958; Green, 1960, 1966; Gurney, Myers, & Podmore, 1886; Membership Committee, American Society for Psychical Research, 1967; Prasad and Stevenson, 1968; Sidgwick et al., 1894), some of the ostensible ESP would be discounted by a scientific investigator and some would turn out to be well evidenced and worthy of investigation. Thus the figures given below for paranormal phenomena are probably too high in terms of actual paranormal phenomena, [1] but do reflect the incidence of ostensible paranormal phenomena in our 150 marijuana users. It is, of course, the experiencer's own judgment of the paranormality of an experience that may radically alter his belief system, not the judgment of a hypothetically expert scientist. Thus ostensible paranormal phenomena are an important aspect of marijuana intoxication.

First, it should be noted that most of the users (76 percent) believe in the reality of ESP; their responses to the question, "*I believe in the existence of extrasensory perception (ESP), i.e., that people can sometimes acquire knowledge about things happening at a distance in space or time, or about other people's thoughts, when there is no possibility of this knowledge having been acquired through the known senses (sight, hearing, etc.)*" are tabulated in Table 10-1.

TABLE 10-1

BELIEF IN ESP

LEVEL OF BELIEF	PERCENTAGE OF USERS
Believe strongly	46%
Believe somewhat	30%
Haven't made up my mind	15%
Disbelieve somewhat	6%
Disbelieve strongly	3%
No response	1%

MAJOR EFFECTS

Telepathy

A specific question dealing with marijuana experiences was *"I feel so aware of what people are thinking that it must be telepathy, mind reading, rather than just being more sensitive to the subtle cues in the behavior."* This was a fairly frequent occurrence (30%, 22%, 31%, 12%, 4%), usually occurring at moderately high levels of intoxication (6%, 11%, 21%, 19%, 5%). Heavy Total users of marijuana report it more frequently than Moderate Total users ($p < .05$) or Light Total users ($p < .05$), with the Light and Moderate Total users peaking sharply at Rarely/Sometimes and not differing significantly from each other. Users of Psychedelics need to be somewhat less intoxicated to feel they experience telepathy ($p < .05$).

A related phenomenon, dealt with fully in Chapter 12, is *"I empathize tremendously with others; I feel what they feel; I have a tremendous intuitive understanding of what they're feeling,"* a very common phenomenon, which occurs at Moderate levels.

Precognition

The experience of precognition is a rare phenomenon: *"I can foretell the future by some kind of precognition, more than just predicting logically from present events"* (64%, 19%, 11%, 1%, 1%); and while most (71%) of the users did not rate the minimal intoxication level for this, those who did gave it a quite high rating (3%, 3%, 7%, 11%, 3%). Heavy Total users report precognition more frequently than Moderate Total users ($p < .01$) or Light Total users ($p < .05$). Similarly, Daily users report precognition more frequently than Weekly users ($p < .05$) or Occasional users ($p < .01$), with a suggestion ($p < .10$) that Weekly users also experience it more often than Occasional users.

Magic, Psychokinesis (PK)

The converse of extrasensory *perception*, a sense of paranormally affecting the world, was investigated with "I can perform magical operations that will affect objects or people while stoned," and appears to be a very rare effect (83%, 6%, 6%, 1%, 0%). The few users rating level of intoxication indicated this as a high-level effect (1%, 1%, 3%, 5%, 3%). Daily users reported it occurring more frequently than Weekly users ($p < .05$) or Occasional users ($p < .01$). The users were also asked to describe examples of this; of the twelve who wrote descriptive comments, five users gave comments which were not readily understandable, suggesting a communications gap. One user expressed clearly a semantic problem inherent in the question: "I believe that magic is just 'doing' on a higher level of awareness. It is 'magic' to the spectator who does not expect or understand it. I have to be very stoned in order to be able to concentrate and flow at the same time to a sufficient degree to perform magic. 'Magic' tricks can be very funny and very beautiful, also astonishing. Maybe dangerous, too."

Two other users indicated that their experiences depended on how you defined magic; one described chanting *mantras* (Govinda, 1960) with others as a magical way of affecting them; another, "using subliminal suggestion in a soft voice across the room."

Of the phenomena reported that resemble those reported in the parapsychological literature: (1) two were of increased telepathic rapport ("playing guitar with a friend so well it seems magic," and "I can be 100 percent accurate about stating peoples' signs (sun), I can predict peoples' movements, social groupings"); (2) two involved being able to paranormally affect another user's level of intoxication ("I can get other people higher by *more* than ordinary communication—can feel as if I exude a force that draws their consciousness to me and higher, more than gaze and conversation alone," and "I can bring people 'up' if I want to—people who are close to me emotionally"); and (3) one involved a sensing of the *prana* force described in Chapter 11 ("Sometimes while stoned we play a game in which one person will hold his hand near another person's body. This will cause the person to feel a tingling, or other feeling in this area. Sometimes the affected person may have his eyes closed").

The frequencies of occurrence of these three paranormal phenomena are shown in Figure 10-1. Telepathy is reported more frequently than precognition ($p < .0005$) or magical operations ($p < .0005$), and in turn, precognition is more frequent than magical operations ($p < .001$). There is a parallel to laboratory work with the paranormal, where contemporary time ESP (telepathy, clairvoyance) studies are most often significant, precognition studies are not significant as often, and psychokinesis (usually "willing" dice faces to come up in a certain pattern) is a rare bird (Rao, 1966). The levels of intoxication for the three phenomena do not differ significantly, although the test is not very adequate due to the small number of users rating the precognition and magical operation items.

Out-of-the-Body Experiences

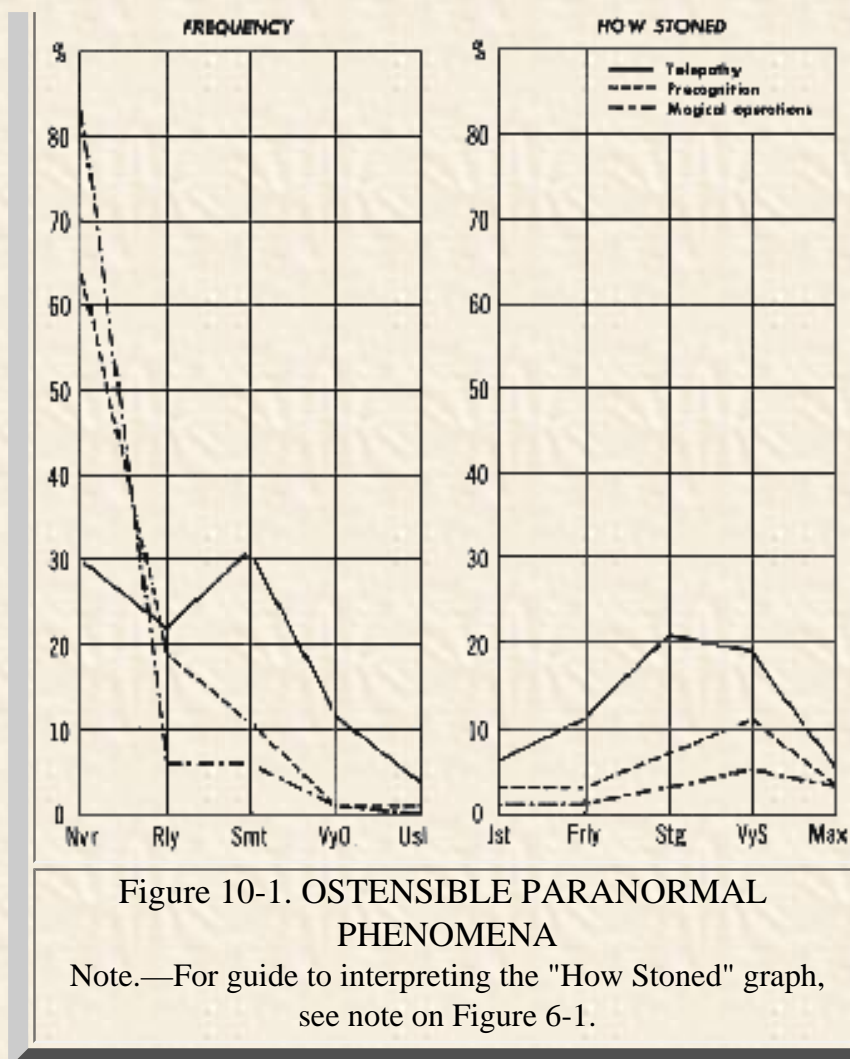
A phenomenon rare in the pilot data, but of particular interest to me because of some intriguing laboratory findings (Tart, 1967, 1968), is the so-called "out-of-the-body" experience (OOBE) *"Have you ever had the experience of being 'located' outside your physical body, i.e., of you being at a different location in space than the one you knew your body was at? Dreams aren't included here, or situations where you just lose consciousness of your body. This is where you consciously feel located at a different place and know at the time that you are conscious but at a different location. Has this happened to you?"* The last sentence ended in several modifiers, *"at all?"* *"while stoned?"* *"happened before started smoking grass,"* and *"happened after started smoking grass."* The users were also asked to describe any such experiences. Fifty-three percent of the users indicated they had never had such an experience, 23 percent (34 users) that they had had it once, and 21 percent (32 users) that they had had multiple experiences; 3 percent did not answer.

Because OOBEs are not familiar to the general scientific reader, half a dozen examples will be given from the comments of 57 users who added some explanatory note to their positive response. This will illustrate the range of phenomena connected with OOBEs, a range similar to that reported generally for spontaneous occurrences of this phenomenon (Crookall, 1961, 1964a, 1964b; Green, 1968).

A rather classical example was reported by a 29-year-old electronics technician:

It occurred one noon hour where I work. I was meditating when I perceived that I was looking down on myself, then looking at the roof of the buildings. The ground passed under as if I was flying, it became a blur then blue and then land again. I then found myself in a Lapp hut with an old shaman who was an old woman. She was brewing a tea of bird twigs and mumbling. The return was instantaneous. Someone at work shook my shoulder and I was back. At the time I did not know she was a Lapp. This came out after I described the kit and costume to my wife who is Scandinavian. We later researched it in several picture books on the Lapp culture.

OOBEs often involve seeing one's own physical body from an outside point of view. Of the 57 who added comments 19 percent specifically mentioned this. An example, also involving the rarer activity of the physical body continuing to operate in a complex manner, was reported by a 23-year-old user:



I was riding my motorcycle home from school (with girl passenger). While I was operating all the controls (of the motorcycle), I was watching my motorcycle with the girl and me from a distance of about six to eight feet above our physical existence. I had no noticeable physical sensations such as feeling while operating the motorcycle, though I seemed to be functioning fairly well. Physical sound didn't register either. I thought I was hearing wonderful, powerful, colorful, emotional, free music. The whole experience was remarkably enjoyable.

Accidents are often associated with OOBEs, presumably in a causative manner. A 36-year-old assistant manager reports:

Knocked unconscious in fall—saw crowd collect around own body from above, saw self lying on pavement. Perception and cognition very sharp for three days afterward.

While a defining characteristic of an OOBEE is that one perceives the self as being at a different location from the physical body while knowing simultaneously that one is not dreaming, occasionally perceptual and cognitive changes occur in addition during the OOBEE that indicate another state of consciousness is operative. The next three examples further illustrate such phenomena.

A 26-year-old teacher reports:

I sometimes view my body and the sequence of functions it follows in a particular environment from some operator's or observer's vantage above and behind my body. "The whole scene" is then more obvious to me in that I have a sense of 360° perception rather than 180-200°. I am now conscious of what is actually behind me.

A 22-year-old clerk reports:

Once on an acid trip in an apartment in San Francisco, a friend and I changed places. I was inside his head looking at my body and my face and hearing my voice *when he talked*. He was looking from my body into his face, and when I spoke it was with his voice.

As a final example of OOBEE phenomena, a 44-year-old psychiatrist reports a fairly frequent sort of OOBEE that involves "visiting" a sort of world that is clearly unlike the known physical world:

I left my own body, went into "another dimension" (?), where I found other people, all young (I was 42) playing games of "switch the body"—an experience like taking off your clothes and playing in the nude—very freeing—seemed somewhere in outer (or another) space.

Several background factors, which affect the reporting of OOBEEs, are noted in Table 10-2, with significance levels for the obtained distributions. [\[2\]](#)

TABLE 10-2
BACKGROUND FACTORS AFFECTING THE REPORTING
OF OUT OF-THE-BODY EXPERIENCES

BACKGROUND VARIABLE	NUMBER OF USERS ANSWERING		
	No OOBes	One OOB	Multiple OOBes
Sex			
Males	46	8	17
Females	20	14	7
		$X^2=8.629, p<.05$	
Meditation			
Meditators	14	6	3
Therapy & Growth	4	3	9
Ordinary	62	25	20
		$X^2=13.099, p<.05$	
Psychedelics			
Users	54	23	28
Non-users	26	11	4
		$X^2=4.927, p<.10$	

Fewer males tend to report OOBes, but of those who do, multiple experiences are more common than with females. The Therapy and Growth group tends to report both more OOBes and more multiple OOBes overall. Similarly, there is a suggestion that Users of Psychedelics tend to report more OOBes and more multiple OOBes than Non-users

Table 10-3 presents responses to the "*while stoned?*" part of the question.

TABLE 10-3
OUT-OF-THE-BODY EXPERIENCES WHILE STONED

OOBES WHILE INTOXICATED	NUMBER OF USERS
Never while intoxicated	27
Once	17

Multiple experiences, <i>all</i> with marijuana intoxication	5
Multiple experiences, some with marijuana, others without	14
Once, with LSD	6
Multiple experiences, with LSD	6

An infrequent phenomenon possibly related to OOBEs is "*I have lost all consciousness of my body and the external world and just found myself floating in limitless space (not necessarily physical space).*" This is dealt with fully in Chapter 11.

Although OOBEs are well-known in parapsychological literature as occurring "spontaneously" (in the sense of cause unknown) or being caused by serious accident or illness (Crookall, 1961, 1964a, 1964b; Eastman, 1962; Green, 1966; Muldoon and Carrington, 1956), the majority (73 percent) in this sample were in conjunction with marijuana intoxication or LSD use. More than twice as many users (38) indicated that their OOBEs began *after* they had started using marijuana as indicated they started *before* (14), a highly significant ($p < .001$) difference if one assumes the proportion should be equal before/after on the null hypothesis that marijuana use does not foster this experience. Twice as many Meditators report that their OOBEs occurred *before* marijuana use as after, however, with the proportion equal for the Therapy and Growth groups and more than three to one in the opposite direction for the Ordinary Users ($p < .01$, overall). The younger users also report that their OOBEs occur after starting marijuana use much more frequently than before, significantly different from the older group ($p < .05$), but this may only reflect the fact that the younger users have not had as much time for the experience to happen to them.

OOBEs are often interpreted as having profound religious significance by the users. An example is given in Chapter 19, Spiritual Experiences, although the user did not report this as an OOBE for the present question. Some other ostensibly paranormal phenomena, generally considered so exotic and far out that even modern parapsychologists have not dealt with them to any appreciable extent, are the sensing of energy in the body (*prana*, *ki*) and the sensing of *chakra* centers, dealt with in Chapter 11; the perception of auras around people, dealt with in Chapter 6; and the rare phenomenon of feeling possessed, dealt with in Chapter 17.

LEVELS OF INTOXICATION FOR OSTENSIBLE PARANORMAL PHENOMENA

All ostensibly paranormal phenomena and related phenomena have been grouped by level of intoxication in Figure 10-2. The overall grouping is highly significant ($p \lll .0005$). Between the Fair and Strong levels, feelings of intuitive understanding of people commonly occur, and this may progress to a feeling of telepathic contact as the user moves up toward the Very Strong level. At high levels, feelings of energy in the body and the spine may occur, along with (rarely) precognition and the ability to magically affect others. Up to this point we have been dealing largely with the ostensible paranormal extension of sensing and manipulating abilities in the known world. At the highest levels, we deal with infrequent and rare phenomena no longer relating to the physical world.

FIGURE 10-2.
INTOXICATION LEVELS, OSTENSIBLE PARANORMAL PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum	
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare </div>					FLOAT IN LIMITLESS SPACE Feel possessed by a hostile force Sense <i>chakra</i> centers Perform magical operations Feel possessed by a good force Energy in spine Precognition AURAS AROUND PEOPLE FEEL ENERGY, POWER IN BODY TELEPATHY INTUITIVE, EMPATHIC UNDERSTANDING OF PEOPLE

Just	Fairly	Strongly	Very Strongly	Maximum
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MODULATING FACTORS

The various background factors affect ostensible paranormal phenomena in a relatively linear fashion. They are summarized in Table 10-4. In general, more drug experience is associated with more frequent experience of practically all the paranormal phenomena covered in the present study. Meditators have more frequent experience with energetic phenomena, and the Therapy and Growth group seems to have more frequent experiences with OOBES and some energetic phenomena.

TABLE 10-4
EFFECTS OF BACKGROUND FACTORS ON
OSTENSIBLE PARANORMAL PHENOMENA

BACKGROUND FACTORS	EFFECTS
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More Drug Experience	<p>More frequent:</p> <ul style="list-style-type: none"> Telepathy Precognition Magical operations Auras around people Energy in spine Sense <i>chakra</i> centers 	<p>Less intoxicated for:</p> <ul style="list-style-type: none"> Telepathy
Meditation	<p>More frequent:</p> <ul style="list-style-type: none"> Energy in body Energy in spine Sense <i>chakra</i> centers OOBEs before using marijuana 	
Therapy & Growth	<p>More frequent:</p> <ul style="list-style-type: none"> OOBEs Multiple OOBEs Energy in body Possessed by good force 	
Males	<p>More frequent:</p> <ul style="list-style-type: none"> Multiple OOBEs 	<p>Less frequent:</p> <ul style="list-style-type: none"> OOBEs
Older		<p>Less frequent:</p> <ul style="list-style-type: none"> OOBEs after starting to use marijuana <p>Less intoxicated for:</p> <ul style="list-style-type: none"> Float in limitless space

SUMMARY

After allowing that general credulousness and specific drug-induced credulousness have probably raised the apparent incidence of paranormal experiences in this group of marijuana users, it is still clear that the proportion of users reporting such phenomena is much higher than in surveys of general populations, which have found a low incidence of 2 percent (Holland) and a high incidence of 22 percent (Germany) (Anonymous, 1958; Green, 1966; Membership Committee, American Society for Psychical Research, 1967; Prasad and Stevenson, 1968). Indeed, the incidence of personal experience of ostensibly paranormal phenomena is as high in the present sample as that reported for members of a society specifically interested in promoting the scientific investigation of the paranormal, the American Society for Psychical Research (Membership Committee, 1967).

Researchers interested in finding subjects especially prone to paranormal experience would do well to consider marijuana users. Either marijuana use affects judgment such that a large number of ordinary

experiences are judged to be paranormal, or there is a very high incidence of paranormal phenomena associated with marijuana use, or both.

Footnotes

1. Although paranormal phenomena are not accepted as real by a large number of scientists, this is primarily a matter of belief system clash ("Since it can't occur, why should I waste my time looking at the evidence?"), or what Kuhn (1962) has called paradigm clash. The reader interested in a survey of the findings of modern parapsychology may consult the following references: Broad (1962), Heywood (1959), Johnson (1953), Murphy (1962), Rao (1966), and West (1954). While laboratory research has established the reality of some paranormal phenomena beyond doubt, the overenthusiastic and uncritical acceptance of these phenomena by the young is muddying the waters. [\(back\)](#)

2. Because all users did not answer all parts of this question on OOBes, the totals in various tables are slightly discrepant. [\(back\)](#)

Chapter 11

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 11. The Body

THE HUMAN BODY is something that is treated with great ambivalence in our culture. On the one hand, it is a frail thing and a source of sin and evil; on the other, a glorious creation and source of joy. Some people neglect their bodies entirely; other focus on them to the point of pathology (hypochondriasis). Our attitudes about what we put into our bodies are also extremely ambivalent; we pump them full of every food fad that comes along, alcohol, stimulants, tranquilizers, and, for some, drugs such as marijuana. Some of the dangerous drugs we put in our bodies receive great praise (alcohol, as a prime example); others, shocked horror. As well as being a reference point for many of our experiences, the body is thus a focus of many ambivalent attitudes, and it is particularly interesting to see what the effects of marijuana intoxication are on the perception of one's own body.

We shall deal with changes in the perception of the body under three semi-distinct categories: (1) changes in the ordinarily perceived aspects of the body, such as its size and strength; (2) the body in motion; and (3) changes in the perception of the internal workings of the body, which are normally not in awareness.

CHANGES IN PERCEPTION OF THE ORDINARY BODY

Direction of Attention

Perception of one's body is more affected by the direction of attention during marijuana intoxication than ordinarily; a common effect is *"If I am paying attention to some particular part of my body, the rest of my body fades away a lot, so the part I'm attending to stands out more sharply"* (13%, 15%, 37%, 27%, 6%). About as common is *"I lose awareness of most of my body unless I specifically focus my attention there, or some*

particularly strong stimulus demands my attention there" (13%, 24%, 39%, 17%, 5%). This latter effect is more common among Non-users of Psychedelics ($p < .0005$). Both effects begin to occur primarily at the Strong and higher levels of intoxication (2%, 19%, 29%, 26%, 7% and 3%, 17%, 28%, 20%, 14%, respectively). The older users do not need to be as intoxicated to lose awareness of their bodies if they are not focusing there ($p < .05$).

This phenomenon manifests in more extreme form with *"I have lost all consciousness of my body during fantasy trips, i.e., gotten so absorbed in what was going on in my head that my body might as well not have existed for a while,"* a common phenomenon (10%, 21%, 36%, 20%, 10%) of the very high levels of intoxication (1%, 7%, 19%, 27%, 29%), experienced less frequently by Daily users ($p < .01$, overall). An even more extreme version of this phenomenon, but still fairly frequent, is *"I have lost all consciousness of my body and the external world, and just found myself floating in limitless space (not necessarily physical space)"* (25%, 29%, 30%, 10%, 4%), which occurs at maximal levels of intoxication (1%, 2%, 11%, 21%, 31%). The younger users need to be more intoxicated to experience this ($p < .05$).

The relationships between these four phenomena dealing with awareness of the body are plotted in Figure 11-1. Totally losing awareness of the body and the world, and experiencing oneself floating in limitless space occurs less frequently than the other, less extreme ways of losing awareness of the body ($p < .0005$, overall). With respect to level of intoxication, the body fading from awareness unless attended to and the focused part of the body standing out more happen at essentially the same levels of intoxication. The two phenomena of totally losing awareness of one's body occur at higher levels of intoxication ($p < .0005$, overall) than the previous phenomena, but these two do not differ from one another.

Given that the perception of one's body is highly affected by the deployment of attention while intoxicated on marijuana, what are some of the specific changes?

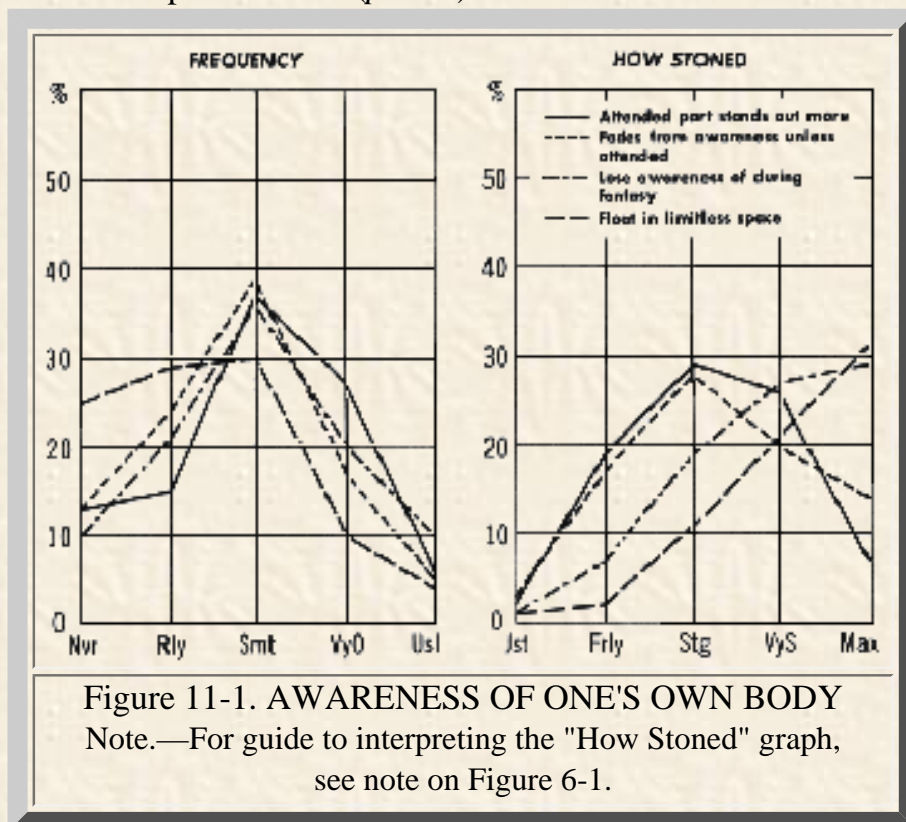


Figure 11-1. AWARENESS OF ONE'S OWN BODY
Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Pain

A common effect is *"Pain is easy to tolerate if I keep my attention elsewhere"* (21%, 10%, 34%, 13%, 12%), with the linked opposite effect, *"Pain is more intense if I concentrate on it,"* which occur with essentially the same frequency (23%, 11%, 23%, 17%, 15%), an excellent illustration of the importance of deployment of attention. Both experiences occur at essentially the same Strong levels of intoxication (7%, 13%, 28%, 15%, 1% and 6%, 19%, 26%, 9%, 2%, respectively).

The phenomenon of pain being more intense if concentrated on is affected by several background variables. It is reported more frequently by the younger users ($p < .05$), by the College-educated ($p < .05$), and by Non-users of Psychedelics ($p < .05$). The older users need to be more intoxicated to experience this ($p < .05$), while the Heavy Total lasers experience this at lower levels of intoxication than the Light or Moderate Total users (p

<.05, overall).

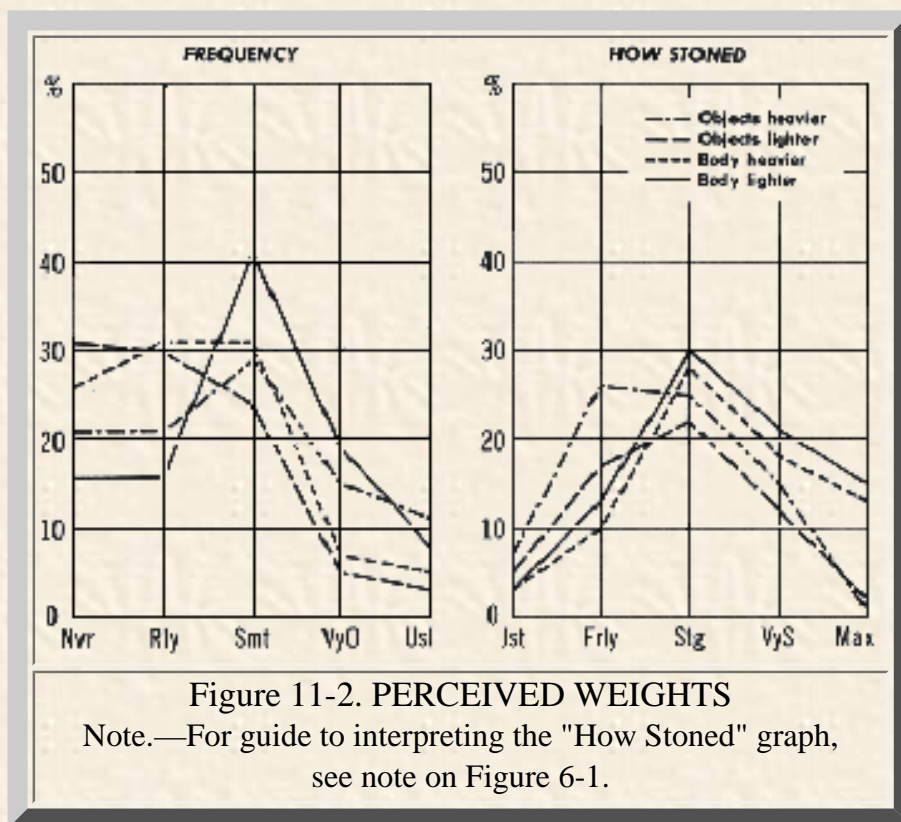
Lightness and Heaviness

A common experience is "With my eyes closed, my body may feel very light or even feel as if I float up into the air when stoned" (16%, 16%, 41%, 19%, 8%), which begins to occur at Strong levels of intoxication (3%, 13%, 30%, 21%, 15%). According to my informants, having the eyes closed is not necessary to experience much lightness, but is necessary to feel as if one were actually floating. This experience is more common among the College-educated ($p < .01$).

The opposite phenomenon, "My body feels abnormally heavy, as if it weighed much more" (26%, 31%, 31%, 7%, 5%), is fairly frequent, but does occur significantly less frequently than lightness ($p < .005$), albeit at essentially the same levels of intoxication (3%, 10%, 28%, 18%, 13%). Heaviness is reported as occurring more frequently by the younger users ($\#p < .05$).

It is of interest to compare these phenomenological increases and decreases in the weight of one's own body with those earlier mentioned for objects, namely, objects' seeming heavier and objects' seeming lighter, discussed in full in Chapter 8. Figure 11-2 compares all four phenomena. Objects seem heavier more frequently than lighter, but one's own body seems lighter more frequently than heavier. Further, increased heaviness is more frequently attributed to objects than to one's own body ($p < .05$), but lightness is more frequently attributed to one's own body than to objects ($p < .0005$).

In terms of levels of intoxication, overall differences among these four phenomena are quite significant ($p < .0005$). While the levels are not different for objects feeling lighter or heavier, or for the body feeling lighter or heavier, a higher level of intoxication is generally needed for the body to feel heavier compared to objects feeling heavier ($p < .0005$). The same is true for body vs. object lightness; the user must generally be more intoxicated for his body to feel light than for objects to feel light ($p < .01$).



Body Size

One's own body may change in perceived size: "My body feels larger than usual" occurs infrequently (37%, 21%, 29%, 9%, 1%), as does the opposite effect, "My body feels smaller than usual" (44%, 25%, 21%, 3%,

0%). Both may begin to be experienced at Strong levels of intoxication (1%, 9%, 21%, 23%, 4% and 1%, 7%, 17%, 18%, 3%, respectively, with many users not being able to rate these). The body's feeling smaller than usual is experienced more frequently by the College-educated ($p < .05$) than by the Professionals, and less frequently by Light Total users ($p < .05$, overall). Males need to be more intoxicated than Females to experience the body's feeling smaller ($p < .05$).

Irritating Effect of Smoking

An infrequent effect is a direct physiological effect of the irritating components of marijuana smoke: "*Smoking grass makes me cough hard while inhaling and holding my breath*" (14%, 42%, 32%, 9%, 2%). Thus, frequently, marijuana smokers use water pipes or hookahs to cool the smoke and dissolve out some of the irritating ingredients. No rating of intoxication levels was asked for, as the quantity and quality of smoke inhaled seem to be the primary factor determining irritation, although some of my informants indicated that if they are fairly intoxicated or higher, they can ignore the irritation of harsh smoke more easily and so are less likely to cough. Note that this item was scored one point on the Validity scale if a user answered Never.

Strength

A pair of experiences relate to strength: "*I feel much stronger when stoned (regardless of whether actually physically stronger or weaker)*" is reported infrequently (37%, 28%, 25%, 7%, 1%), with Heavy Total users experiencing this more often than Moderates ($p < .05$), and Moderate Total users experiencing it more often than Lights ($p < .05$). These feelings of strength begin occurring at Strong levels of intoxication (4%, 13%, 25%, 13%, 3%, with 43% not rating).

The converse effect, "*I feel much weaker when stoned (regardless of whether actually physically stronger or weaker)*" occurs just often enough to be rated a common effect (27%, 21%, 33%, 11%, 6%), and occurs significantly more frequently than feeling stronger ($p < .05$), albeit at essentially the same levels of intoxication (5%, 17%, 25%, 14%, 6%).

Tremor

The final and quite infrequent effect on the ordinarily perceived body is "*My muscles develop actual physical tremors (large enough to see visually)*" (51%, 23%, 17%, 4%, 3%), which may occur at the Stronger and higher levels of intoxication in the minority of users who could rate this (1%, 7%, 11%, 14%, 11%).

These last few phenomena bring us to a consideration of the moving body in contrast to the relatively static experiences above.

THE BODY IN MOTION

Relaxation and Restlessness

One of the most characteristic effects of marijuana intoxication is *"I get physically relaxed and don't want to get up or move around"* (1%, 3%, 24%, 49%, 23%), which typically begins to occur at Moderate levels of intoxication (12%, 37%, 29%, 12%, 8%). While this occurs primarily at the Fairly and Strongly levels for Occasional and Daily users, many Weekly users also indicate Very Strong and Maximal for this effect ($p < .05$, overall). One informant commented on this to the effect that marijuana is naturally tranquilizing; the Weekly user is busy learning about all the things he can do when intoxicated, the Occasional user hasn't learned to exert himself like the Weekly user to overcome this tranquilizing effect, and the Daily user has already explored what he can do and is content to be relaxed.

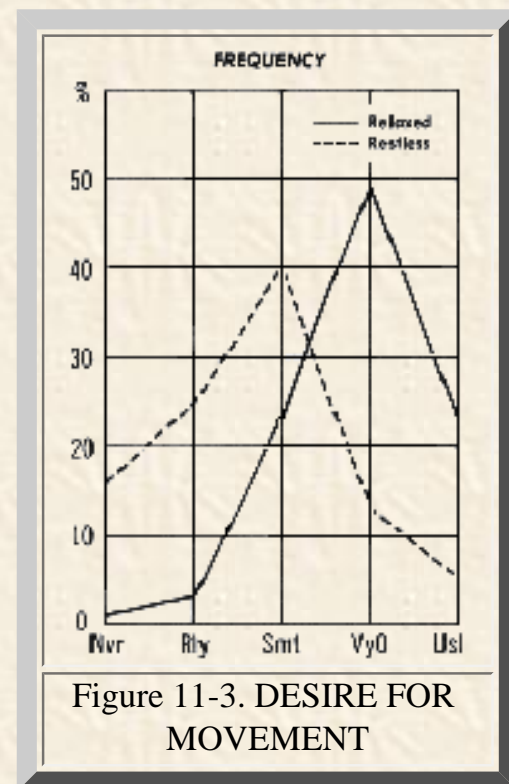
The opposite effect, *"I get physically restless so that I want to move around a lot"* is common (16%, 25%, 40%, 13%, 5%), more so in the young users and the College-educated, compared to the older users ($p < .05$) and the Professionals ($p < .01$). It also occurs at Fair to Moderate levels of intoxication (13%, 29%, 26%, 7%, 5%). It occurs far less frequently ($p < .0005$) than feeling relaxed and not wanting to move, as shown in Figure 11-3.

Coordination

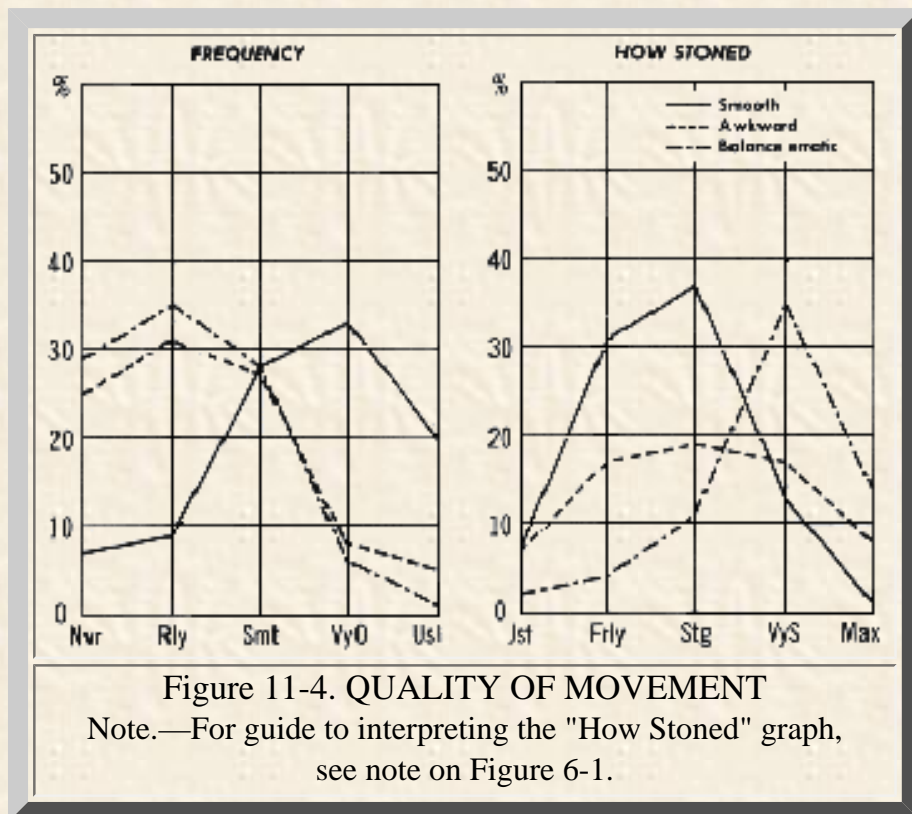
In spite of this tendency to sit around and relax, if the user moves about, he characteristically finds his movement seems exceptionally well coordinated: *"When I move about or dance, my motions seem exceptionally smooth and well coordinated"* (7%, 9%, 28%, 33%, 20%). This is reported as occurring more frequently by females ($p < .05$) and by Non-users of Psychedelics ($p < .01$). It begins to occur at Moderate to Strong levels of intoxication (7%, 31%, 37%, 13%, 1%), with Weekly users needing to be more intoxicated than Occasional or Daily users for this ($p < .05$, overall).

The converse effect, *"When I move about or dance, my motions seem awkward and uncoordinated"* is infrequent (25%, 31%, 27%, 8%, 5%). It may begin to occur from Moderate Levels of intoxication and higher (7%, 17%, 19%, 17%, 8%). It is reported as occurring less frequently by Light Total users ($p < .05$, overall), Occasional users ($p < .05$, overall), and Non-users of Psychedelics ($p < .01$). The Professionals need to be more intoxicated to experience this awkwardness ($p < .05$). It is an important research problem to determine whether this is an actual decrement in coordination or simply an altered perception of one's own movements, possibly related to time alterations.

A more extreme version of poor coordination is *"My sense of balance gets very erratic, making it seem difficult to walk or even maintain a sitting position."* This is a fairly frequent effect (29%, 35%, 28%, 6%, 1%) in that few users have not experienced it at all, but even fewer experience it Very Often or Usually. It is reported as occurring more frequently by females ($p < .05$). It generally occurs at Very Strong levels of intoxication (2%, 4%, 11%, 35%, 14%), with older users having to be less intoxicated to experience it ($p < .05$).



The relationships between these three effects on the quality of movement are plotted in Figure 11-4. Movement seeming exceptionally well coordinated occurs significantly more frequently than movement being uncoordinated and jerky ($p \ll .0005$) or than the sense of balance being lost ($p \ll \ll .0005$). There is no significant difference in frequency of occurrence between awkwardness and erratic balance. Exceptional smoothness of movements occurs at lower levels of intoxication than awkwardness ($p < .0005$) and, in turn, awkwardness occurs at lower levels of intoxication than balance becoming lost ($p < .0005$). In general, marijuana intoxication seems at first to make movements feel smoother and more coordinated, but at very high levels of intoxication this may reverse and may sometimes culminate in experiential loss of the sense of balance.



PERCEPTION OF INTERNAL PROCESSES

Shape of the Body and Location of the Self

We shall first consider an infrequent effect that stands as a bridge between the perception of the ordinary body with modifications and a more radical shift toward new internal perceptions. *"My perception of how my body is shaped gets strange; the felt' shape or form doesn't correspond to its actual form (e.g., you may feel lopsided, or parts of your body feel heavy while others feel light,"* a fairly frequent effect (29%, 29%, 32%, 6%, 2%), which may begin to occur at Very Strong levels of intoxication (1%, 9%, 15%, 24%, 13%). This is of particular interest also in its relation to identity; the constancy of our perceived body can lend a stability to our sense of identity. Indeed, many people will readily localize their own consciousness in some part of their body more than others, and this may also change during marijuana intoxication. *"The location of my consciousness, the physical locale of the part of me that seems most me, has moved to different parts of my physical body from those it occupies while straight"* is reported, albeit infrequently (55%, 17%, 18%, 3%, 2%) and at Strong levels of intoxication by those users who could rate it (1%, 5%, 12%, 13%, 6%). The College-educated need to be more intoxicated than the Professionals to experience this ($p < .01$).

Note that the rather high incidence of out-of-the-body experiences in this sample, already discussed in Chapter 10, represents an even more radical change in the experienced location of consciousness with respect to the body.

Interior Perceptions

General awareness of internal organs and processes was investigated with *"I become aware of parts of my body that I am normally unaware of can't become aware of when straight, such as internal organs."* This is an infrequent effect (35%, 23%, 27%, 11%, 2%), which may begin to occur at Strong levels of intoxication (1%, 3%, 19%, 21%, 13%), and is higher for Males than Females ($p < .05$). The converse effect, *"My body gets very numb, without feeling,"* however, occurs almost as frequently (42%, 29%, 22%, 5%, 1%) and at similar intoxication levels (0%, 3%, 16%, 19%, 17%). Males experience numbness slightly more often than Females ($p < .05$), but need to be more intoxicated to have the experience ($p < .01$).

That both increased perception of internal organs and bodily numbness occur, with about equal frequency and at the same levels of intoxication, serves to underscore the importance of psychological and situational factors in determining which of many potential effects may manifest at any given time.

We shall now consider some particular types of awareness of internal organs and processes, starting with the most frequent.

Warmth

"I feel a lot of pleasant warmth inside my body" is a common effect (13%, 13%, 34%, 25%, 13%), which begins to occur at Moderate to Strong levels of intoxication (9%, 23%, 33%, 17%, 1%).

Beating of the Heart

"I am much more aware of the beating of my heart" is also common (11%, 19%, 41%, 18%, 10%), more so with females ($p < .05$). It may begin to occur at Strong levels of intoxication (5%, 22%, 34%, 19%, 6%), with the Professionals needing to be less intoxicated to experience this ($p < .05$).

Breathing

"I become very aware of my breathing and can feel the breath flowing in and out of my throat as well as filling my lungs" is also common (21%, 18%, 40%, 15%, 5%), more so with the College-educated ($p < .05$). It may begin to occur at Strong levels of intoxication (6%, 13%, 33%, 18%, 6%). Meditators may experience this at lower levels of intoxication than the Therapy and Growth group or ordinary users ($p < .01$, overall), probably because so many techniques of meditation involve becoming more aware of the flow of breath.

Defecating and Urinating

"When defecating or urinating, I become aware of the internal organ processes involved that I can't be aware of when straight." This is an infrequent effect (43%, 16%, 21%, 13%, 5%), which is reported more

frequently by Heavy Total users ($p < .05$, overall). It is also experienced more frequently by the Therapy and Growth group ($p < .05$, overall). It may begin to occur at Strong and higher levels in those who experience it (1%, 7%, 19%, 17%, 5%).

Sexual Orgasm

Note also that "*Sexual orgasm has new qualities, pleasurable qualities, when stoned,*" is a characteristic effect. It is discussed fully in Chapter 13.

Most of the above experiences have a known physiological basis. We now come to a group of experiences which cannot be readily conceptualized as resulting from increased awareness of known physiological processes.

Vibration, Energy, Chakra Centers

The most common of these is "*I get feelings in my body that are best described as energy, force, power of some sort flowing*" (21%, 13%, 35%, 21%, 9%). Both the Meditators and the Therapy and Growth group experience this somewhat more often than Ordinary Users ($p < .05$, overall). It may begin to occur at Strong and higher levels of intoxication (4%, 10%, 25%, 26%, 7%). This experience is reported more frequently by Users of Psychedelics ($p < .05$).

A more general phenomenon that does not specifically interpret unusual internal feelings as energy or force is "*I feel a vibration or tingling sensation in some or all of my body that I can tell is not an actual muscle tremor by looking at my body,*" a common effect (27%, 15%, 32%, 17%, 7%). It is reported about as frequently, and at similar levels of intoxication (1%, 10%, 24%, 25%, 7%), as sensations of force or energy. It is also of interest to note that these tingling feelings are reported more frequently than actual muscle tremors ($p < .0005$).

There is an occult theory, known mainly in its Indian form in the West (Garrison, 1964) but occurring in the occult traditions of many lands (Blofeld, 1970; Chang, 1963; Evans-Wentz, 1958; Frager, 1970; Govinda, 1960; Muses, 1961), that there is some sort of psychical energy that flows through man's body, and particularly through the nerves such as those in the spinal cord. This energy has been called a variety of names, such as *prana* in India, *ki* in Japan (Westbrook & Ratti, 1970), *magnetic fluid* (Mesmer, 1774), and *odic force* (von Reichenbach, 1968). While proof of the physical reality of such a force is highly debatable, it is clearly a phenomenological reality. Since experiences with some sort of energy were mentioned by informants in designing the present study, the two previous questions were included to deal with this phenomenon. The phenomenon of an aura around people (Chapter 6) is also considered a manifestation of this energy in some occult systems.

Two more specific questions deal with the common statement in occult philosophies that the spinal cord is the main channel for this energy to flow through and that there are special centers (*chakras* in Yoga literature, *latifa* in Sufi literature; see Shah, 1968) in the body, primarily lying along the spinal cord, in which this energy may activate special sorts of experiences; i.e., if the energy flows into one of these centers, special psychological and/or spiritual experiences are manifested. An example will be given below.

"*I become very aware of my spine and feel energy flowing through it*" is a rare effect (59%, 17%, 14%, 2%,

3%), which may occur at Very Strong and Maximal levels of intoxication (3%, 4%, 7%, 14%, 7%). It is reported more frequently by Meditators ($p < .05$, overall) and by Users of Psychedelics ($p < .05$).

"I become aware of chakra centers along my spine and feel changes in my state of consciousness as energy flows through the chakras" is also a rare effect [1] (65%, 14%, 6%, 3%, 1%), which may occur at Very Strong and Maximal levels of intoxication (2%, 2%, 2%, 8%, 8%) in the few who have experienced it. It occurs more frequently among Heavy Total users ($p < .05$, overall) and among Meditators ($\#p < .01$, overall).

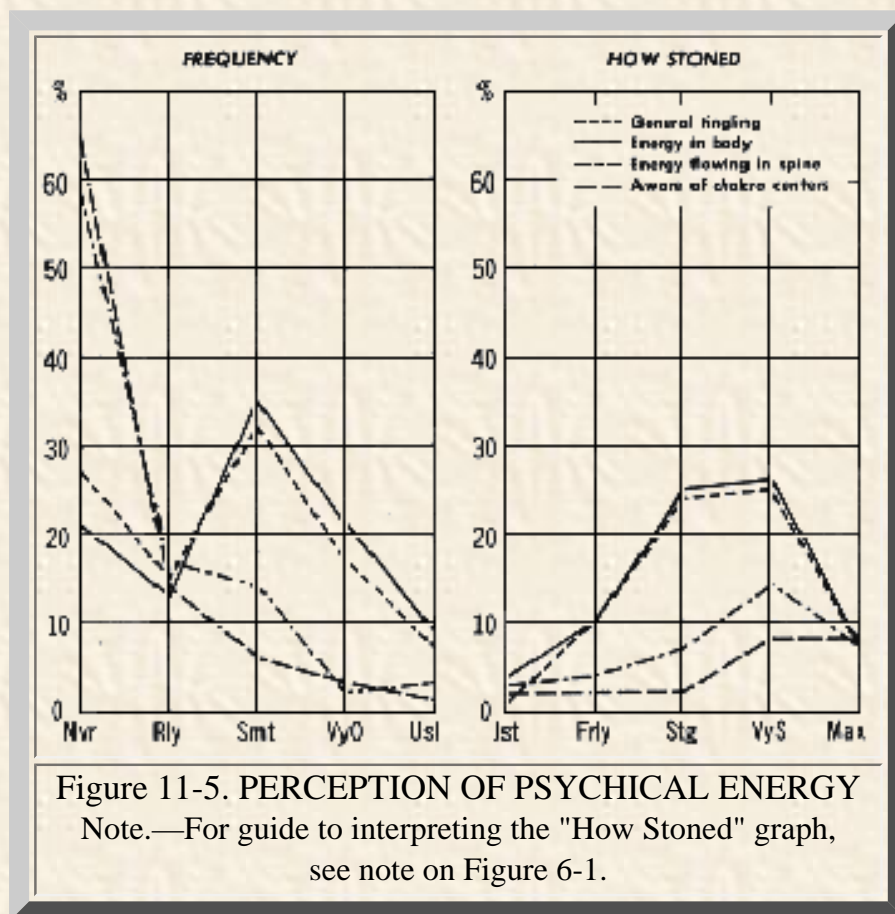
One of my informants, asked to describe an experience with *chakra* centers in detail, replied:

I occasionally try various Yoga breathing and meditation exercises when I'm stoned. Several times I've tried one of inhaling slowly and deeply, picturing a flow of energy coming in with my breath and going right on down to the base of my spine. I hold my breath for half a minute to a minute, all the time picturing an accumulation of energy in the root *chakra* at the base of the spine. As I slowly exhale I picture this energy as flowing up my spine, all the way up to my brain. The several times I've done this have convinced me that *prana* is real and powerful enough so I've decided to stop fooling around with it. The first few breaths I'm picturing, imagining all this, but then it becomes real and I can *feel* the energy, the *prana*, flowing up my spine. My consciousness is changed in distinct jumps as it goes up my spine; and by the time the *prana* flows into my head, there is a very distinct jump, and I'm suddenly more stoned, and 25 percent more stoned than I usually am for smoking whatever quantity of grass I've had. I'll stay more stoned as long as I keep up the exercise, but drift back down in a minute or two after I stop. I can't really describe the nature of the particular sorts of consciousness I experience as the energy jumps up along the spinal cord....

Figure 11-5 summarizes the relationships between the four questions dealing with perception of non-physical energies. Awareness of a general tingling or vibration, or feelings of energy or force in the body, both occur commonly; awareness of energy flowing in the spine or of *chakra* centers occurs much less frequently ($p \lll .0005$, overall). Both of the latter two phenomena also occur at significantly higher levels of intoxication than the former two ($p < .05$, overall).

Nausea and Sickness

Two rare phenomena complete the items dealing with the body. "I get dizzy or nauseated, so much so that I wonder if I will get sick" occurs rarely or not at all for the vast majority of users (47%, 41%, 8%, 1%, 1%).



Actual sickness, "I have gotten very nauseous and vomited" is significantly ($p < .0005$) rarer (80%, 15%, 2%, 0%, 1%). Of the users who could rate these effects, these were generally considered the very highest-level phenomena (1%, 1%, 6%, 13%, 21% and 1%, 0%, 1%, 5%, 8%, respectively). My informants indicate that the usual way feelings of nausea are dealt with is to lie down, divert one's attention, and wait for them to pass. Usually one or two experiences with nausea are sufficient to teach a user what his overdose level is, and he will avoid smoking enough marijuana to reach that level in the future.^[2]

ADDITIONAL EFFECTS

Many additional effects were volunteered for the body:

"When I'm walking it seems as if the world is rolling under me and I'm remaining still" (Very Often, Fairly).

"I become much more aware of my body temperature" (Usually, Fairly).

"Pains in the chest" (Sometimes, Fairly).

"I feel like I am controlling a huge machine (my body) from my eyes" (Sometimes, Very Strongly).

"After much pot, my head feels as if it were about to explode" (Sometimes, Very Strongly).

"My whole body is surrounded by a ghost body about six inches thick (all rounded); when I close my eyes, I fill out" (Sometimes, Very Strongly).

"I can feel the blood rushing through my veins, pulsating throughout my entire body" (Usually, Just).

"Body consciousness includes large amount of space all around actual physical body" (Usually, Fairly).

"Parts of my body begin to *feel* as if they're moving wildly, faster and faster, in geometrical patterns. Actions I perform are repeated over and over in my mind, so that I feel that my body is racing about (i.e., I chew my food and suddenly my mouth is moving in fast, set patterns), even though I'm doing this slowly or not at all" (Very Often, Very Strongly).

"My feet and legs immediately become cold and numb when stoned and become progressively number and colder as my 'stonedness' increases in magnitude. When exceptionally stoned, I sometimes feel no contact with my skin. I've received surface injuries and not felt them. Heat and cold are difficult to perceive. I've walked in snow barefoot and not felt cold" (Very Often, Strongly).

"I become keenly aware of unrelaxed muscles and sphincters" (Sometimes, Very Strongly).

LEVELS OF INTOXICATION FOR BODILY EXPERIENCES

The various phenomena are arranged by levels of intoxication in Figure 11-6. The overall ordering is highly significant ($p \lll .0005$).

FIGURE 11-6.
INTOXICATION LEVELS, BODY PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
-------------	---------------	-----------------	--------------------------	----------------

Type size code:

CHARACTERISTIC

COMMON

INFREQUENT

Rare

Vomit

Float in space

Feel nauseated

LOSE ALL CSS OF BODY DURING FANTASY

Aware of *chakras*

BODY GETS NUMB

FELT FORM DIFFERENT FROM ACTUAL BODY SHAPE

Feel energy in spine

MORE AWARE OF INTERNAL ORGANS GENERALLY

MUSCLE TREMOR

CHANGE IN LOCATION OF CONSCIOUSNESS

VIBRATION IN BODY THAT IS *NOT* MUSCLE TREMOR

AWARE INTERNAL ORGANS, URINATING

BODY FEELS LARGER

BODY FEELS SMALLER

FEEL ENERGY, POWER FLOW IN BODY

BODY PART ATTENDED TO STANDS OUT MORE

SENSE OF BALANCE ERRATIC

BODY SEEMS VERY LIGHT, FLOATING

BODY SEEMS VERY HEAVY

LOSE AWARENESS OF BODY UNLESS STIMULATED

VERY AWARE OF BREATHING

MOVEMENTS AWKWARD, UNCOORDINATED

FEEL WEAKER

AWARE OF HEART BEATING

FEEL STRONGER

LESS AWARE OF BODY TENSIONS IN EMOTION

PAIN EASIER TO TOLERATE IF ATTENTION DIVERTED

SEXUAL ORGASM HAS NEW, PLEASURABLE QUALITIES

OBJECTS SEEM LIGHTER

MORE AWARE OF BODY TENSIONS IN EMOTION

SURFACES FEEL ROUGHER, FORM PATTERNS

PLEASANT WARMTH THROUGHOUT BODY

PAIN MORE INTENSE IF CONCENTRATED ON

OBJECTS SEEM HEAVIER

NEW QUALITIES TO TOUCH

**SURFACES SEEM SMOOTHER, SILKIER
 MOVEMENTS EXCEPTIONALLY SMOOTH
 GET PHYSICALLY RELAXED, DON'T WANT TO MOVE
 TOUCH MORE EXCITING
 GET PHYSICLLY RESTLESS**

Just Fairly Strongly Very Strongly Maximum

Effects on the perception of the user's body begin between the Fairly and Strongly intoxicated levels, and at first consist primarily of alterations in the perceived interaction of the body with external objects, i.e., the touch and muscle senses. As the user gets higher, sexual orgasm characteristically acquires new, pleasurable qualities, and a variety of internal processes may become accessible to awareness if attention is turned there. From this level up, the experienced body becomes more and more affected by the direction of attention rather than by the inherent physical structure of the body.

Between the Strong and Very Strong levels of intoxication, very unusual sorts of perceptions may begin to occur, which become more pronounced at higher levels, namely, sensations of vibration and energy inside the body, as well as the increased possible awareness of internal organs. The size and shape of the user's body may seem to change and the location of his consciousness in his body alter. Between Very Strongly and Maximally intoxicated, he may lose all awareness of his body during fantasy, and a few users may become aware of the chakra centers along the spine. At the maximal levels the user may feel nauseated, although this is rare, and even more rarely may actually vomit as a result of this nausea.

MODULATING FACTORS

Background factors affecting perception of the body, which had relatively linear effects, are summarized in Table 11-1. Both more drug experience and experience with meditation are associated with more frequent experience of energy in the body and some of its exotic concomitants such as *chakra* centers.

Feeling physically relaxed and not wanting to move is mostly reported at Fairly/Strongly as a minimal level of intoxication, but Weekly users have a significant number of responses at Very Strong/Maximum for this. The same pattern occurs for Weekly users on levels of intoxication for movement being exceptionally smooth.

**TABLE 11-1
 EFFECTS OF BACKGROUND FACTORS ON
 PERCEPTION OF THE BODY**

BACKGROUND FACTORS	EFFECTS

<p>More Drug Experience</p>	<p>More frequent: Body feels smaller Feel stronger Aware of internal organs when defecating Feel energy in spine Aware of <i>chakra</i> centers Movements awkward Feelings of energy in body</p>	<p>Less frequent: Lose awareness of body parts not focused Pain more intense Movement exceptionally smooth, coordinated Lose consciousness of body in fantasy</p> <p>Less intoxicated for: Pain more intense</p>
<p>Older</p>	<p>More intoxicated for: Pain more intense</p>	<p>Less frequent: Pain more intense Body feels heavier Physically restless</p> <p>Less intoxicated for: Float in limitless space Lose awareness of body parts not focused on Balance erratic</p>
<p>More Educated</p>	<p>More intoxicated for: Movements awkward</p>	<p>Less frequent: Pain more intense Body feels light Body feels smaller Hyperaware of breathing Physically restless</p> <p>Less intoxicated for: Location of consciousness moves Aware of heart beating</p>
<p>Males</p>	<p>More frequent: Body feels numb</p> <p>More intoxicated for: More aware of internal organs Body feels numb Body feels smaller</p>	<p>Less frequent: Aware of heart beating Movements exceptionally smooth, coordinated Balance erratic</p>

Meditators	More frequent: Energy in body Energy in spine Aware of <i>chakra</i> centers	Less intoxicated for: Hyperaware of breathing
Therapy & Growth	More frequent: Aware of internal organs when defecating Energy in body	

SUMMARY

Except for various enhancements of touch sensation, physical relaxation, and smoothness of movement, there are practically no characteristic effects of marijuana intoxication on the perception of the user's body, i.e., while there are many potential alterations of the perception of the body, few of them are highly likely unless specific psychological and situational factors bring them out.

In general, the perception of the body becomes less determined by actual structure and more affected by the deployment of attention during marijuana intoxication. The body and its parts may fade partially or completely from awareness if not concentrated on, and the user may totally lose awareness of his body and be immersed in some internal experience or fantasy. When attention is deployed properly (voluntarily or by circumstances), a wide variety of perceptions of the internal workings of the body are possible, including many processes which one cannot normally be aware of. It is also common for various feelings described as energy, force, or power to be sensed within the body.

The only bodily effect of marijuana intoxication that is decidedly unpleasant, nausea, is a rare effect, usually coped with by the user's diverting his attention; actual sickness is extremely rare.

These experimental alterations of bodily perception could be of great theoretical importance to psychosomatic medicine and the study of the relationship of identity to the body.

Footnotes

1. It is interesting to note that most users (89 percent) apparently knew what *chakras* were, for few skipped this question completely as they had been instructed to do if a question made no sense to them. This reflects the tremendous rise of interest in metaphysics and the occult among the young. ([back](#))

2. In many of the laboratory studies of marijuana or one of its active ingredients, tetrahydrocannabinol (THC), nausea is frequently reported by subjects, suggesting that the experimenters may be overdosing them. While such findings are of interest in a purely scientific sense, they are not representative of the ordinary use of marijuana. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 12. Social Interaction

MUCH MARIJUANA use is carried out in the company of other users. This results not only in a variety of effects on interpersonal relations, but the gestalt configuration of a group of users at any given time can strongly affect each user's individual experiences.

We shall consider social effects under three semi-distinct categories: (1) overall characteristics of groups of intoxicated users; (2) perceptions of the quality of social interaction; and (3) some negative effects on social interaction.

OVERALL CHARACTERISTICS OF INTOXICATED GROUPS

Quieting Effects

An extremely characteristic effect of marijuana intoxication, in comparison to alcohol intoxication, is "*I am less noisy and boisterous at parties than when drunk or tipsy on alcohol*" (7%, 2%, 16%, 15%, 51%). One informant remarked, "When the cops walk into a party and everybody is yelling, arguing, and reeling around, they don't bother you; but if everybody is sitting around quietly talking or listening to music, they hassle you because they're pretty sure you're stoned!" Moderate Total use is associated with a higher frequency of this than Light, and Light with a higher frequency than Heavy ($p < .05$, overall). Quietness begins to occur at Low levels of intoxication (23%, 27%, 20%, 9%, 1%).

This sort of quietness is characteristic even without a comparison with alcohol intoxication: "*I am less noisy and boisterous at parties than when straight*" (5%, 9%, 30%, 23%, 29%). This is reported less frequently by

the Occasional users ($p < .05$, overall). Users of Psychedelics do not need to be as intoxicated to experience this ($p < .05$), and the effect generally begins at Moderate levels (16%, 30%, 29%, 11%, 3%).

Being less noisy than when intoxicated on alcohol is more frequent ($p < .0005$) than being quieter than when straight, as shown in Figure 12-1, but they occur at essentially the same levels of intoxication.

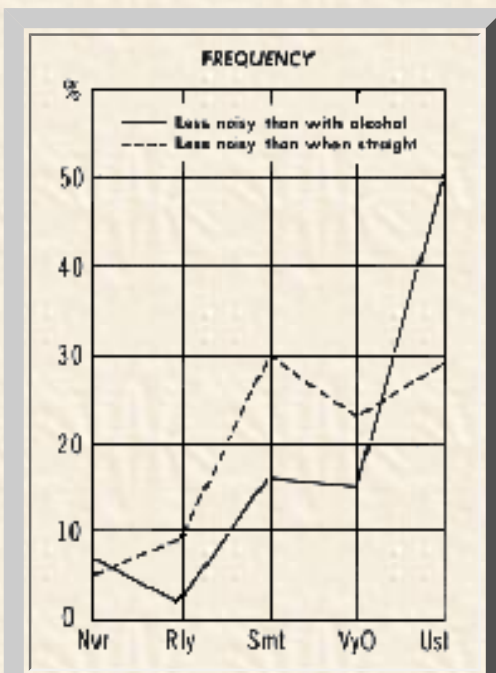


Figure 12-1.
NOISINESS AT PARTIES

This general quieting effect of marijuana intoxication in social groups generally is further reflected in the very common effect, "I talk a lot less than when straight" (5%, 11%, 49%, 21%, 13%), an effect that begins to occur in the Moderate to Strong ranges of intoxication (11%, 21%, 38%, 16%, 7%). The converse effect, "I talk a lot more than when straight" is a common effect (12%, 23%, 45%, 13%, 5%), which begins in the Moderate levels of intoxication (15%, 33%, 29%, 4%, 2%), but it occurs significantly less frequently ($p < .01$) and at lower levels of intoxication ($p < .0005$) than talking less, as shown in Figure 12-2.

The Meditators less often report that they talk more when intoxicated ($p < .05$, overall). The College-educated need to be more intoxicated to talk more ($p < .05$), as do Users of Psychedelics ($p < .01$).

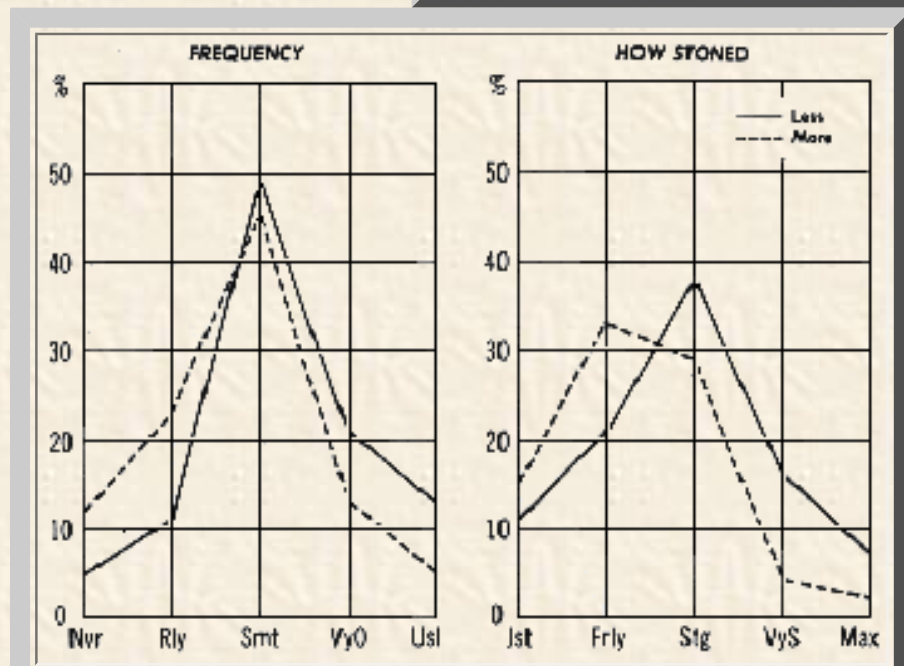


Figure 12-2.
AMOUNT OF TALKING WHEN INTOXICATED
Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Sociability

"I become more sociable: I want to be with and interact with people more" is a common effect (5%, 17%, 45%, 19%, 12%), but its converse, "I become less sociable; I want to be by myself" is just as common (7%, 19%, 49%, 17%, 7%). The latter effect occurs at higher levels of intoxication than the former (16%, 48%, 25%, 3%, 1% and 11%, 22%, 30%, 15%, 10%, respectively, $p < .0005$), as shown in Figure 12-3. Of the people at a

marijuana party, the ones sitting by themselves may often be more intoxicated than the ones conversing. The Meditators report higher levels of intoxication for wanting to be by themselves ($p < .05$, overall).

Changes in Overt Behavior

Before considering the more specific ways in which social interaction is altered among intoxicated users, it is of interest to wonder how much an outside (non-intoxicated) observer would notice as different in the actual social interaction of intoxicated users. It is a common experience that "*Others (who were straight at the time) have not noticed that I've been stoned (applies to other people who were your friends and would have told you if they'd noticed)*" (11%, 9%, 34%, 21%, 14%). This is reported as occurring more frequently by the older users ($p < .01$). The relationship between educational level and this effect is complex, as presented in Figure 12-4. The differences between the distributions are significant ($p < .01$).

The users were asked to rate the highest level of intoxication at which others have not noticed they were intoxicated. This was primarily the Strong and Very Strong levels (5%, 15%, 27%, 23%, 5%); thus, users can be experiencing a wide variety of powerful effects without outside observers (friends who were straight at the time) being able to notice any differences in their external behavior. Heavy Total users indicate higher levels for this unnoticeability (Very Strong/Maximum) than Moderate and Light Total users ($p < .05$, overall), as do Users of Psychedelics ($p < .05$). More drug experience apparently allows the user to appear normal at very high levels of intoxication.

The converse of unaltered external behavior is "*Others (who were straight at the time) have told me that I act very differently when I'm stoned,*" an infrequent effect (39%, 23%, 21%, 9%, 3%), which may begin to occur at Very Strong levels of intoxication (2%, 5%, 12%, 19%, 11%). As shown in Figure 12-5, acting noticeably different when intoxicated occurs less frequently than no noticeable differences ($p < .0005$), and at higher levels ($p < .01$).

The unawareness of friends that they are intoxicated is often amazing to users; as one informant, a 40-year-old psychologist, put it, "Several times I've gone home stoned, not tremendously so but pretty stoned, and my wife, who knows me incredibly well, hasn't noticed a thing. I stand there seeing all these obvious changes in

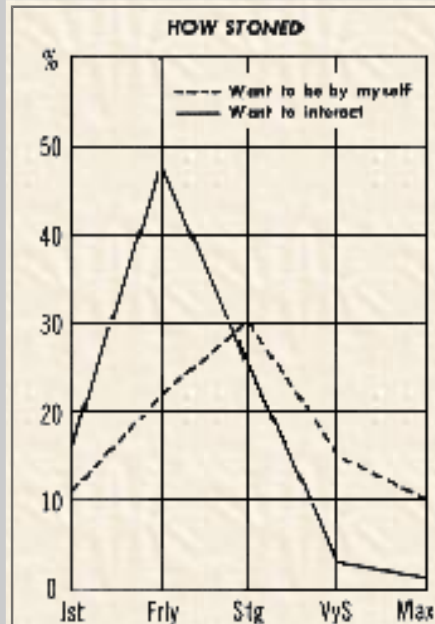


Figure 12-3. SOCIABILITY

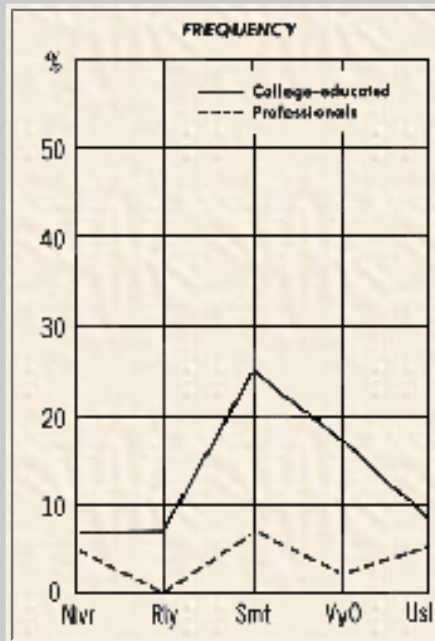


Figure 12-4
EDUCATIONAL LEVEL
AND
UNNOTICEABILITY OF
INTOXICATION

my experience, and it's just incredible that she doesn't notice!" [1]

Given these general qualities of marijuana intoxication on social groupings, namely, a general quieting effect, let us now examine what changes in social interaction are reported when the user chooses to interact with others.

QUALITY OF SOCIAL INTERACTION

Game Playing

A very characteristic effect of marijuana intoxication is *"I find it very hard to play ordinary social games when stoned"* (6%, 7%, 21%, 35%, 27%), i.e., various kinds of polite social chit-chat and the like seem hollow and worthless, not worth engaging in. They are "seen through," as later descriptions of effects will indicate. This is reported less frequently by Heavy Total users ($p < .0005$, overall), suggesting some Heavy Total users have learned to function quite easily in ordinary social settings. The College-educated also experience this difficulty more frequently ($p < .05$). This effect begins to occur by Moderate levels (13%, 32%, 24% 13%, 5%)

On the other hand, it is common for users to report *"I can play elaborate games and get very involved in the games"* (14%, 25%, 34%, 17%, 9%), beginning at Moderate to Strong levels (13%, 31%, 30%, 8% 1%). Light Total users have to be more intoxicated for this ($p < .05$) and Users of Psychedelics less intoxicated ($p < .05$). The social games played while intoxicated are not always elaborate, however; *"when stoned with others, I play 'childish' games; i.e., we interact with each other in ways which are very enjoyable but which people would ordinarily consider childish"* is a very common experience (5%, 15%, 51%, 22%, 7%). As one informant put it, "Kids have a lot of fun just doing groovy things like skipping; and if you're stoned with your friends and somebody says 'Wouldn't it be neat to skip down the road?' we may do it and have a ball. We care less that some dumb-ass old authority figure is sitting around and frowning and saying, 'Grownups don't skip!' " Playing childish games may occur in the Moderate to Strong levels and higher (9% 31%, 37%, 15%, 1%).

Figure 12-6 plots the interrelationships of these three aspects of social game playing. Difficulty in playing ordinary games is more frequent than playing childish games ($p < .0005$), and playing childish games is more frequent than playing elaborate games ($p < .01$). Playing childish games tends to occur at higher levels than finding it hard to play ordinary social games ($p < .05$), but there are no other significant differences in level of intoxication.

There are a number of alterations in the perception of social interaction that lie behind the change in overall social interaction, which we shall now consider in decreasing order of frequency.

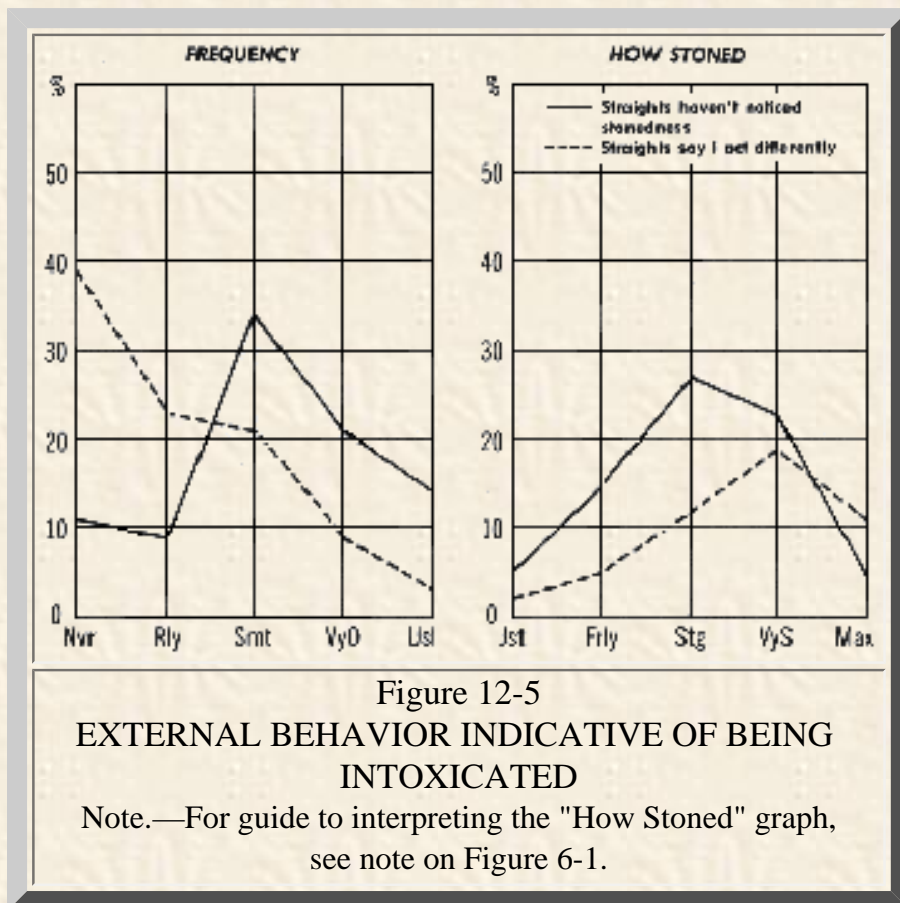


Figure 12-5
EXTERNAL BEHAVIOR INDICATIVE OF BEING INTOXICATED

Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Insights into Others

A characteristic effect is *"I have feelings of deep insights into other people, how they tick, what their games are, when stoned (regardless of whether they check out later)"* (7%, 7%, 31%, 34%, 21%). These feelings occur in the Moderate to Strong levels (10%, 35%, 39%, 6%, 2%). A related phenomenon, discussed fully in Chapter 6, is *"The face of another person will change even as I watch it, so he keeps changing from one different person to another."* Some informants indicate that sometimes this is a purely illusory experience on the part of the perceiver but other times it seems a veridical "illusion" in that it allows insights into the perceived person's character, literally seeing one of the other "persons" within him.

Another common, related phenomenon, discussed fully in Chapter 15, is *"I learn a great deal about psychological processes, what makes people tick..."*

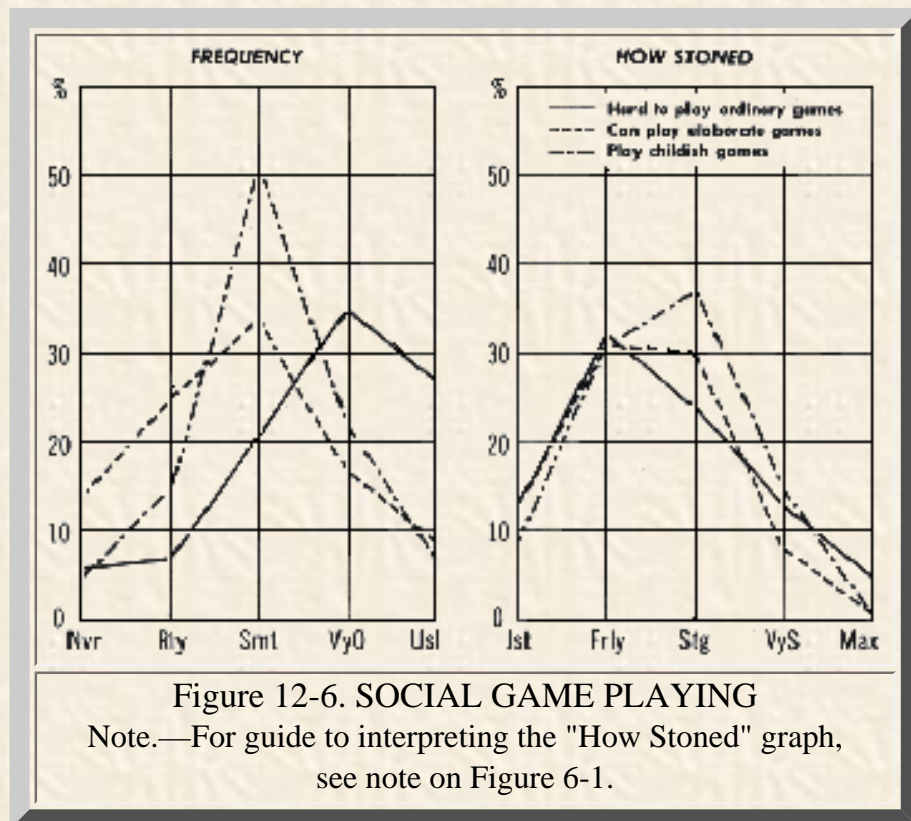
Not only do users characteristically feel as if they have insights into others, they very commonly empathize with them: *"I empathize tremendously with others; I feel what they feel; I have a tremendous intuitive understanding of what they're feeling"* (7%, 11%, 40%, 25%, 18%). This begins to occur at Moderate to Strong levels of intoxication (12%, 31%, 35%, 10%, 1%). A more extreme form of this, discussed in Chapter 10, is the infrequent feeling of telepathic rapport with others. Indeed, this can reach the point of feeling merged with another person, or being at one with the world, as discussed in Chapter 18.

Profundity

Another very common effect influencing social interaction is *"I feel the things I say in conversation when stoned are more profound, more appropriate to the conversation, more interesting"* (5%, 13%, 37%, 27%, 15%). This occurs at Moderate to Strong levels (9%, 38%, 31%, 11%, 1%). While most Users of Psychedelics indicate this happens at Fair and Strong levels, Non-users are more variable, indicating Fairly and Very Strongly as main levels ($p < .05$).

Subtlety and Humor

A related characteristic effect is *"I appreciate very subtle humor in what my companions say, and say quite subtly funny things myself,"* dealt with in Chapter 15. Similarly, the common effect *"I giggle a lot when stoned..."* is dealt with fully in Chapter 16.



Another related phenomenon, dealt with in Chapter 15, is *"Commonplace sayings or conversations seem to have new meanings, more significance."*

Group Unity

Our group of marijuana users, then, may be sitting together feeling as if they have increased insight into one another, empathizing more fully with one another, being more childlike and open, and saying more profound things. Thus it is not surprising to find that a very common effect of marijuana intoxication is *"When stoned with a group of people, the group takes on a much greater sense of unity, of real social relationship, than when straight; i.e., I feel much more part of a group instead of one person simply in the presence of other people"* (7%, 17%, 30%, 25%, 21%). As with the other social effects, this begins to occur at Moderate to Strong levels of intoxication (15%, 35%, 29%, 10%, 0%).[\[2\]](#)

Contact Highs

There is one particularly interesting social effect occurring in groups of users, which further illustrates the importance of psychological variables in affecting the nature of the intoxicated state: *"Being with people who are much higher than I am (as from their being on acid or much more stoned on grass) gets me higher even though I don't smoke any more grass."* This is a common effect (13%, 13%, 32%, 23%, 15%), which may occur even at the lowest levels of intoxication (23%, 22%, 26%, 5%, 2%).

Related Phenomena

Other relevant phenomena for understanding social interaction are the loss of short-term memory, the feeling that this does not seriously impair the user's ability to carry on an intelligent conversation, and the feeling of having said things that were not actually said (discussed in Chapter 14), as well as various alterations in other cognitive phenomena (discussed in Chapter 15).

NEGATIVE EFFECTS ON SOCIAL INTERACTION

There were four effects studied that seem predominantly negative. The first of these is *"I feel isolated from things around me, as if there were some kind of barrier or glass wall between me and the world, muting everything coming in and partially isolating me,"* a common effect (29%, 21%, 33%, 14%, 3%). The Meditators experience this less often ($p < .01$, overall). It may occur at the Strong and Very Strong levels (4%, 11%, 22%, 21%, 9%).

Another infrequent effect is *"I get somewhat paranoid about the people with me; I am suspicious about what*

they're doing" (20%, 38%, 31%, 7%, 4%). Non-users of Psychedelics experience it more frequently ($p < .01$). This also may occur at the Strong and Very Strong levels (9%, 15%, 21%, 24%, 7%). The Meditators tend to experience paranoid feelings at lower levels of intoxication ($p < .05$, overall).

What may be an even more extreme cutting-off from social relationships is the rare phenomenon, *"Other people seem dead, lifeless, as if they were robots, when I'm stoned"* (49%, 27%, 18%, 5%, 0%). This effect may begin occurring from the moderately intoxicated level on up in the users who could rate it (3%, 11%, 13%, 14%, 6%). Users of Psychedelics may experience it at lower levels ($p < .05$).

An infrequent negative effect of the group on the user is *"I am very strongly influenced by the social situation set up by my companions, so I will do whatever they are doing, even if it is something I don't want to do or wouldn't do normally"* (33%, 38%, 23%, 3%, 0%). This is reported as occurring more frequently by Males ($p < .05$). Weekly users also have it occur more frequently than Occasional or Daily users ($p < .05$). In retrospect, this question is hard to interpret, as it does not specify how undesirable the actions are that a group might pressure the user into doing. A highly relevant question, dealt with fully in Chapter 17, is *"I lose control of my actions and do antisocial things (actions that harm other people) that I wouldn't normally do."* This is one of the rarest phenomena reported, with 77 percent saying Never, 22 percent Rarely, and only one user saying Sometimes. Thus the question on social influence must deal primarily with actions ordinarily unacceptable to the individual, but not necessarily harmful.

ADDITIONAL EFFECTS

Four users mentioned increased feelings of love and compassion toward others: (1) "Increased feelings of tenderness and compassion toward people I'm with, and toward animals, if any present" (Very Often, Strongly); (2) "I become less evaluative of myself and others, more loving" (Usually, Fairly); (3) "I am more concerned with other people's happiness" (Very Often, Fairly); and (4) "If there is some particular person whom I have not cared for, if I get the opportunity to be around him while I'm stoned, I often gain understanding of him and feel very close to him afterwards. The person need not also be stoned" (Very Often, Strongly).

"Feel that many statements made by other people are, more often than not, ambiguous" (Very Often, Strongly).

"When I am with others we tend to share fantasies" (Very Often, Strongly).

"I am more tolerant of other people's beliefs and ideas" (Usually, Fairly).

"I tend to become a member of a group: laugh when they laugh, listen when they listen" (Sometimes, Strongly).

"People seem more violent when I am stoned" (Sometimes, Maximum).

"I enjoy listening to stories about people" (Usually, Strongly).

"I feel much more political" (Very Often, Just).

"A feeling that my friends are different when they're stoned" (Usually, Just).

"Think you would like to turn others on" (Rarely, Maximum).

"Say something and then realize no one heard you—this is frightening, for you're with people and they didn't notice you at all" (Sometimes, Very Strongly).

"I dislike people, especially men who are with me—I see them differently, more clearly, it seems" (Very Often, Fairly).

"An ability to communicate ritual messages" (Usually, Strongly).

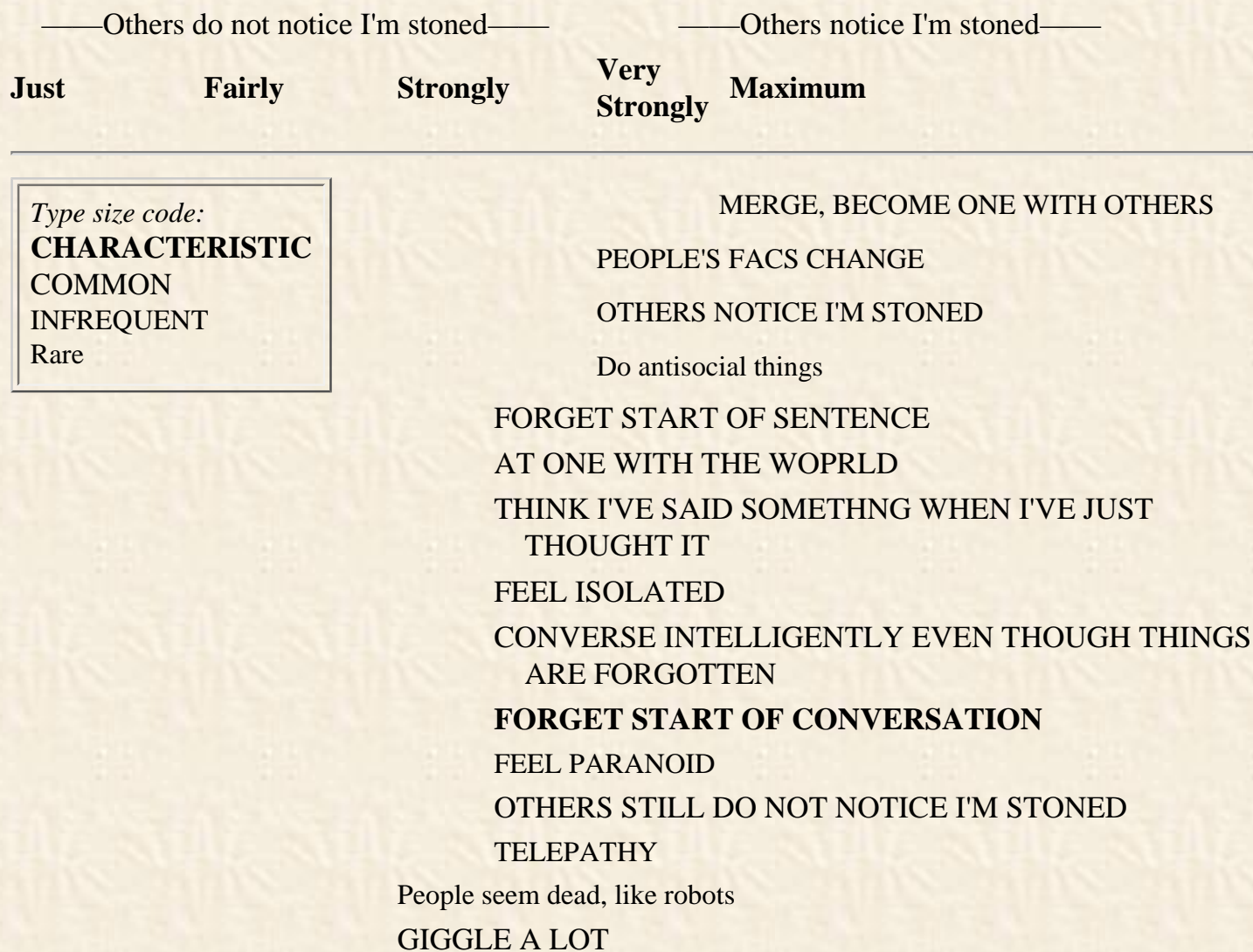
"I am aware of multi-level communication; i.e., people are communicating more things than their words express, and often the messages

- aren't related, or one is used to communicate another" (Very Often, Strongly).
- "A good way to get to know someone more quickly" (Very Often, Fairly).
- "I tend to want to be with familiar people who are as stoned as I" (Usually, Maximum).
- "Can relate better to my own children" (Very Often, Fairly).
- "Strong desire to be alone, bordering on narcissism" (Very Often, Strongly).
- "Experience extreme withdrawal" (Sometimes, Just).
- "Loneliness has a pleasant rather than an undesirable quality" (Usually, Just).

LEVELS OF INTOXICATION FOR SOCIAL INTERACTION

The effects of marijuana intoxication on social interaction by level of intoxication are summarized in Figure 12-7. The overall ordering of levels is highly significant ($p \lll .0005$).

FIGURE 12-7. INTOXICATION LEVELS, SOCIAL EFFECTS



LEARN A LOT ABOUT WHAT MAKES PEOPLE TICK
SIGNIFICANCE IN COMMONPLACE CONVERSATIONS

LESS SOCIABLE

TALK LESS

PLAY CHILDISH GAMES

STRONGLY INFLUENCED BY COMPANIONS

EMPATHIZE MORE WITH OTHERS

INSIGHTS INTO OTHERS

SAY MORE PROFOUND, APPROPRIATE THINGS

MORE SUBTLE HUMOR

PLAY ELABORATE GAMES

MORE GROUP FEELING

ORDINARY SOCIAL GAMES HARD TO PLAY

LESS NOISY THAN WHEN STRAIGHT

TALK MORE

MORE SOCIABLE

HIGHER PEOPLE GET ME HIGHER

LESS NOISY THAN WHEN DRUNK

Just

Fairly

Strongly

**Very
Strongly**

Maximum

—Others do not notice I'm stoned—

—Others notice I'm stoned—

Beginning at Low to Moderate levels, there is a general reduction of loudness and noisiness as the pattern of social interaction begins to change from ordinary interaction to that characteristic of groups of intoxicated users. Ordinary social games become harder to play; users become more sociable and talk more. Thought processes begin to alter so the users feel they have insights into others and interact more subtly, especially with respect to humor. A strong feeling of group solidarity commonly occurs in this Moderate to Strong range of intoxication. Generally, at these low levels, users feel social interaction is greatly enhanced.

As the users begin to enter the Strong ranges and higher, however, *inner* experience often begins to predominate over social interaction. When social interaction continues, it is usually felt to be very profound. At the highest ranges it includes occasional feelings of telepathic contact and merging with others. Because of the increasing intensity of inner experiences, however, from the Strong level up, many users become less sociable, more wrapped up in themselves. Many of my informants comment that when marijuana is first smoked at a social gathering, there is a lot of interaction, conversing, group discussion, good feeling, but if a lot is smoked, a fair number of people will often begin to withdraw into themselves or become involved in intense dialogues with another user rather than take part in the general group interaction.

Thus low levels of intoxication seem to facilitate and deepen social interaction among users, whereas higher levels may either deepen it further or result in withdrawal from the group.

MODULATING FACTORS

Table 12-1 summarizes the effects of relatively linear background factors on social interaction effects.

Two phenomena were not affected linearly by frequency of use. Weekly users more frequently report being strongly influenced by their companions. They also need to be more intoxicated to believe they've said something when they haven't.

TABLE 12-1
EFFECTS OF BACKGROUND FACTORS ON
SOCIAL INTERACTION

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	<p>More frequent: People's faces change Less noisy than when straight Telepathy More subtle humor</p> <p>More intoxicated for: Talk more People haven't noticed I'm stoned Giggle a lot Forget start of conversation</p>	<p>Less frequent: Think said something when just thought it Feel paranoid Hard to play ordinary social games</p> <p>Less intoxicated for: Quieter than when straight Insights into others People seem like robots Say more profound things Play elaborate games Telepathy</p>
Meditation	<p>More frequent: People's faces change Merge with others Feel one with world</p> <p>More intoxicated for: Less sociable</p>	<p>Less frequent: Talk more Feel isolated</p> <p>Less intoxicated for: Feel paranoid</p>
More Educated		<p>Less frequent: Ordinary games hard to play</p> <p>Less intoxicated for: Talk more Merge with others</p>

Older	More frequent: People haven't noticed I'm stoned	Less intoxicated for: Talk more Merge with others
Males	More frequent: Strongly influenced by companions More intoxicated for: Forget start of sentence	Less frequent: Giggle a lot

SUMMARY

In terms of its effects on users' perceptions, marijuana acts as a potentiator of social interaction in the Low to Moderate intoxication levels. Users feel more empathy toward and insights into others, play childish and elaborate games, feel that their conversation is often profound, and commonly experience strong feelings of group unity.

At high levels of intoxication, marijuana may have two different effects on users because of the intensification of inner experiences. The user may become less sociable and withdraw from a group in order to more fully appreciate the inner experiences he is having or, if he continues to interact, may feel that the interaction becomes exceptionally profound, including such things as merging with another person or feeling so aware of another that it seems like telepathic communication.

Negative effects on social interaction are mostly infrequent or rare.

Footnotes

1. This apparent rarity of changes in external behavior should be carefully noted in terms of research methodology; insofar as it is true, behavioristic approaches to this area will waste a lot of time. ([back](#))
2. Note, however, that marijuana intoxication does not inevitably create group feelings; if some group members do not fit in or seem "phony," this will kill any feelings of closeness or group coherence. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 13. Sexuality

GIVEN THE COMMON American stereotype of the "sex-crazed dope fiend," it is interesting to see what effects on sexuality are perceived by marijuana users themselves.

MAJOR EFFECTS

Desire for Sex

A common effect is *"My sexual drive goes up when stoned; I have more need for sex"* (18%, 21%, 28%, 21%, 12%). This may begin to occur at the Moderate to Strong levels of intoxication (11%, 25%, 32%, 8%, 2%). Users of Psychedelics experience this at lower levels of intoxication ($p < .0005$), as does the Therapy and Growth group ($p < .05$, overall).

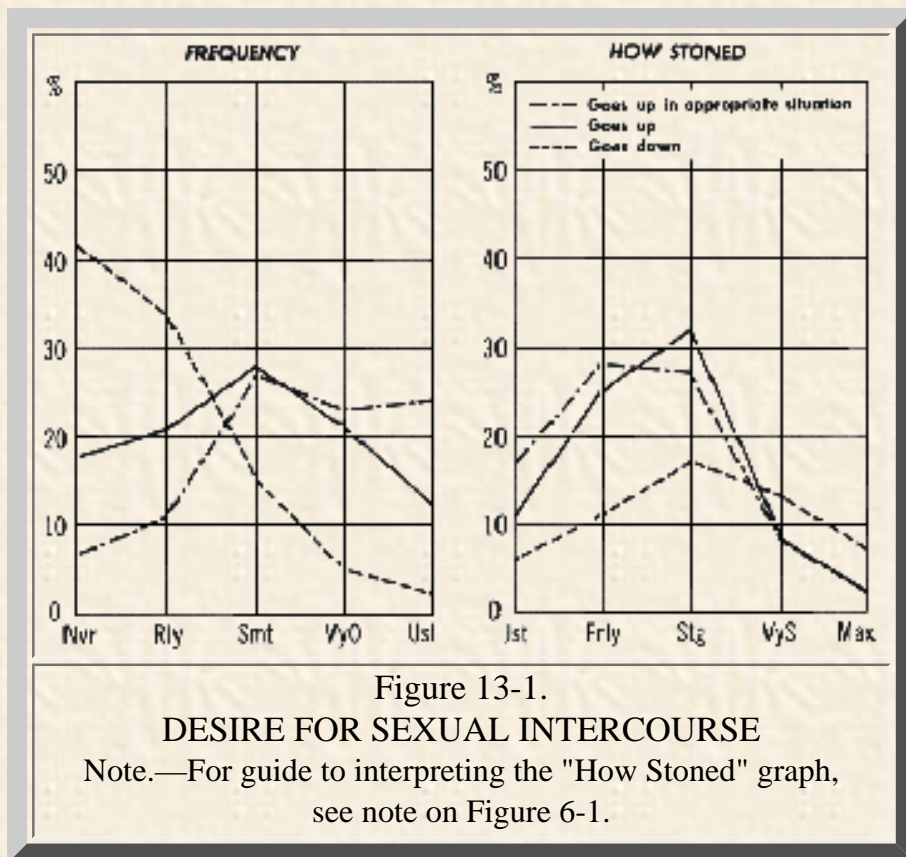
The converse effect *"I have much less sexual drive when stoned; it's difficult to arouse me even in a situation which would normally arouse me"* is rare (42%, 34%, 15%, 5%, 2%). When it occurs, it is at the strong levels and higher (6%, 11%, 17%, 13%, 7%). The Professionals experience this loss of sexual need at lower levels of intoxication ($p < .05$).

A very common effect is *"I have no increase in sexual feelings unless it's a situation that I would normally be sexually aroused in, and then the sexual feelings are much stronger and more enjoyable"* (7%, 11%, 27%, 23%, 24%). Users of Psychedelics report this more frequently ($p < .05$) than Non-users. It generally occurs at Moderate to Strong levels (17%, 28%, 27%, 8%, 2%).

The relationships of these three alterations of sexual need are plotted in Figure 13-1. Sexual need going up

when the situation is appropriate is reported more frequently than need per se going up ($p < .01$), and sexual need per se going up is more frequent than its going down ($p < .0005$). Most of my informants commented that sexual *drive* or *need* does not go up, but rather the knowledge of how intensely gratifying sex is when intoxicated serves to make any perceived sexual drive more attention getting and desirable when intoxicated.

With respect to levels of intoxication, they are the same for sexual desire per se going up and for sexual desire going up when the situation is appropriate, but sexual desire going down occurs at higher levels of intoxication ($p < .01$ with respect to desire per se, $p < .0005$ with respect to desire in appropriate situations). My informants indicate that sexual intercourse at very high levels of intoxication can be an ecstatic, overwhelming experience, but at these levels chances are good that the user will be absorbed in his own inner experiences and not get interested in making love with someone.



Contact with Partner

A very common experience is *"When making love, I feel I'm in much closer mental contact with my partner; it is much more a union of souls as well as bodies"* (9%, 9%, 31%, 20%, 25%). This closeness occurs more frequently among Users of Psychedelics ($p < .0005$) and the College-educated ($p < .05$). It generally begins to be experienced at the Moderate and Strong levels (7%, 27%, 35%, 9%, 3%). The Heavy Total users and the Daily users both experience this closeness at lower levels of intoxication ($p < .05$ in each case).

The converse effect, *"When making love, I feel rather isolated from my partner; I'm wrapped up in my intensified sensations and not really very aware of my partner's reactions and feelings"* occurs infrequently (25%, 29%, 28%, 7%, 2%) and at Strong levels (5%, 13%, 25%, 15%, 7%). Feeling isolated from one's sexual partner occurs much less frequently than feeling closer ($p < .0005$) and at higher levels of intoxication ($p < .05$), as shown in Figure 13-2.

Qualities of Orgasm

One of the factors that enhance love-making when intoxicated on marijuana is the characteristic effect, "*Sexual orgasm has new qualities, pleasurable qualities, when stoned*" (6%, 9%, 22%, 27%, 28%). This occurs somewhat less often, albeit still very frequently, for the Meditators ($p < .01$, overall) and the Professionals ($p < .01$). Most users experience these new qualities of orgasm by the Strong level of intoxication (8%, 21%, 37%, 8%, 8%).

Among the various qualities potentially going into orgasm enhancement that my informants are able to describe, one or several of the following may be experienced as part of an orgasm when intoxicated: (1) prolongation of orgasm (possibly an effect of time slowing); (2) feelings of energy flowing and/or exploding or erupting in the body; (3) feelings of energy interchange with one's sexual partner, both flows before orgasm and explosive interchanges through the genitals and whole body during orgasm; (4) absolutely total immersion in the orgasm, no distractions of any sort; (5) the orgasm taking place as ecstatic sensations through most of the body rather than being confined to the genital area; (6) merging of identity with one's sexual partner during orgasm, with a sharing of sensation and joy; (7) feelings that the energy interchange during orgasm balances and replenishes each partner's own vital energies, rather than depleting them—more so than when not intoxicated; (8) greater awareness of the bodily feelings leading up to orgasm, with a consequent ability to time one's movements in a way that will maximize the pleasurable qualities of the orgasm; (9) the ego temporarily disappearing, the body taking over, the orgasm happening rather than being produced; and (10) the feeling that the orgasm (and shared feelings with the sexual partner) are happening on a much vaster, wider scale than those consciously experienced, that this is an event of much greater magnitude or significance than the ego is able to sense or comprehend.

Because a number of informants indicated they are aware of what seems to be organ sensations in genitals and gut that are normally not in awareness, it is interesting to compare this report of new qualities to sexual orgasm with two more general changes in sensation, namely, touch sensations taking on new qualities (Chapter 8) and becoming aware of internal organs and processes that are normally not accessible to consciousness (Chapter 11). The relationships are plotted in Figure 13-3. New qualities of orgasm do not

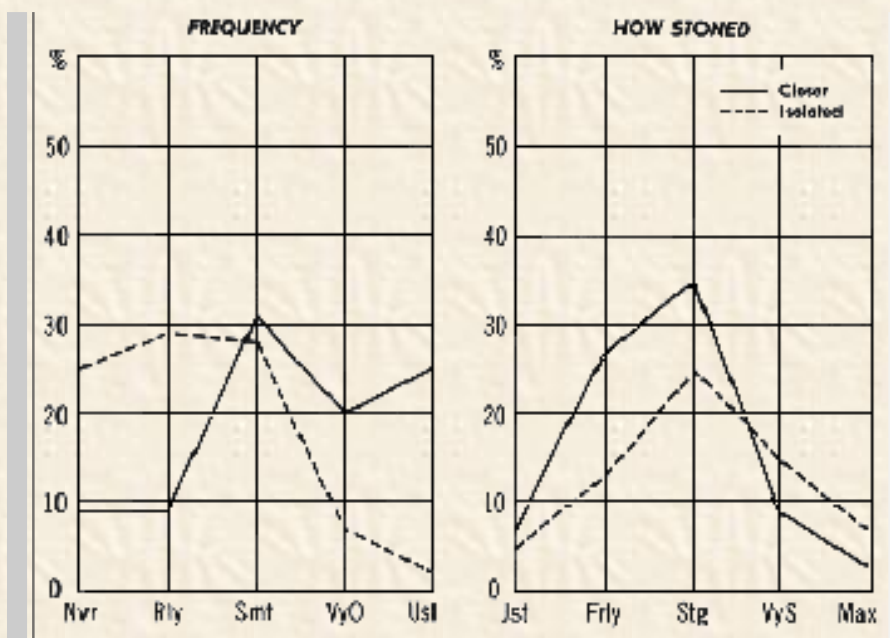
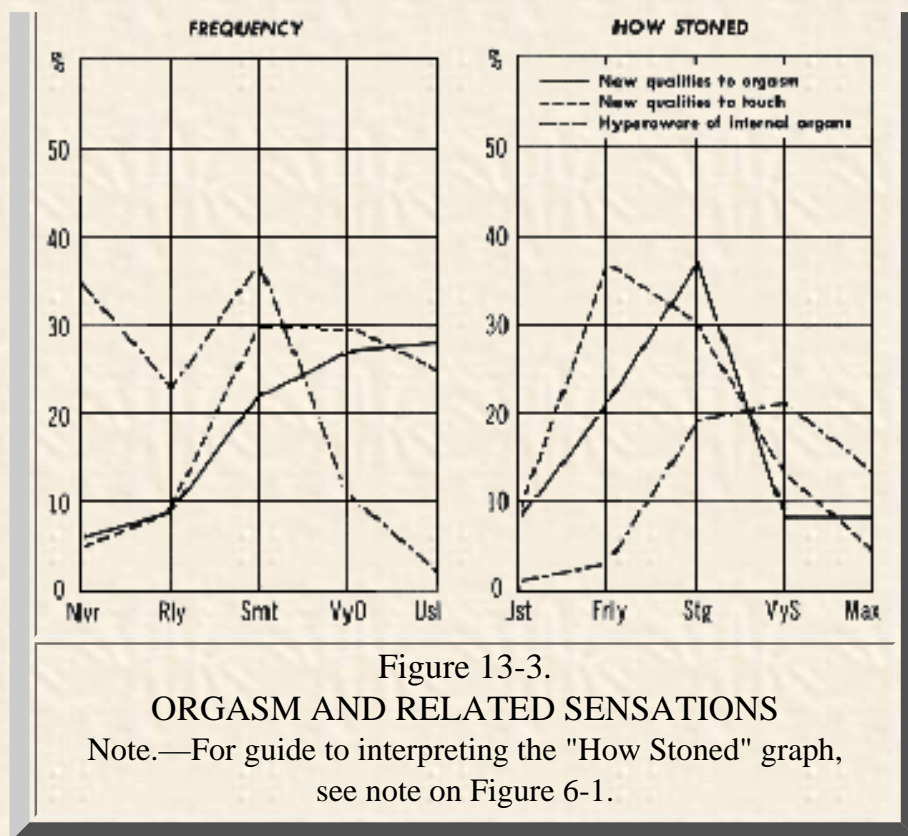


Figure 13-2.

MENTAL CONTACT WHILE MAKING LOVE

Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

occur more frequently than new touch qualities, but they do occur much more frequently than awareness of normally unsensed internal organs ($p \ll .0005$). New touch qualities begin to occur at lower levels of intoxication than orgasm enhancement ($p < .05$), and increased awareness of internal organs at higher levels than orgasm enhancement ($p < .0005$). Apparently the sheer intensity of sexual orgasm may result in internal organ sensations connected with it that ordinarily occur at higher levels of intoxication.



Related Effects

There are a number of related intoxication phenomena, dealt with in preceding and subsequent chapters, that indicate, in conjunction with pilot interview data and comments of informants, some other specific ways in which sexual contact and intercourse can be altered. These will be briefly listed below.

"... sensual quality to vision..." (Chapter 6). Looking at one's lover can be like touching him or her.

"... face of another... will change even as I watch it..." (Chapter 6). One woman can become another woman, many women, all women, Woman.

"Touch sensations take on new qualities..."; "... touch more exciting, more sensual..."; "... surfaces feel smoother, silkier..."; and "... surfaces rougher... graininess forms interesting patterns ..." (Chapter 8). All of these changes in touch quality apply particularly to a lover's garments, skin, hair, mouth, genitals.

"Taste... new qualities..." and "Smell ... new qualities..." (Chapter 8) apply to kissing and oral-genital contacts.

"I empathize tremendously... feel what they feel. ..." (Chapter 12). Your lover's joy is your joy; your lover's pain is your pain.

"... so absorbed... in a person... felt as if I were that... person..." (Chapter 18). Total blending, merging with one's lover.

"Some events become archetypal, part of the basic way man has always done things..." (Chapter 18). Instead of John Smith and Mary Jones making it in John's apartment in California on a particular night, Man and Woman Blend Together, in Now and Eternity, Here and Everywhere, an integral part of the Blending of Maleness and Femaleness of the Universe.

Note also that sexual fantasy, as well as real sexuality, can be markedly enhanced by marijuana intoxication. Imagery in all sensory modalities is generally enhanced, so fantasy preceding actual sexual contact or

masturbation can be much more intense and exciting than ordinarily. New and pleasurable qualities to orgasm can occur with masturbation as well as actual sexual contact. My informants indicate, however, that as greatly enhanced as fantasy and masturbation are, that enhancement generally does not begin to compare to the enhancement of real sexuality.

Being a Better Lover

The final item dealing with sexuality was "*I feel as if I'm a better person to make love with when stoned.*" This is a common experience (26%, 12%, 20%, 12%, 20%). Although many users (44 percent) did not rate the minimal level of intoxication for this, those who did generally considered it a Moderate-to Strong-level effect (8%, 15%, 20%, 9%, 3%). The College-educated indicated higher levels of intoxication for this than the Professionals ($p < .05$).

The users were asked to explain *why* they were a better person to make love with when high on marijuana. Thirty-nine males and twenty-one females wrote brief explanations. These have been summarized in several categories in Table 13-1.[1] The number of users giving particular reasons is broken down by males and females, and by those of each sex who indicate Rarely/Sometimes or Very Often/Usually for categorizing themselves as a better lover when intoxicated.

TABLE 13-1
REASONS FOR BEING A BETTER LOVER

QUALITY	NUMBER OF MALES		NUMBER OF FEMALES	
	Rly/Smt	VyO/Uly	Rly/Smt	VyO/Uly
Less inhibited, more arousable	6	6	5	6
More contact with, responsiveness to lover, gentler, more giving	6	17	5	12
More sensual, stronger sensations, feelings	2	7	2	2
More control, capacity, coordination	5	4	0	1
More here-and-now, archetypal, spontaneous	3	4	0	1
Prolonged duration of love-making	0	1	0	0
Harder, longer-lasting erection	0	1	-	-
Miscellaneous	5	0	0	0

1. Note that this table includes one or more answers from each user, and so is not amenable to valid statistical treatment. A valid table, using the main or first answer of each user only, was prepared, but as no differences between males and females reach statistical significance, it will not be presented here.

The first category, *less inhibited, more arousable*, represents answers such as the following: "... generally

more open to my partner, less inhibited by sexual conventions..."; or "I'm usually somewhat inhibited when straight but not when stoned..."; or "... many of my inhibitions and petty thoughts are transcended by a much stronger desire to unite deeply with my partner"; or "Because *I'm* grooving to it more, because I'm frigid and when stoned I get close to coming, I'm more willing to experiment and please the other person."

It is important to clarify the above descriptions of reduction of sexual inhibitions by noting that my pilot interview subjects and later informants all commented to the effect that this reduction was not an aphrodisiac effect in the usual understanding of the word. Rather it was a selective lowering of inhibition. If the situation was appropriate, if the user really wanted sexual relations with someone else, marijuana would lower inhibitions; but if someone the intoxicated user does not like to be with attempts seduction or sexual manipulation, they will seem even more repulsive and undesirable than normally.

By far the most frequent reason for being a better lover when intoxicated, especially if the sexual partner is also intoxicated on marijuana, is feelings of *tremendously enhanced contact* with one's partner, sharing of feelings, being more sensitive, gentle, giving. A poignant expression of this was given by an eighteen-year-old male student: "When I am stoned and making love, sometimes I can be so much a part of my partner that it hurts and makes me feel very alone when we are apart..."; or "My own sensations are so acute that I want the person I love to feel it also..."; or "I feel closer physical and mental communication (actually both become one)."

The third category, *increased sensuality* and intensity of sensations, has already been illustrated above.

More control, capacity, or coordination is expressed in such comments as "... my movements are relaxed, confident ..."; or "My actions are more fluid—heightened emotion and passion..."; or "... can do much more because I feel stronger..."; or "... can last as long as I'm stoned without tiring..."

More here-and-now-ness, spontaneity, sometimes leading to a totally archetypal experience is illustrated by: "The act and the communion become reduced to the most basic and, at the same time, expanded to the most elevated and consecrated form of experience possible..."

Increased experiential duration of orgasm and *increased erectile potency* are both illustrated by one student: "Potency seems to be incredibly augmented, such that an infinite orgasm could seem possible. I have had as many as seven orgasms in the span of one night, having been extremely stoned. My organ seems immense (when flaccid) and seems that it would swell to immeasurable proportions... my erection seems to be harder than steel. .."

Note however that 26 percent of the users indicated they were never a better lover when intoxicated. As one user put it, "While I find it rather more pleasurable than not (the act itself), I feel that it is not *complete* somehow, because it becomes a purely sensual thing. This feeling of sensuality is tremendously vitalizing, but I find myself enjoying this so much that I wonder if my partner is aware of it in me; I am not aware of his pleasure, only my own, and this fact that neither of us can communicate this to each other makes it a selfish act... We both prefer not to have sex when stoned because of this." Another user, who indicates he is sometimes a better lover when intoxicated, points out the importance of direction of attention in this respect: "When I'm stoned, sex seems more natural and less inhibited. I seem to flow right into things—doing without thinking. But, I have heard later from the chick (on occasions) that I was out to gratify myself, not her. This type of self-gratification love-making usually happens when I occasionally go on a grass ego-trip. But there have been many times when we both are gratified; this result, fortunately, is the more frequent."

ADDITIONAL EFFECT

"Sexual orgasm entails a strong feeling of physical union, two making *one flesh* where I touch my

partner" (Sometimes, Maximum).

LEVELS OF INTOXICATION FOR SEXUAL EFFECTS

Various phenomena affecting or characterizing sexuality on marijuana are summarized by level of intoxication in Figure 13-4. The overall stratification by level is highly significant ($p \lll .0005$).

Beginning at the Moderate to Strong levels, there is commonly more desire for sex (especially if the situation is appropriate), enhancement of sense qualities that add to sexual pleasure, especially touch, and the feeling that one becomes a better lover, usually with more feeling or empathy for one's sexual partner. At the Strong level there are new qualities to orgasm and, rarely, the desire for sex may diminish. If sexual desires are acted out, though, rather than the user getting caught up in internal fantasies and experiences, the sexual act becomes particularly profound at this and higher levels. Actions may become archetypal, all sorts of new sensations may arise from the body, and, near the maximal levels, the sexual partners may experience merging with one another, becoming one.

The potential sidetracking of sexual desires into a more general form of intimate contact was well described by one female user: "... If I am very stoned (especially if both of us are) sometimes the mind just won't turn off, and even in the middle of a kiss there may come an overwhelming sense of peanut butter, roses, lakes, psychology, or goodness knows what. At times like these—fortunately it has usually happened to both of us at the same time—it is very pleasant just to talk and/or hold one another. Sexual attraction has become replaced or become less important than affection and simple contentment in the other's nearness...."

FIGURE 13-4.
INTOXICATION LEVELS, SEXUAL EFFECTS

Just	Fairly	Strongly	Very Strongly	Maximum
<i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare				MERGE WITH ANOTHER
				FACES CHANGE
				NEW SENSATIONS FROM INTERNAL ORGANS
				ACTIONS BECOME ARCHETYPAL
				SENSUAL QUALITY TO VISION
			FEEL ISOLATED	
			Less ned for sex	
			NEW QUALITIES TO ORGASM	
			NEW QUALITIES TO SMELL	
			SURFACES FEEL GRAINIER, INTERESTING	
			BETTER LOVER THAN WHEN STRAIGHT	
			CLOSER CONTACT WITH PARTNER IN MAKING LOVE	

NEW QUALITIES TO TOUCH

SURFACES SEEM SMOOTHER, SILKIER

TOUCH MORE SENSUAL

MORE NEED FOR SEX

EMPATHIZE TREMENDOUSLY WITH OTHERS

MORE NEED FOR SEX IF SITUATION APPROPRIATE

NEW TASTE QUALITIES

Just Fairly Strongly Very Strongly Maximum

MODULATING FACTORS

All the background factors affecting sexuality had relatively linear effects. They are summarized in Table 13-2. An interesting pattern seems to distinguish the group with much drug experience from the more educated group. The high drug experience group reports increased frequency of a variety of sensual enhancements and closeness to their sexual partners, while the more educated group does not have as much sensual experience, but has some of it at lower levels of intoxication, as well as reporting themselves to be better lovers at lower levels. The more educated group also experiences increased closeness to their sexual partners less frequently. This may reflect a generation gap in some ways, as the more educated are generally older than the rest of the users in the present sample, and may have many more inhibitions about sensuality and sexuality.

**TABLE 13-2
EFFECTS OF BACKGROUND FACTORS ON SEXUALITY**

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequent: Actions become archtypal New smell qualities Faces change Vision sensual More need for sex if situation appropriate Closer to partner	Less intoxicated for: Vision sensual More need for sex Closer to partner

Males	More intoxicated for: Actions become archetypal Awareness of internal organs	
Meditators	More frequent: Merge with another Faces change	Less frequent: New qualities to orgasm
More Educated		Less frequent: Closer to partner New qualities to orgasm Surfaces rougher Vision sensual Less intoxicated for: Merge with another Surfaces rougher Surfaces silkier Need sex less Better lover
Older		Less intoxicated for: Merge with another
Therapy & Growth	More intoxicated for: New touch qualities Touch more sensual	Less intoxicated for: More need for sex

SUMMARY

For practically all experienced users, marijuana intoxication greatly intensifies the sensations experienced in sexual intercourse. A minority feel that this takes something important away from sexual intercourse, namely, contact with their sexual partner as they become immersed in their own intensified sensations. For the great majority, however, marijuana seems to be the ideal aphrodisiac. Sex is generally desired more, but with others who would be likely sexual partners anyway; there is usually no drive toward sex unless the overall situation seems right to the user. Desire is then intensified, sexual sensations enhanced, and feelings of greater contact, responsiveness, sharing, desire to give, and empathy with one's sexual partner are often experienced.

While many aspects of human experience, particularly when intoxicated on marijuana, are difficult to describe, my informants and the user-respondents indicate this is particularly true for sexual experience. So much is beyond words. The descriptions above deal only with some of the partially describable aspects.

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 14. Cognitive Processes: Memory

EFFICIENT AND ACCURATE access to memories is central to adaptive human action, both in terms of keeping track of the nature of immediate situations (intermediate-and short-term memory) and in keeping immediate action congruent with long-term values and knowledge (long-term memory).^[1] With marijuana intoxication, the user perceives a variety of alterations in memory functions—enhancements, decrements, and falsifications.

MAJOR EFFECTS

Long-Term Memory

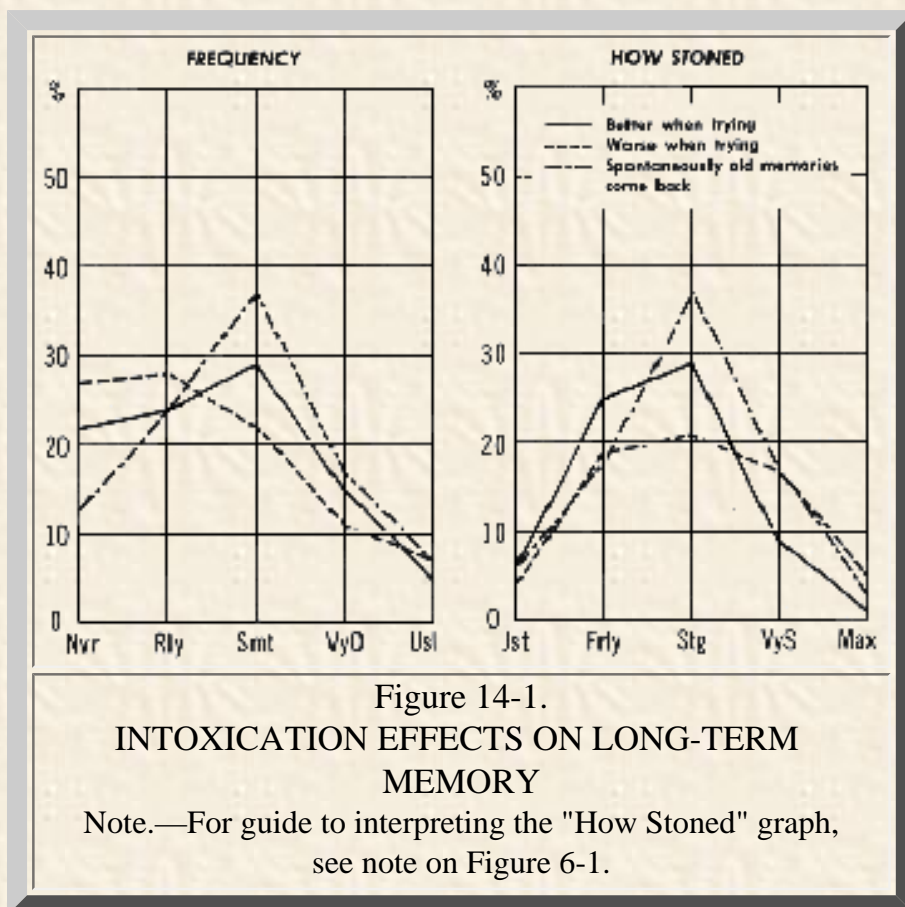
"My memory for otherwise forgotten events is much better than when straight when I consciously try to remember" is a fairly frequent effect (22%, 24%, 29%, 15%, 5%), which begins to occur at Moderate to Strong levels of intoxication (6%, 25%, 29%, 9%, 1%). The converse effect, "My memory for otherwise forgotten events is much worse than when straight when I try to remember" is an infrequent effect (27%, 28%, 22%, 11%, 7%), which also occurs at Moderate to Strong levels (4%, 19%, 21%, 17%, 5%). The College-educated experience this worsening more frequently than the Professionals ($p < .05$). The young experience worse memory primarily at Fairly and Very Strong levels, whereas the older users experience it primarily at the Strong level ($p < .05$).

Aside from consciously trying to recall things, a common effect is "I spontaneously remember things I

hadn't thought of in years, more so than straight (does not apply to consciously trying to remember things)" (13%, 24%, 37%, 17%, 7%). This is more frequent among the young users ($p < .05$). It begins to occur at the Strong levels (6%, 18%, 37%, 17%, 3%).

The relationships of these three aspects of long-term memory are shown in Figure 14-1. Spontaneously remembering the past occurs more frequently ($p < .01$) than recall becoming poorer, and recall becoming poorer occurs at higher levels of intoxication than recall becoming better ($p < .05$).

Comments from my informants suggest that the nature of poor recall is one of selection; many memories are available, but they are often the wrong ones, not those the user wants.



Intermediate-and Short-Term Memory

A very characteristic effect of marijuana intoxication is *"My memory span for conversations is somewhat shortened, so that I may forget what the conversation is about even before it has ended (even though I may be able to recall it if I make a special effort)"* (3%, 7%, 29%, 49%, 11%). It begins to occur at Strong and Very Strong levels (4%, 15%, 39%, 30%, 8%). Heavy Total users need to be more intoxicated to forget the start of the conversation ($p < .05$).

Going from intermediate-to short-term memory, a common effect is *"My memory span for conversations is very shortened, so that I may forget what the start of a sentence was about even before the sentence is finished (although I may be able to recall it if I make a special effort)"* (8%, 24%, 31%, 31%, 5%). This drastic shortening of memory span begins to occur at the Strong and Very Strong levels (3%, 9%, 28%, 29%, 22%), with males needing to be more intoxicated than females to experience this ($p < .05$).

In spite of this drastic shortening of immediate memory, it is also a common effect that *"I can continue to carry on an intelligent conversation even when my memory span is so short that I forget the beginnings of what I started to say; e.g., I may logically complete a sentence even as I realize I've forgotten how it started"* (6%, 20%, 43%, 24%, 5%). This effect also begins to occur at the Strong and Very Strong levels (5%, 13%, 33%, 29%, 9%). The college-educated experience this beginning at higher levels than the Professionals ($p < .05$), and the Weekly users at higher levels than the Daily or Occasional users ($p < .05$).^[2]

The relationships of these three alterations of intermediate- and short-term memory are presented in Figure 14-2. Forgetting the start of the conversation occurs more frequently than forgetting the start of one's sentence

($p < .0005$) or than being able to converse despite a shorter memory span ($p < .0005$). Forgetting the start of one's sentence occurs at higher levels than forgetting the start of the conversation ($p < .01$), and forgetting the start of one's sentence is rated as beginning at somewhat higher levels than being able to converse intelligently despite a shortened memory span ($p < .05$).^[3]

Two related items dealt with elsewhere also illustrate the shortening of intermediate- and short-term memory. Finding that thoughts slip away before they can quite be grasped (Chapter 15) occurs less frequently than either forgetting the start of the conversation ($p < .0005$) or the start of one's sentence ($p < .01$), and at intoxication levels midway between these two phenomena, albeit not significantly different from either of them. Forgetting to finish a task one has started (Chapter 17) occurs more often than

forgetting the start of one's sentence ($p < .01$), but with about the same frequency as forgetting the start of the conversation. It occurs at lower levels of intoxication than forgetting the start of the conversation ($p < .01$) and much lower levels than forgetting the start of one's sentence ($p < .0005$).

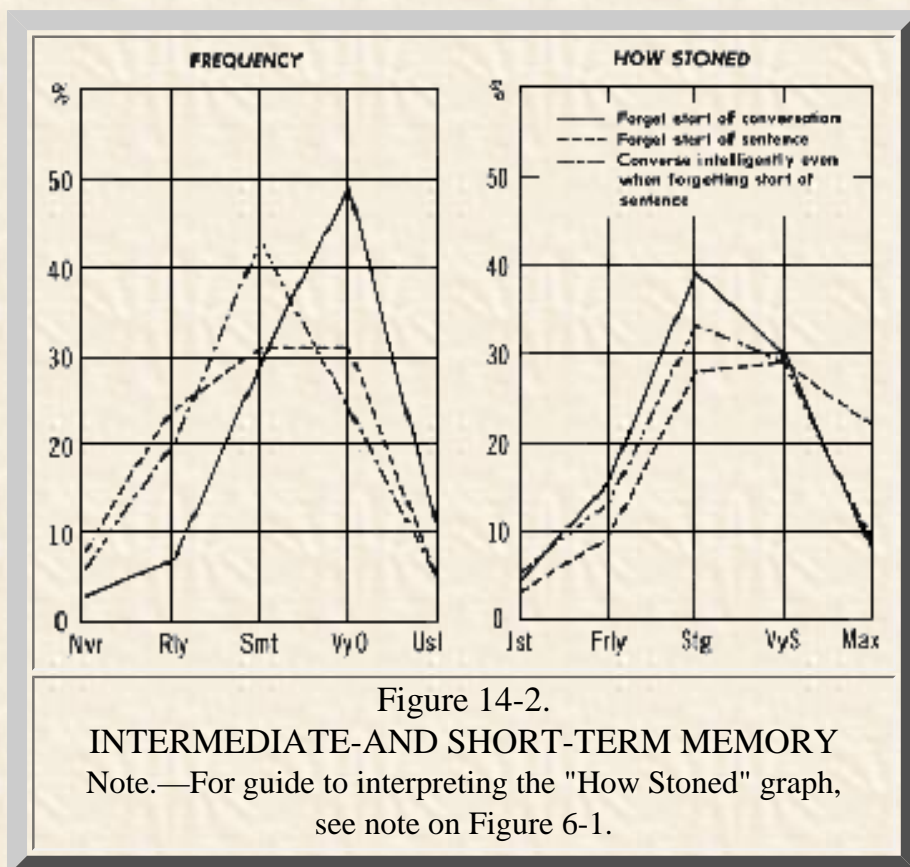
In sum, there is often an increasing shortening of intermediate- and short-term memory span with increasing levels of intoxication, as much as forgetting the start of a sentence one is speaking at Strong and Very Strong levels, but it is commonly felt that this does not necessarily have any effect on the intelligibility of the user's conversation.

False Memories

A mild version of a user's memory playing him false is "I think I've said something when actually I've only thought about saying it, more so than when straight." This is a common effect (18%, 24%, 36%, 19%, 3%), which may occur at the Strong and Very Strong levels (3%, 9%, 26%, 34%, 8%). Users of Psychedelics report it as occurring less often ($p < .05$) and at higher levels of intoxication ($p < .05$) than Non-users. Light Total users experience this mistake more frequently ($p < .05$, overall), and Weekly users need to be more intoxicated to experience this than either Daily or Occasional users ($p < .01$, overall).

"I think something is a memory when it turns out to be a fantasy, something I just made up but fooled myself into thinking was a memory at the time (not the same as *déjà vu*)" is a rare effect (47%, 27%, 20%, 3%, 0%),^[4] which may occur at the very high levels of intoxication (3%, 6%, 13%, 17%, 8%). Light Total users need to be more intoxicated for this ($p < .05$).

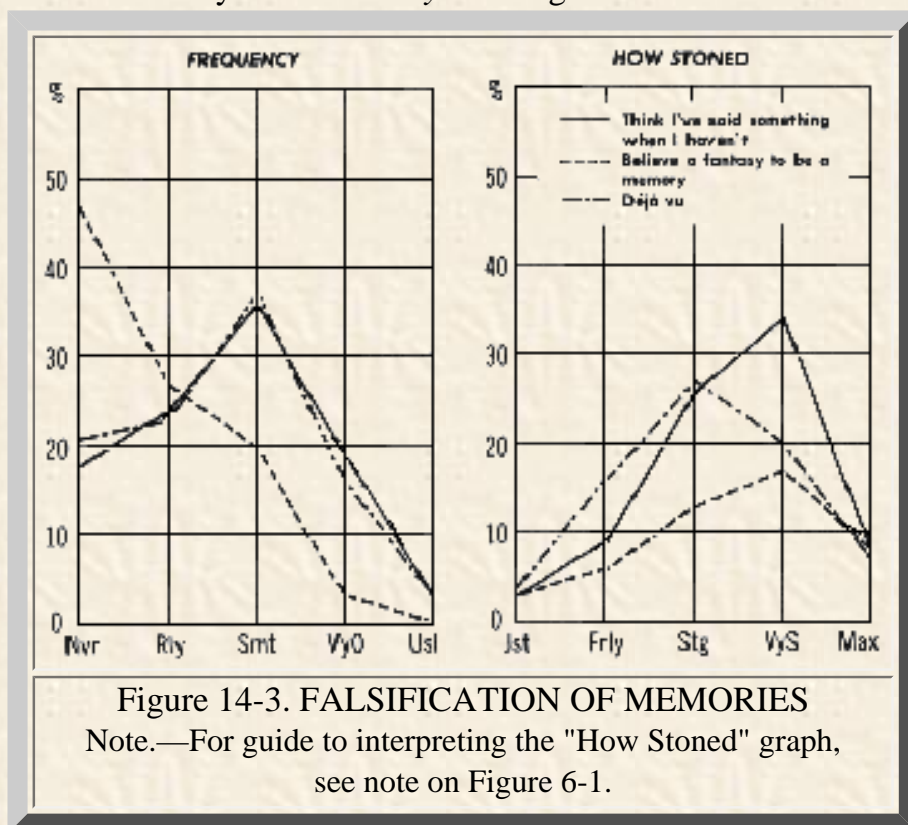
The experience of *déjà vu* (Chapter 9), a common effect beginning to occur at the Strong levels of intoxication, has already been described; this is another instance of poor operation of the memory process, for



either a current situation falsely has the quality of "memory" attached to it, or an actual memory is not being completely labeled as a memory. It seems to *feel* like a memory without *really* seeming to be one.

The relationships between these three falsifications of memory functioning are shown in Figure 14-3. Believing a fantasy to be a memory occurs much less frequently than thinking one has said something when he has not ($p < .0005$) or *déjà vu*. Although *déjà vu* occurs at somewhat lower levels of intoxication than the other two effects, the differences do not reach statistical significance ($p < .10$ at the greatest).

Thus while the "quality" attached to contents of consciousness that identifies them as a memory may be frequently affected by marijuana intoxication, it is seldom that this is affected strongly enough for the user to actually mistake a fantasy for a memory, i.e., he may frequently experience things *seeming* like memories but he does not necessarily believe it.



Memory for Periods of Intoxication

If memory functions during the intoxicated state seem to alter, what happens to the memories of the intoxicated state?

"My memory of what went on while I was stoned is good afterwards, better than if I had been straight all the time" is a common effect (19% 25%, 31%, 14%, 9%), which begins to occur at the Moderate and Strong levels (13%, 24%, 25%, 13%, 1%). It is reported as occurring more frequently by females ($p < .05$), and by the College-educated ($p < .05$). The Daily and Weekly users have this improved memory more frequently than the Occasional users ($p < .01$, overall).

The converse, "My memory of what went on while I was stoned is poor afterwards compared to what I would have remembered had I been straight" is also a common effect (18%, 24%, 24%, 16%, 17%), which begins to occur at Strong levels (7%, 14%, 28%, 15%, 13%). It occurs as frequently as improved memory, but at higher levels of intoxication ($p < .0005$), as shown in Figure 14-4.

Comments from informants make it clear that a good deal of the poor memory for periods of intoxication is not ordinary forgetting but what has been termed "state-specific memory." The events of the intoxicated state are stored in memory, but they cannot be retrieved in an ordinary state of consciousness. The next time the user becomes intoxicated, however, he can remember many of the things from previous periods of intoxication that he could not remember in his ordinary state.

Thus the forgetting of periods of intoxication are a combination, in unknown degree, of genuine forgetting (no initial storage and/or no possible way of retrieval) and state-specific storage of memories.

A specific aspect of memory for periods of intoxication relates to the results of reading during such periods.

"If I read while stoned, I remember less of what I've read hours later than if I had been straight" is a common effect (15%, 11%, 19%, 14%, 29%), which may begin at Moderate levels of intoxication (13%, 29%, 23%, 5%, 1%). It is experienced less frequently by Meditators and the Therapy and Growth group ($p < .05$, overall) and more frequently by the younger users ($p < .01$).

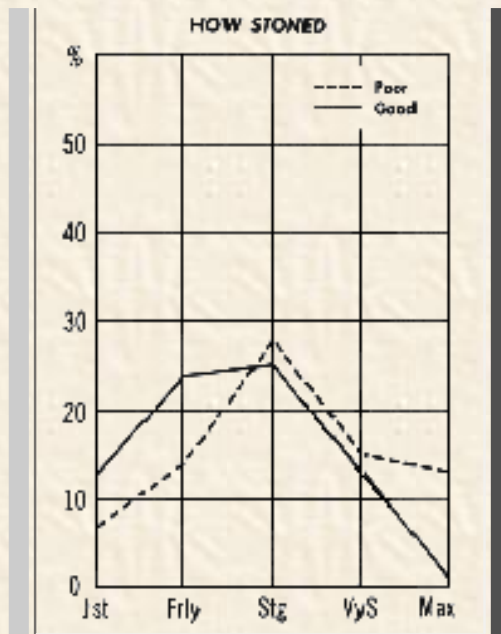


Figure 14-4.
MEMORY FOR PERIODS OF INTOXICATION
 Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

The converse effect, "If I read while stoned, I remember more of what I've read hours later than if I had been straight" is infrequent (41%, 25%, 16%, 6%, 3%) and, when it occurs, begins at the Low and Moderate levels (15%, 18%, 10%, 3%, 1%). It occurs less frequently among the Light Total users ($p < .001$), the Occasional users ($p < .05$), and the Non-users of Psychedelics ($p < .05$). The Therapy and Growth group experience increased memory for read material more often ($p < .05$, overall).

Figure 14-5 shows that decreased memory occurs much more frequently than increased memory ($p < .0005$). The levels of intoxication do not differ significantly.

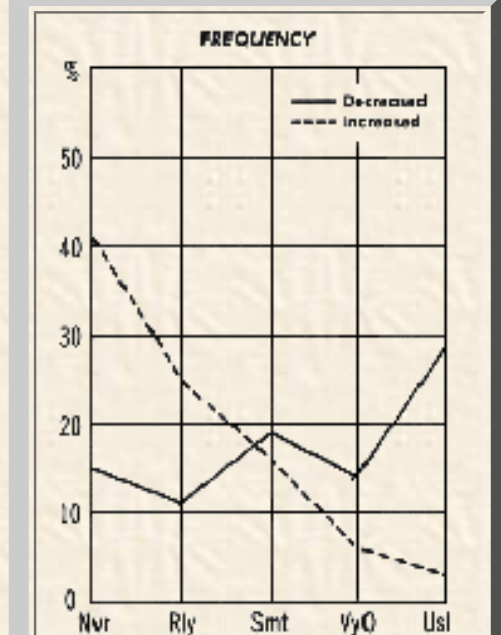


Figure 14-5.
MEMORY OF READ MATERIAL

ADDITIONAL EFFECTS

"I remember the most obvious things and laugh to think I could have forgotten them" (Rarely, Strongly).

"Relive childhood experiences" (Usually, Fairly).

LEVELS OF INTOXICATION FOR MEMORY PHENOMENA

MODULATING FACTORS

The effects of relatively linear background factors are summarized in Table 14-1.

Users with more drug experience seem less prone to tricks of memory, experiencing several of them less frequently and at higher levels of intoxication. The older users show a similar trend.

Several effects of background factors were not linear. The younger users were more variable on level of intoxication for worsened long-term memory. The Weekly users can be more intoxicated and still converse intelligently despite memory problems than can the Occasional or Daily users, as well as needing to be more intoxicated to think they've said something when they've only thought about it.

TABLE 14-1
EFFECTS OF BACKGROUND FACTORS ON MEMORY PHENOMENA

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	<p>More frequent: Recall more of material read Good memory for periods of intoxication Easily sidetracked</p> <p>More intoxicated for: Forget start of conversation Think said something when haven't</p>	<p>Less frequent: Thoughts slip away Think said something when haven't</p> <p>Less intoxicated for: Mistake fantasy for memory</p>
Older		<p>Less frequent: Easily sidetracked Spontaneously remember long-past events Recall less of material read</p>
More Educated		<p>Less frequent: Easily sidetracked Worse long-term memory Good memory for periods of intoxication</p> <p>Less intoxicated for: Easily sidetracked Converse intelligently despite forgetting</p>

Males	More intoxicated for: Forget start of sentence	Less frequent: Good memory for periods of intoxication
Meditation		Less frequent: Recall less of material read
Therapy & Growth	More frequent: Recall more of material read	Less frequent: Recall less of material read

Summary

While very low levels of intoxication may not affect or even may slightly potentiate memory, in the Moderate and higher levels of intoxication there are strong alterations of memory functioning. There is an increasing shortening of memory span, up to the point where a user may forget the start of a sentence he is speaking. Users are generally aware of this span shortening and try to compensate for it in various ways—apparently successfully, as it is a common experience for users to feel they can converse intelligently in spite of this shortening of memory span. State-specific memory is also experienced, i.e., happenings of one intoxication period, which were unrecalable in the subsequent ordinary state of consciousness, are recalable the next time the user again becomes intoxicated.

Footnotes

1. The terms long-, intermediate-, and short-term memory are not used in an exact technical sense in this chapter, but more generally to indicate memory span over years or days, minutes, and seconds. ([back](#))

2. My informants indicate that this is an objective effect, for many of them have had the experience of talking to a straight person while they were intoxicated, forgetting the start of many of their sentences, but having no indication from the straight person that their speech was noticeably impaired. Whether this says something about the intoxicated state or the intelligence required to carry on normal conversation is an interesting question. ([back](#))

3. Being able to converse intelligently even though the beginnings of one's sentence may be forgotten, should, strictly speaking, occur at the same levels of intoxication as forgetting the start of one's sentence. This was not exactly so in the last difference mentioned above, probably because the slight ambiguity in the wording of the first question allowed it to include somewhat less drastic shortenings of memory span. ([back](#))

4. The rounding-off process lets the figures in Never and Rarely add up to only 74 percent here, but the originals round off to 75 percent, thus the "rare" classification. ([back](#))

Chapter 15

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 15. Cognitive Processes: Thought

THE ABSORBINGNESS, intensity, and peculiarities of thought are highly valued by users of marijuana as a better or more efficient way of thinking; thus the common use of the phrase "being high" for describing marijuana (or other psychedelic drug) intoxication implies that the thoughts and experiences are more profound, more insightful. In this chapter we shall consider the absorbingness of intoxicated thinking, its orientation, the change in the quality of thought, and its experienced consequences.

MAJOR EFFECTS

Absorption in Thought

A common experience is *"I can get so wound up in thoughts or fantasies that I won't notice what's going on around me or won't hear someone talking to me unless they attract my attention forcibly"* (9%, 21%, 40%, 23%, 6%). This is experienced more frequently by the younger users ($p < .05$) and by the College-educated ($p < .01$) and less frequently by Users of Psychedelics ($p < .05$). It generally occurs at the Strong and Very Strong levels of intoxication (3%, 9%, 33%, 32%, 12%), with Light and Moderate Total users experiencing it at lower levels than the Heavy Total users ($p < .05$, overall).

This kind of extreme absorption can apparently occur without some physical actions being stopped: *"I can get so wound up in thoughts or fantasies while doing some physical task or job that I lose awareness of doing it, yet suddenly find that I have finished the physical task even though I lost track of it mentally."* This is also a common experience (17%, 16%, 42%, 21%, 4%), more so among the College-educated than among the

Professionals ($p < .05$). When experienced, it begins most frequently at the Strong and Very Strong levels (3%, 11%, 38%, 25%, 5%). Moderate Total users may experience this absorption at somewhat lower levels of intoxication ($p < .05$, overall).

An essentially similar common effect, getting so lost in fantasy that it takes a while to reorient, has already been mentioned in Chapter 9.

Although these three ways of being lost in thought occur with about equal frequency, they do form a continuum of absorption with respect to level of intoxication. Finishing a physical task without awareness of what one is doing occurs at lower levels than being so absorbed that others must attract one's attention by rather forcible means, albeit not significantly so; while having been so absorbed that reorientation is needed afterwards occurs at higher levels than finishing a task nonconsciously ($p < .0005$) or than needing to have one's attention gotten forcibly ($p < .01$). These differences are shown in Figure 15-1.

Blank Periods

In spite of the absorbingness of thought, and the changes in its nature discussed below, it also seems possible for thought to cease for periods: "I suddenly realize that nothing has been happening for a long time; my mind has been blank and nothing has been going on." This is an infrequent effect (31%, 33%, 27%, 5%, 0%), especially among Users of Psychedelics ($p < .05$), which occurs at very high levels (2%, 4% 18%, 27%, 11%).

Occurring significantly less frequently ($p < .0005$) is the rare effect of prolonged blank periods: "My mind goes completely blank for long periods (15 minutes or more); even though I'm not asleep, I have no thoughts or images or anything going on in my mind" (56%, 27%, 13%, 2%, 0%), also a phenomenon of the very high levels of intoxication for those who could rate it (1%, 2%, 8%, 16%, 13%). Females experience prolonged blank periods more frequently than males ($p < .05$). The young and the College-educated need to be more intoxicated to experience prolonged blanks than the older users ($p < .01$) or the Professionals ($p < .05$).

As discussed in Chapter 20, it is possible that these prolonged blank periods are actually periods of sleep with sudden onsets and terminations, even though the users do not label them as such.

Insights

The content of thought when intoxicated is commonly felt to be insightful into one's own psychological processes and those of others. "Spontaneously, insights about myself my personality, the games I play come to mind when stoned and seem very meaningful" is a characteristic effect (3%, 9%, 31%, 40%, 15%), which begins to occur at Moderate to Strong levels of intoxication (7%, 28%, 37%, 17%, 4%). It is reported as occurring at lower levels of intoxication by Users of Psychedelics ($p < .01$). One would assume that, if insights characteristically come spontaneously while intoxicated, adding conscious effort to the process would help it. "If I deliberately work on it, I can have important insights about myself my personality, the games I play,"

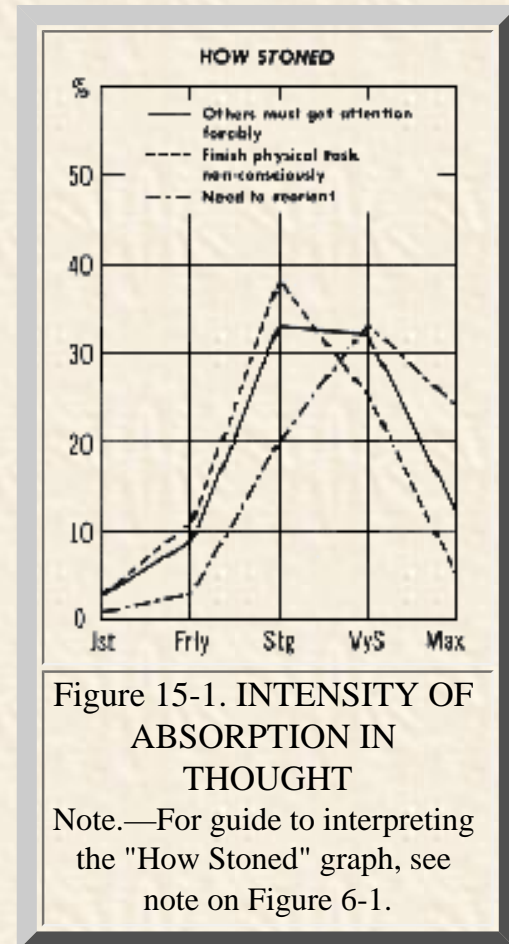


Figure 15-1. INTENSITY OF ABSORPTION IN THOUGHT

Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

while a common effect (6%, 17%, 31%, 23%, 19%), occurs less frequently than spontaneous insights ($p < .05$), as shown in Figure 15-2. Whether this means that the users do not deliberately try to have insights very often or whether they try but it does not work as well as letting insights occur spontaneously is unknown, although my informants' comments incline me to the former hypothesis. Deliberate insights also begin to occur at the Moderate to Strong levels of intoxication (12%, 26%, 34%, 9%, 5%).

Insights into others, mentioned briefly in Chapter 12, are indicated by "*I learn a great deal about psychological processes, what makes people tick, i. e., general knowledge about how the mind works (as opposed to specific insights about yourself).*" This is also a common effect (11%, 16%, 35%, 24%, 12%), which occurs at Moderate to Strong levels (7%, 21%, 39%, 11%, 2%). Heavy Total users experience it at lower levels of intoxication ($p < .05$, overall). As shown in Figure 15-2, it occurs less frequently than spontaneous insights about oneself ($p < .01$), but with the same frequency as deliberate insights into oneself. Levels of intoxication do not differ for these three phenomena.

Orientation of Thought

Let us now consider more specific ways in which cognitive processes alter.

"*I give little or no thought to the future; I'm completely in the here-and-now*" is a characteristic effect (3%, 10%, 34%, 32%, 21%), reported more frequently by Light Total users than by Moderate or Heavy Total users ($p < .01$). It begins to occur at Moderate to Strong levels (11% 21%, 39%, 17%, 5%), at lower levels for Meditators ($p < .05$, overall). What may be a consequence of this increased here-and-now-ness is "*I do things with much less thought to possible consequences of my actions than when straight; i.e., I go ahead and do things without thinking first about 'What will people think? How will this affect me?' etc.,*" a common effect (14%, 20%, 29%, 24%, 12%). This is also less frequent among Heavy Total users ($p < .001$, overall). It may occur at Strong levels (9%, 17%, 36%, 17%, 4%), with Users of Psychedelics reporting lower minimal levels ($p < .05$).

Feeling more in the here-and-now occurs more frequently than giving less thought to consequences ($p < .0005$), but at essentially the same levels of intoxication, as shown in Figure 15-3. The shortening of intermediate- and short-term memory is also plotted in Figure 15-3, as it is of interest to see if increased here-and-now-ness results from shortening of memory span. Forgetting the start of the conversation occurs more frequently than increased here-and-now-ness ($p < .05$), and the latter more frequently than forgetting the start of one's sentence ($p < .0005$). Increased here-and-now-ness occurs

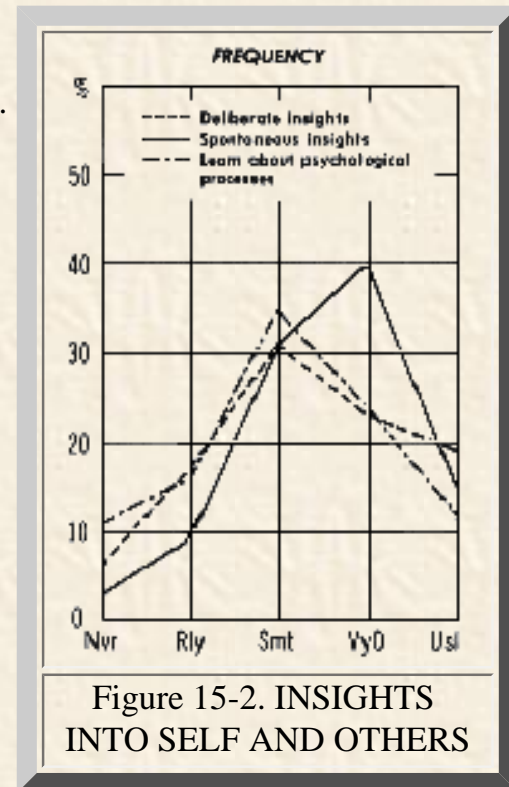


Figure 15-2. INSIGHTS INTO SELF AND OTHERS

at lower levels of intoxication than forgetting the start of the conversation ($p < .05$) or of one's sentence ($p < .0005$), so other factors, such as increased attention to intensified sensory input, are partially responsible for increased here-and-now-ness.

Thinking and Problem Solving

Some aspects of alterations in problem-solving activity concern the dropping of steps in problem solving, the switch to more intuitive modes of thought, increased tolerance of contradictions, and increased use of imagery.

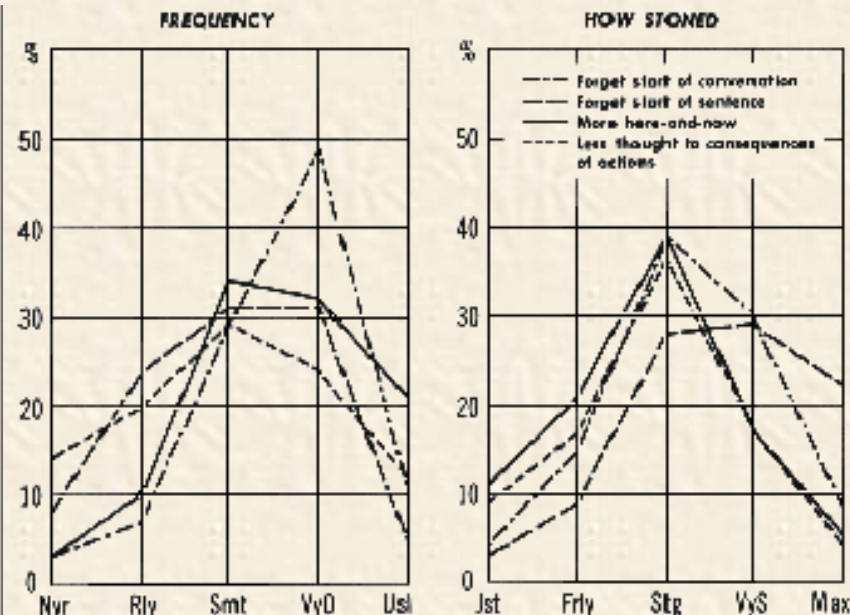


Figure 15-3.
HERE-AND-NOW-NESS VS. MEMORY SHORTENING
Note.—For guide to interpreting the "How Stoned" graph,
see note on Figure 6-1.

"I think about things in ways that seem intuitively correct, but which do not follow the rules of logic" is a very common effect (7%, 10%, 36%, 31%, 11%), which begins to occur at Moderate to Strong levels (7%, 26%, 38%, 13%, 3%). Both Meditators and the Therapy and Growth group experience this at lower levels than ordinary users ($p < .05$, overall).

Less frequent than things seeming intuitively correct ($p < .0005$), but at similar levels of intoxication, is "In thinking about a problem of the sort that normally requires a series of steps to solve, I can get the answer without going through some of the usual intermediate steps; i.e., I can start to think about the problem and then just arrive at what is clearly the answer, without being aware of the steps in the thought process I would normally be aware of" This is a common effect (26%, 18%, 39%, 13%, 1%), more so with females ($p < .05$). The modal minimal level of intoxication is Strongly (3%, 16%, 27%, 17%, 5%).

"I am more willing to accept contradictions between two ideas or two views of the situation than when straight. I don't get up tight because the two things don't make immediate sense" is a characteristic effect (11%, 8%, 24%, 33%, 17%), which begins to occur at Moderate levels of intoxication (13%, 33%, 23%, 9%, 1%). Light and Heavy Total users experience this more frequently than Moderate Total users ($p < .01$, overall).

"When thinking about things while stoned, there are visual images that just automatically go along with the thinking; i.e., I think much more in images instead of just abstract thought" is a very common effect (8%, 15%, 29%, 31%, 15%), which begins to occur at Moderate and Strong levels (7%, 27%, 35%, 15%, 3%).

Efficiency of Thought

Given then that thought commonly is less oriented to the future, is more intuitive, skips intermediate steps, and uses imagery more, is it "higher" or better? The users' feeling about the efficiency of their thought processes while intoxicated were obtained in the next two questions.

"If I try to solve a problem, it feels as if my mind is working much more efficiently than usual (regardless of

how you evaluate your solution later)" is a common effect (13%, 19%, 37%, 17%, 11%), which begins to occur at Moderate to Strong levels of intoxication (12%, 24%, 35%, 9%, 1%).

"If I try to solve a problem, it feels as if my mind is much less efficient than usual (regardless of how you evaluate the solution later)" is also a common effect (12%, 26%, 40%, 11%, 5%), which begins to occur at Strong levels (3%, 17%, 31%, 22%, 7%). It is experienced less frequently by Heavy and Moderate Total users ($p < .05$, overall), as well as less frequently by Users of Psychedelics ($p < .05$). One aspect of thinking seeming less efficient is "I can't think clearly; thoughts keep slipping away before I can quite grasp them," a common effect (11%, 18%, 50%, 19%, 2%), which begins at the Strong and Very Strong levels (3%, 13%, 24%, 31%, 14%). This inability to grasp thoughts occurs less frequently in the Weekly users than in the Daily or Occasional users ($p < .05$, overall). Users of Psychedelics report this less frequently ($p < .05$). This may be a phenomenon of memory span shortening, rather than of thought per se; i.e., a complex thought may be partially or wholly forgotten before it is completely worked out.

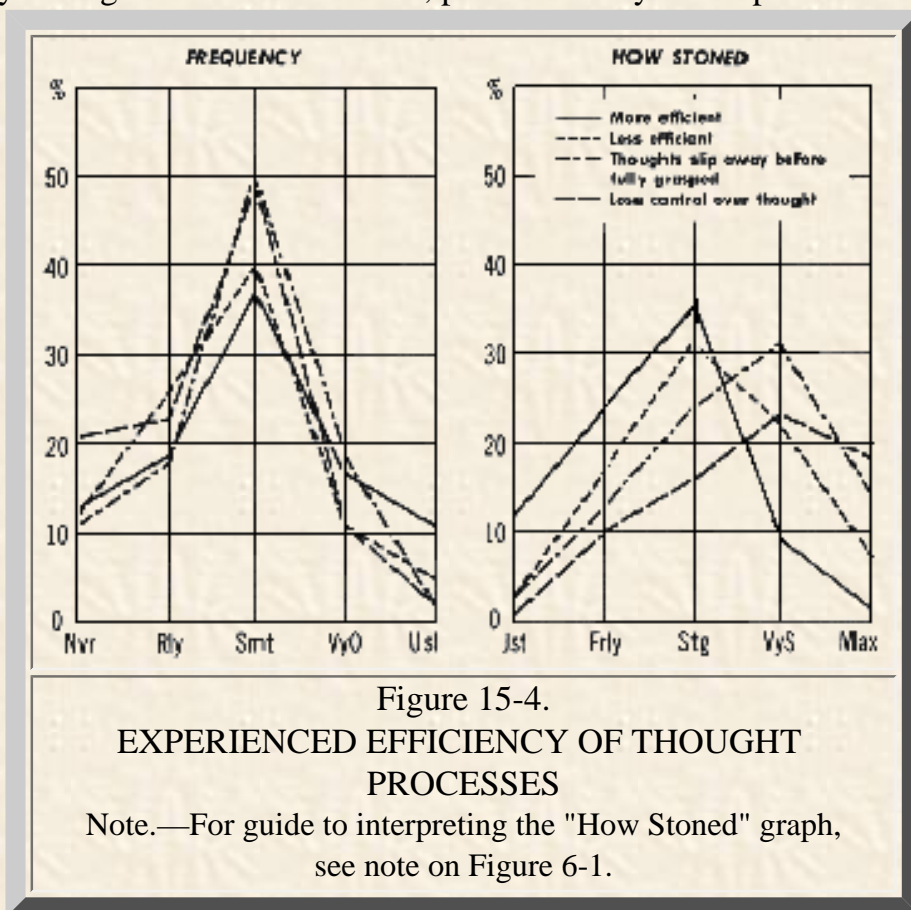
The control of thought, its directability, rather than its graspability, is dealt with in "I feel as if I lose control over my thoughts; they just go on regardless of what I want (without reference to whether you like this or not)." This is also a common phenomenon of the Very Strong levels of intoxication, presented fully in Chapter 17.

The relationships between the direction and grasping of thought and the users' feelings about its efficiency are presented in Figure 15-4. Overall differences in frequency of occurrence and level of intoxication are both significant ($p < .001$ and $p < .0005$, respectively). The feeling that thought is more efficient than usual is somewhat more frequent than the other three phenomena, and definitely occurs at lower levels of intoxication. Thoughts slipping away before grasped and losing control of thought begin to occur mainly at the Very Strong level, with thought seeming more efficient beginning at the Moderate and Strong levels.

The *feeling* that one's thoughts are more or less efficient in problem solving is, as we all know from experience, not necessarily related to actual performance. To get at this distinction, the following two questions were asked.

"If I work on a problem while stoned, I work more accurately than straight, as judged by later real-world evaluation" is a fairly frequent effect (17%, 29%, 28%, 10%, 3%), which begins to occur at Moderate to Strong levels (13%, 23%, 24%, 7%, 1%). The converse effect, "If I work on a problem while stoned, I work less accurately than straight as judged by later real-world evaluation" is a common effect (9%, 15%, 37%, 17%, 8%), which again occurs at Moderate to Strong levels of intoxication (4%, 27%, 25%, 17%, 2%).

The relationships between the mind *feeling* more or less efficient at problem solving and later *evaluations* of accuracy are shown in Figure 15-5. The feeling that the user's mind is working more efficiently occurs slightly more frequently than the feeling that it is working less efficiently but not significantly so. Later evaluation of work indicates that decreased accuracy is more frequent than increased accuracy ($p < .0005$). Too, the *feeling* of



increased efficiency occurs more often than the later evaluations of increased accuracy ($p < .01$), so a certain false confidence is sometimes produced by marijuana intoxication.

With respect to levels of intoxication, feeling that the mind is more efficient begins at lower levels ($p < .0005$). A similar trend is apparent in later evaluation, where increased accuracy is rated as beginning at lower levels of intoxication ($p < .01$). There is a suggestion in the data ($p < .10$) that decreased accuracy begins to occur at somewhat lower levels of intoxication than the feeling of decreased efficiency.

These relationships suggest that Moderate to Strong levels of intoxication may increase the efficiency of the user in problem solving activity, but higher levels decrease it, judging by both concurrent feelings and retrospective evaluation. A certain amount of false confidence also occurs. Comments by my informants on this indicate that at high levels, what seem to be brilliant chains of thought and insights frequently occur, but are often seen to be false in retrospect. Occasionally they can be very creative, as discussed elsewhere. It is difficult to concentrate and direct thought at these high levels, to keep it centered around a single problem. At low levels direction is relatively easy.

The Sense of Meaning

Although psychologists have never been able to conceptualize it well, thought has dimensions other than being logical or illogical, correct or incorrect by external standards. One of these dimensions is characterized by words such as *depth* and *subtlety*.

"I appreciate very subtle humor in what my companions say, and say quite subtly funny things myself" is a characteristic effect of marijuana intoxication (2%, 5%, 38%, 39%, 15%). Moderate Total users report it most frequently ($p < .05$, overall). It begins to occur at Moderate levels of intoxication (12%, 40%, 31%, 10%, 2%).

My informants indicate this sense of subtle humor is very pervasive; two intoxicated users can have a conversation that will be incredibly humorous in this subtle way to them, but it might not seem at all humorous to a straight observer. Or an intoxicated user will see very funny implications and connotations in what a straight person is saying, without the latter being aware of them. This general feeling of being able to "tune in" to deeper levels of understanding and meaning is exemplified by the very common phenomenon, "Commonplace sayings or conversations seem to have new meanings, more significance" (4%, 9%, 42%, 35%, 11%), which begins to occur at Strong levels of intoxication (9%, 25%, 43%, 14%, 3%). This is one of the bases of the ability to get involved in very elaborate and subtle social games discussed in Chapter 12.

Another very common effect of marijuana intoxication is "The ideas that come to my mind when stoned are much more original than usual" (5%, 7%, 42%, 33%, 8%). This begins to occur at Moderate to Strong levels

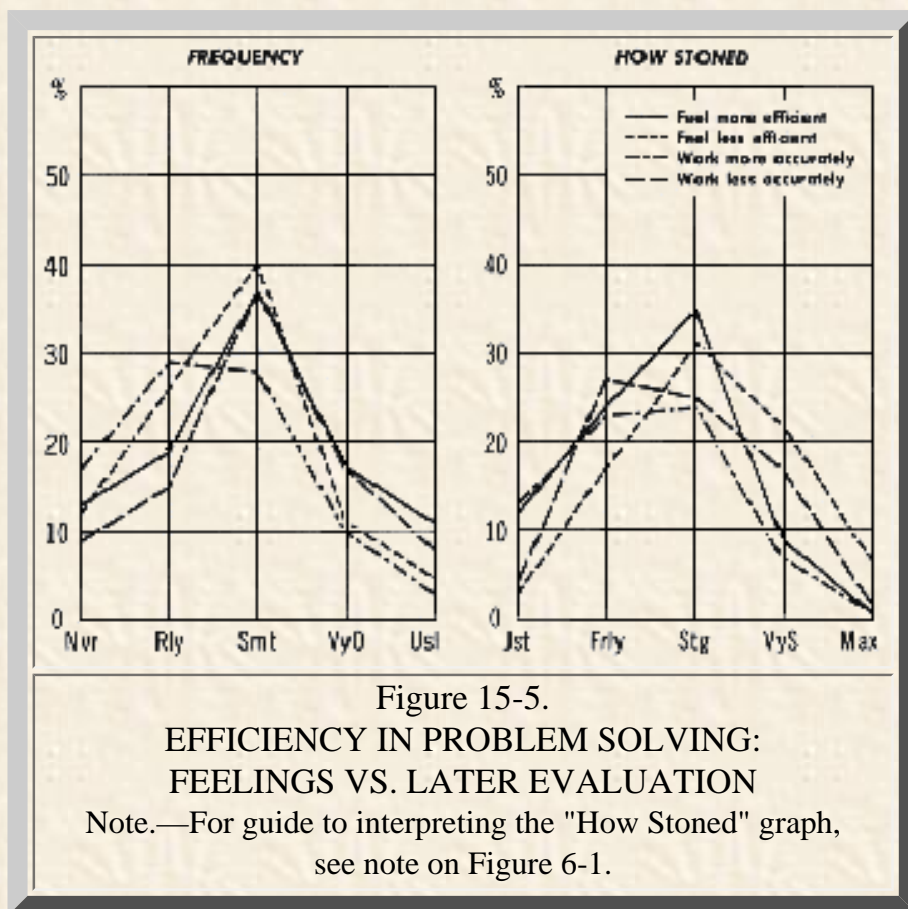


Figure 15-5.

EFFICIENCY IN PROBLEM SOLVING: FEELINGS VS. LATER EVALUATION

Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

(6%, 32%, 41%, 7%, 3%).

A striking example of the apparent facilitation of creative processes in conjunction with marijuana intoxication was offered by one user, a 40-year-old physicist:

I smoke marijuana once or twice a week for recreation, but a couple of times I've started thinking about my work when stoned and had real breakthroughs as a result. Once, when I had been in the process of setting up a new laboratory for several months, I got stoned one evening and started thinking about things at the lab and suddenly had all these ideas popping into my mind of little things I had to do if the laboratory was to function on schedule, little details about equipment that were unspectacular but essential. I listed about twenty ideas in an hour, and every one of them checked out the next day. They were all sorts of things that had been pushed to the back of my mind by more obvious problems in setting up the laboratory. Another time I got thinking about a problem area in my work, and all sorts of theoretical ideas came popping into my head. They fit together into a coherent theory which looked damned good the next morning—I have since published the theory and organized a lot of research around it, to my great advantage.

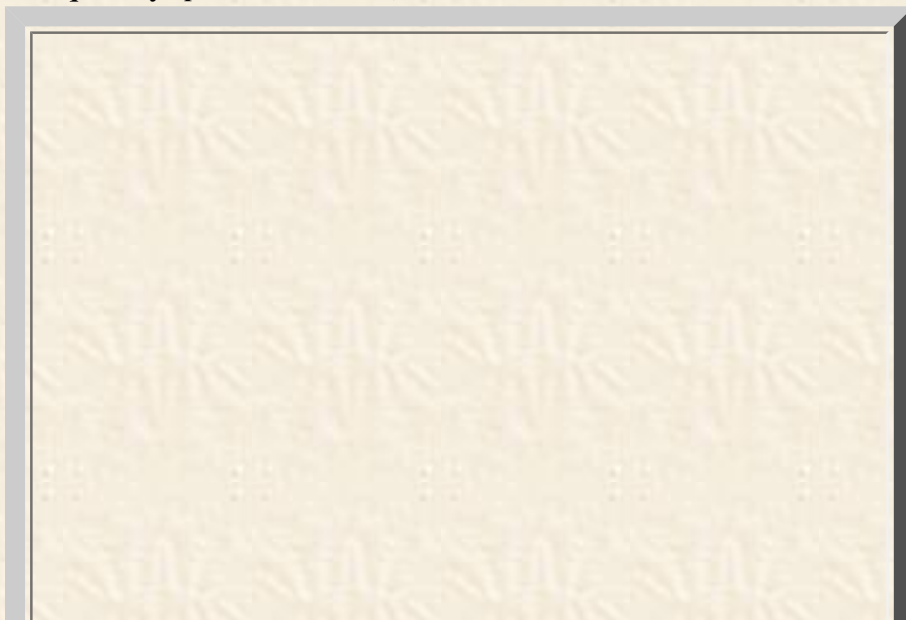
Thus users find that marijuana intoxication allows a new depth of thought to be experienced, adding meaning, humor, subtlety, and originality to their thought processes on occasion.^[1]

Reading

Reading is a type of thought process that is fundamental to modern technological civilization. A very characteristic effect is "*I find it difficult to read while stoned*" (9%, 6%, 23%, 24%, 33%). This occurs less frequently among Heavy Total users and the Therapy and Growth group ($p < .01$ and $p < .05$, overall, respectively). It begins to occur at Moderate and Strong levels of intoxication (11%, 29%, 27%, 13%, 5%). The converse phenomenon, "*It is easier to read than usual while stoned*" is infrequent (43%, 26%, 20%, 1%, 2%) and occurs at Low and Moderate levels (18%, 20%, 7%, 2%, 1%) among those who could rate it. Moderate and Heavy Total users experience reading ease more frequently ($p < .05$, overall).

The relationships between ease and difficulty of reading are shown in Figure 15-6. Finding reading difficult occurs much more frequently ($p < < .0005$). Reading ease is a phenomenon that occurs primarily at the lowest levels of intoxication and is then replaced by reading difficulty ($p < .0005$).

As discussed in Chapter 14, recall of what has been read while intoxicated is generally poorer after the period of intoxication is over, although it may be somewhat better at very low levels of intoxication. Note also the common effect of visual imagery



automatically accompanying reading (Chapter 6).

Thought and Memory

The process of thinking and problem solving involves continual use of memory functions. Sensory input data must be compared with information in memory for recognition and classification, and compared with stored data (values, desires) to see if the input is congruent with the goals of the person. If not, the person must think about what to do, a process involving comparison of the current situation with memories of past situations and the outcomes of various courses of action in those past situations. Memories must be sorted as to degrees of relevance.

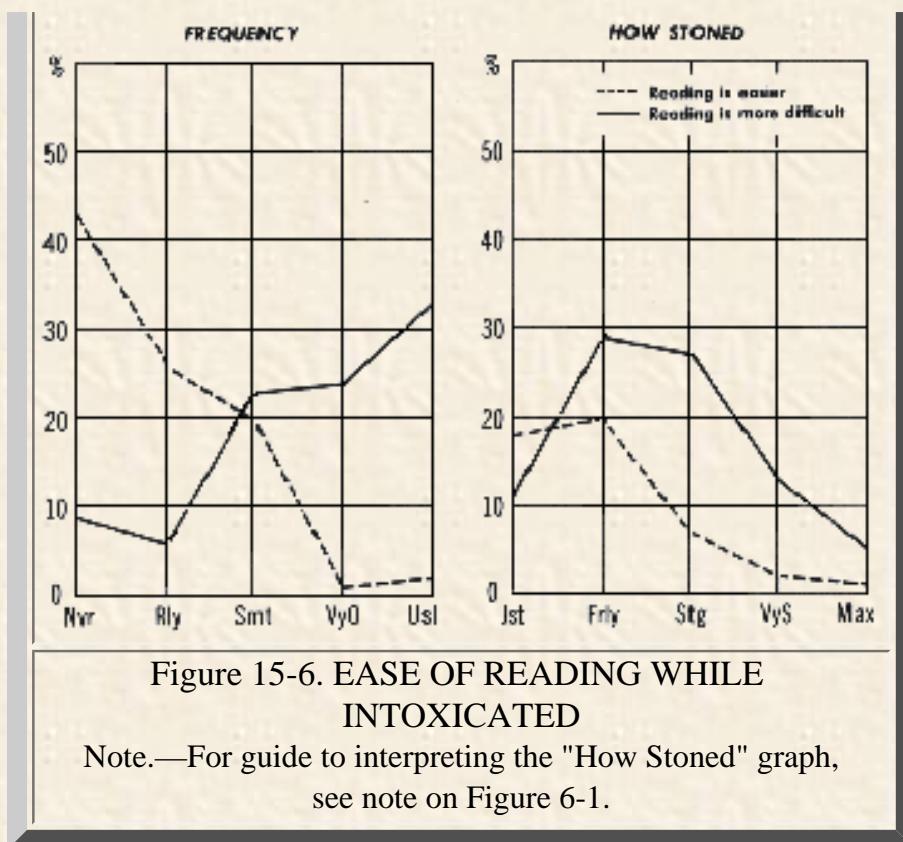
The shortening of memory span noted in Chapter 14 clearly affects the thought processes, even though some or much of the shortening may sometimes be overcome with special effort on the user's part. Long-term memories may not be as readily available for comparison with the present situation, or the "wrong" old memory may be retrieved.^[2] With shortening of intermediate- and short-term memory, the nature of the current situation may not be grasped clearly throughout problem-solving activity, so the thought processes are no longer guided by the goal of being relevant to the situation. Thus decreased efficiency of thought may be a common effect of marijuana intoxication.

This is very much a matter of level, however. At low levels there is little effect on memory, and users often feel their thought processes are more efficient.

When it comes to a consideration of creativity, the shortening of memory span may be a distinct advantage. To the extent that creativity is defined as unlikely chains of associations, a common pragmatic definition in much research on the subject, the shortening of memory span and the erraticness of retrieval will produce unlikely associations and facilitate the creative process. Whether this will appear "genuinely" creative after the intoxication has ended is another question; we usually require a certain coherence and "fit" with other conceptual systems or reality before we consider something creative. The users generally recognize this, enjoying the feeling of creativity that occurs at high levels of intoxication without taking it too seriously until checked out later.

This view of the effects of marijuana on creativity has been expounded in detail elsewhere (Anonymous, 1969).

An intriguing research question then centers around the effects, particularly creative effects, of marijuana intoxication on users who were especially disciplined or had trained themselves to be able to concentrate much more than the normal person. The only account of this sort of thing I know of is by Crowley (in Regardie, 1968), although Krippner's studies of artists influenced by psychedelic drugs is also relevant (Krippner, 1969a, 1969b). Both suggest that a highly disciplined and goal-directed individual can guide a drug experience as he wishes, even at very high levels of intoxication.



ADDITIONAL EFFECTS

Many specific effects of marijuana intoxication on thought processes were offered:

"I am aware of multi-leveled thought processes, often not related" (Very Often, Strongly).

"My concentration is longer and stronger" (Usually, Fairly).

"I notice and become engrossed in details" (Usually, Just).

"The ability to see things (society, the world, interpersonal relationships) from a different perspective, unclouded by the fog of our sociological upbringing and the usual ego-trip" (Very Often, Strongly).

"People and irrelevant events seem synchronized" (Very Often, Strongly).

"Considering in ultimate detail every aspect of my own personal involvements" (Usually, Fairly).

"I become very philosophical..." (Usually, Strongly).

"I find myself trying to do something ordinary and pay too little attention so that I do it wrong (e.g., dial the wrong phone number for my home telephone)" (Sometimes, Very Strongly).

"Helpful in putting writings or ideas in perspective" (Sometimes, Fairly).

"I can foresee the future possibilities of my life and its patterns" (Usually, Maximum).

"Discover dramatic new ways of looking at problems when stoned" (Very Often, Strongly).

"See subtle harmony and interplay between diverse subjects, e.g., math and music" (Usually, Strongly).

"Able to comprehend the most abstract concepts" (Very Often, Strongly).

"Thought process is very fast, yet you see things as happening slower than they actually are (at least you think you do)" (Rarely, Very Strongly).

"Very complex connections are made between two or more unrelated events or comments or scenes" (Usually, Fairly).

"Everything (sounds, objects, people, total environment) seems to be *just exactly right!* All related and perfectly in place" (Usually, Fairly).

"I have a feeling, during and after, of an integration of thoughts and emotions" (Sometimes, Strongly).

"Grasp of total situation widened and strengthened (seeing things whole)" (Sometimes, Very Strongly).

"I am able to sit still and attend to things carefully if I want to" (Very Often, Fairly).

LEVELS OF INTOXICATION FOR THOUGHT PHENOMENA

The various alterations of thought processes and some of the relevant memory process are arranged by level in Figure 15-7. The overall grouping is highly significant ($p \lll .0005$).

FIGURE 15-7.
INTOXICATION LEVELS, THOUGHT PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
-------------	---------------	-----------------	--------------------------	----------------

Prolonged blank periods

Type size code:

CHARACTERISTIC

COMMON

INFREQUENT

Rare

SO ABSORBED IN THOUGHT OR FANTASY
THAT NEED TO REORIENT AFTERWARDS
LOSE CONTROL OF THOUGHT
BLANK PERIODS

FORGET START OF SENTENCE

ABSORBED, ATTENTION MUST BE FORCIBLY GOTTEN

THOUGHTS SLIP AWAY BEFORE GRASPED

FORGET START OF CONVERSATION

FINISH TASK EVEN THOUGH MENTALLY LOST TRACK OF

MIND FEELS LESS EFFICIENT

SKIP INTERMEIATE STEPS IN PROBLEM SOLVING

LESS THOUGHT ABOUT CONSEQUENCES OF ACTIONS

MORE HERE-AND-NOW

INSIGHTS INTO OTHERS

NEW SIGNIFICANCE TO COMMONPLACE CONVERSATIONS

SPONTANEOUS INSIGHTS INTO SELF

WORK *LESS* ACCURATELY

THOUGHT ACCOMPANIED BY VISUAL IMAGES

THOUGHT MORE INTUITIVE

HARDER TO READ

IDEAS MORE ORIGINAL

DELIBERATE INSIGHTS INTO SELF

MIND FEELS *MORE* EFFICIENT

APPRECIATE MORE SUBTLE HUMOR

PLAY ELABORATE GAMES

WORK MORE ACCURATELY

MORE VISUAL IMAGERY WHEN READING

ACCEPT CONTRADICTIONS MORE READILY

EASIER TO READ?*

Just

Fairly

Strongly

**Very
Strongly**

Maximum

*There is some question whether this effect is available at all levels above the minimal one.

Beginning at the lowest levels of intoxication, we have a "relaxation" of thought such that contradictions are tolerated and feelings of increased subtlety and efficiency are noticed. Moving toward the Strong level of intoxication, reading becomes difficult and the direction of thought becomes less controllable, but the richness of thought continues to increase; it may seem more intuitive, original, and significant, and is commonly

accompanied by more visual imagery than usual. The user begins to feel he is less efficient at problem-solving thought and is more oriented to the here-and-now.

Above the Strong level, shortening of memory span begins to affect thinking, so the user may become completely absorbed in the experience of long chains of what seem brilliant thoughts, but not recall where he started from. The intense pull of enhanced sensations and intensified feelings and fantasies at these high levels makes direction of thought difficult. Rarely, blank periods may occur at the very high levels.

MODULATING FACTORS

The effects of relatively linear background variables are summarized in Table 15-1.

TABLE 15-1
EFFECTS OF BACKGROUND FACTORS ON THOUGHT

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	<p>More frequent: More subtle humor Easier to read Recall more of material read</p> <p>More intoxicated for: Absorbed, attention must be gotten forcibly Forget start of conversation</p>	<p>Less frequent: Mind goes blank So absorbed need to reorient afterwards More here-and-now Less thought to consequences of actions Mind feels less efficient Thoughts slip away before grasped Harder to read</p> <p>Less intoxicated for: Spontaneous insights Insights into others Less thought to consequences of actions</p>
Older		<p>Less frequent: Absorbed, attention must be gotten forcibly Recall less of material read</p> <p>Less intoxicated for: Prolonged blank periods</p>

More Educated		Less frequent: Absorbed, attention must be gotten forcibly Lose track of task, but finish it anyway Less intoxicated for: Prolonged blank periods
Males	More intoxicated for: Forget start of sentence	Less frequent: Prolonged blank periods Skip intermediate steps in problem solving
Meditation		Less frequent: Recall less of material read Less intoxicated for: More here-and-now Think intuitively
Therapy & Growth	More frequent: Recall more of material read	Less frequent: Harder to read Recall less of material read

Several background variables had non-linear effects. Moderate Total users were less intoxicated for the experience of finishing some physical task without realizing it, and they accepted contradictions between ideas less frequently than the Heavy or Light Total users. The Weekly users experienced thoughts slipping away before they could grasp them less frequently than the Occasional or Daily users.

The effects of greater drug experience form a pattern that suggests that more experienced drug users: (1) get into psychological, insightful material at lower levels; (2) have given up the here-and-now-ness orientation to some extent; and (3) have altered a number of effects that might be detrimental to long-term adaptation to the world. With respect to the latter point, the experienced users more frequently find it easier to read and retain what they read, and less frequently experience blank periods, thoughts slipping away, decreased planning (less thought to consequences of actions), and disorientation from hyper-absorption in thoughts and fantasies; also high absorption and memory span shortening shift to higher levels of intoxication.

SUMMARY

Marijuana intoxication can produce intensified awareness of thought processes such that the user can get very absorbed in his thinking, have insights into himself and others, appreciate very subtle humor, and feel his thoughts are more original, intuitive, and profound. At low levels of intoxication, the user may feel his thought

processes are more efficient and accurate; but as he becomes more intoxicated, this may be replaced by a feeling of inability to properly direct his thought processes so that he becomes less efficient at problem-solving activities, although creative thought may continue to be enhanced. Shortening of memory span at high levels of intoxication also makes the direction of thought difficult. Users do not feel that this shortening of memory span or difficulty in consciously directing thought is necessarily a hindrance in coping with the world, however, and may consider the more intuitive approach to thought while "high" superior in many situations. More experienced users are less affected by some of the apparently debilitating changes in thought patterns.

Footnotes

1. One of the most intriguing and practically exciting studies of creativity ever carried out ([Harman, McKim, Mogar, Fadiman & Stolaroff, 1966](#)) found a substantial enhancement of creativity, both in terms of psychological tests and actual job performance, when carefully prepared subjects (professionals whose work involved creativity, such as designers and physicists) were given moderate doses of LSD in the proper setting. I strongly suspect marijuana could have the same effect under proper conditions and consider this a high research priority. ([back](#))

2. "Wrong" is highly situation-specific; retrieving a memory other than the one desired may be seen as non-adaptive, entertaining, or creative, depending on the situation. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 16. Emotions

MAJOR EFFECTS

Emotional Tone of Intoxication

As might be expected in a group of *experienced* users, i.e., users who repeat the marijuana intoxication experience over and over, it is a very characteristic effect that *"I almost invariably feel good when I turn on, regardless of whether I felt bad before turning on"* (5%, 11%, 19%, 31%, 30%). This effect has begun to occur in most users by Moderate levels of intoxication (21%, 33%, 25%, 7%, 1%). The converse effect, *"I almost invariably feel bad when I turn on, regardless of how I felt before I turned on"* is a rare effect (47%, 36%, 9%, 1%, 1%). In those who could rate it, it generally began at the Moderate level (8%, 15%, 9%, 5%, 7%). Heavy Total users need to be more intoxicated to feel bad ($p < .05$, overall).

Although emotional mood prior to intoxication was overcome in the previous two effects, it is a common effect that *"Whatever mood I was in before turning on becomes greatly amplified, so if I felt down I really feel bad and if I felt good I really feel very good"* (9%, 18%, 36%, 22%, 14%). This occurs more frequently with the Meditators and the Therapy and Growth groups ($p < .05$, overall). It begins to occur at Moderate to Strong levels (19%, 22%, 32%, 11%, 2%).

The relationships of these three phenomena are shown in Figure 16-1. Feeling almost invariably good occurs more frequently than pre-intoxication emotions being amplified ($p < .0005$), and amplified emotions occur more frequently than feeling bad ($p < < .0005$). Feeling almost invariably bad occurs at higher levels of intoxication than either feeling good ($p < .001$) or emotions being amplified ($p < .01$), primarily because of a few users who indicate Very Strong and Maximum for feeling bad. The difference in levels between feeling good and emotions amplified is not significant.

While the graph suggests that feeling good tends to occur at lower levels and feeling bad at very high levels, comments of pilot subjects and informants indicate that this picture is incomplete. There is a general good feeling that comes from marijuana intoxication at all levels, and this will override mild emotional states the user may have just before becoming intoxicated. If the user has a strong negative mood before becoming intoxicated (whether he is consciously completely aware of it or not), the amplification of emotions common to marijuana intoxication will amplify the negative feelings sufficiently to overcome the good feeling that accompanies intoxication, and he will feel very bad indeed. This latter effect is also modulated by a user's ability to control his intoxication effects; he may be able to suppress the effects of a negative pre-intoxication emotion up to a point, usually by concentrating his attention on pleasurable stimuli and/or not giving attention to his negative feelings. If he is so intoxicated that his control is erratic, and/or the negative pre-intoxication emotion is too strong, he will be unsuccessful and experience the negative emotion in amplified form. [1] The material in Chapter 17 on control is very relevant here.

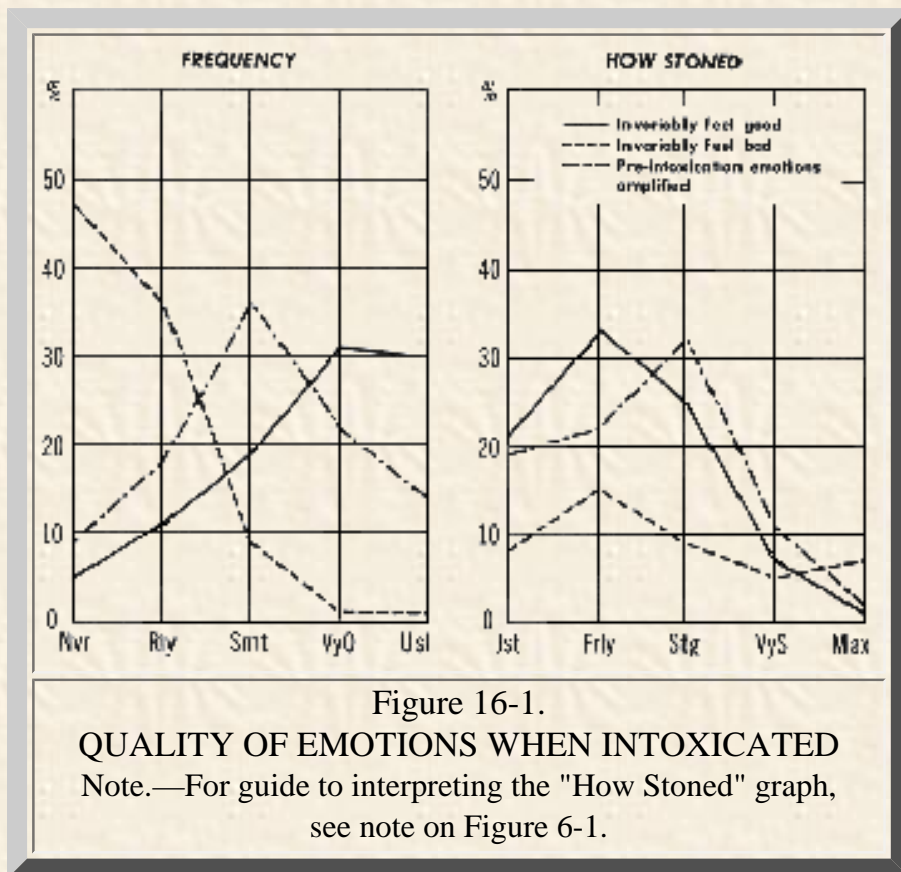


Figure 16-1.

QUALITY OF EMOTIONS WHEN INTOXICATED

Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Giggling

An aspect of the positive emotional tone characteristically associated with marijuana intoxication is *"I giggle a lot when stoned; I am silly, even though the situation is not that funny."* This is a very common effect (3%, 23%, 47%, 20%, 7%), which occurs more frequently with Females ($p < .05$). It generally begins to occur at Strong levels (11%, 25%, 36%, 18%, 5%), although Heavy Total users must be more intoxicated to experience it ($p < .05$, overall). Older users begin giggling at lower levels than younger ones ($p < .05$).

Strength of Emotions

A very common effect of marijuana intoxication is *"I feel emotions much more strongly when stoned, so they affect me more"* (6%, 13%, 37%, 27%, 17%). The younger users experience this more frequently ($p < .05$). It begins to occur at the Strong levels (14%, 21%, 39%, 13%, 4%).

The converse effect, *"I feel emotions much more weakly when stoned, so they have little effect on me"* is infrequent (35%, 29%, 21%, 7%, 4%), and occurs less frequently than emotions feeling stronger ($p < .0005$). It begins to occur at Moderate to Strong levels (7%, 20%, 21%, 6%, 3%), essentially the same levels as feeling

emotions more strongly.

Emotional Crises—"Freaking Out"

Given the effect of intoxication in amplifying emotions, combined with some loss of control at very high levels of intoxication, the possibility of the user's being temporarily overwhelmed by intense negative emotions requires investigation. Users term such an event "freaking out."

The users were asked, "*How many people have you seen freak out' on grass, i.e., have such a*

catastrophic emotional upset that they needed help of some sort? (Not counting yourself)." Table 16-1

tabulates their answers. It is important to note,

however, that these figures cannot be taken as an estimate of the actual number of emotional crises among users of marijuana but only as a *maximal* estimate; because the questionnaires were passed from acquaintance to acquaintance in the distribution process, a fair number of users had been intoxicated

together and so were probably reporting on the same cases of emotional crises and overestimating the incidence of such crises to an unknown extent. Thus most of the users have never seen an overwhelming emotional reaction in other users, and few (10 percent) have seen three or more.

If one wished to estimate an incidence ratio of emotional crises, the data in Table 16-1 are not useful as we do not know the number of observations on which they are based, i.e., how many intoxicated people the users have observed altogether. To get at this question, the users were asked as part of the above item, "*What percentage is this compared to all the times you've seen people get stoned?*" The categorized data are presented in Table 16-2.

It is again important to stress that these figures overestimate the incidence to some unknown degree. Nevertheless, the incidence of emotional crises would seem to be very low. Except for 5 percent of the users (one of them a physician), 89 percent of the users estimate the incidence of such reactions as 1 percent or less, and 73 percent as less than a tenth of 1 percent.

TABLE 16-1
NUMBER OF PEOPLE HAVING
EMOTIONAL CRISES (FREAKOUTS)
WITNESSED BY USERS

NUMBER OF PEOPLE HAVING CRISES	PERCENT OF USERS [a]
0	61%
1	17%
2	11%
3 or more	10%

Note.—These figures cannot be taken as an estimate of the actual number of emotional crises among users of marijuana but only as a maximal estimate because many of the users had been intoxicated together and were probably reporting on the same cases, thus overestimating the incidence of crises to an unknown extent.

[a] 1% of the users were lost in the rounding process here

TABLE 16-2
PERCENTAGES OF PEOPLE HAVING
EMOTIONAL CRISES
WITNESSED BY USERS

PERCENTAGE OF PEOPLE HAVING CRISES [a]	PERCENT OF USERS
0 %	61%
</=.01%	7%
</=.1%	5%
</=1%	16%
2%-4%	3%
5%-10%	2%

Nature of Emotional Crises

Although explanations of the emotional catastrophes were not asked for on the questionnaire, some users added comments. Combining this with various remarks by pilot subjects and informants, it seems that emotional crises fall mainly into two classes. The major one is that of emotionally unstable people or normal people with a major emotional problem on their mind who use marijuana and have their problems amplified. The second, less frequent category is negative emotions of fright and/or confusion, which occasionally result from initial experiences with overdoses of marijuana; i.e., the inexperienced user smokes much more than he knows how to handle and is temporarily confused, disoriented, or frightened by the effects of intoxication. Many users have this happen early in their marijuana-using career. Most apparently learn to control negative effects and/or adapt to unusual effects so as not to be concerned about them; indeed, they come to value them. A few, frightened by the experience, do not use marijuana any more.

Note.—These figures cannot be taken as an estimate of the actual number of emotional crises among users of marijuana but only as a maximal estimate because many of the users had been intoxicated together and were probably reporting on the same cases, thus overestimating the incidence of crises to an unknown extent.

[a] The remainder of the users gave verbal answers that were not classifiable. These were: "very small," "super small," "so small," "almost not worth noting," and "very small percent." Note also that 1% of the users were lost in rounding errors.

Outcome of Emotional Crises

With respect to emotional crises in others, the users were asked, "*What sort of help did they get? How effective was it?*" Of the 53 users answering this question, the majority (64 percent) indicated that friends and other users present simply talked to the disturbed person, reassured him, and calmed him down—a sufficient treatment. Touching the disturbed person was often mentioned in these accounts as particularly effective and reassuring. In 8 percent of the cases the incident simply subsided by itself. In 13 percent some sort of medical or psychological assistance was obtained, although this included such mild treatments as "sleeping it off in the student health center." Miscellaneous methods were used in the other instances.

In one of the above cases the user indicated the help was not effective for the disturbed person, but his disturbance was part of a long-term pattern of personality disorder.

Emotional Crises among the Users

The users were asked, "*Have you ever freaked out in this way? How many times? What sort of help did you get, and how effective was it?*" Because the size of the sample is known, this gives a better estimate of the incidence of this occurrence. Table 16-3 presents the data.

Of the 30 users who had had such an experience, 40 percent indicated it had subsided by itself, and 53 percent that they had been "talked down" by friends, with one user indicating that professional help was needed. One of the users indicated he had deliberately provoked a crisis just to see if he could take it!

TABLE 16-3
EMOTIONAL CRISES AMONG
THE USERS

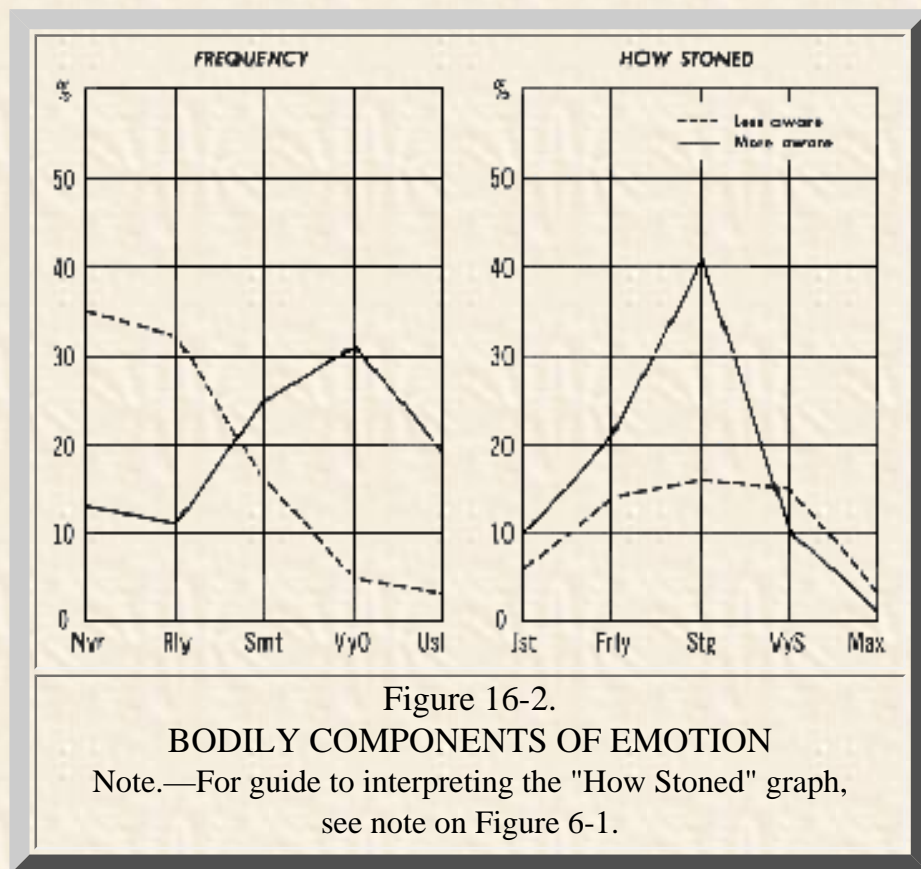
NUMBER OF CRISES	PERCENT OF USERS [a]
-------------------------	-----------------------------

Thus in the present sample 20 percent of the users reported one or more experiences of emotional crises, almost all of which subsided by themselves or through the support and reassurance of friends. Only one required professional assistance, giving a serious risk ratio of about 1 percent.^[2] The caution should be added, however, that this figure of 1 percent applies to populations similar to the present one, i.e., users who are experienced and (by implication) well adapted to handling marijuana intoxication. In an unselected population of non-users, the risk ratio for emotional crisis reactions requiring professional help would probably be somewhat higher, depending on the nature of the situations in which marijuana was used.

0	77%
1	14%
2	3%
3 or more	3%
No response	3%

Physical Components of Emotion

A common experience is "I am more aware of the body tensions and feelings that are part of emotions when stoned" (13%, 11%, 25%, 31%, 19%). This begins to occur at Strong levels of intoxication (10%, 21%, 41%, 10%, 1%). The converse effect, "I am less aware of the body tensions and feelings that are part of emotions when stoned" is an infrequent effect (35%, 32%, 16%, 5%, 3%), which is more variable with respect to levels of intoxication (6%, 14%, 16%, 15%, 3%) in those who could rate it. As shown in Figure 16-2, being more aware occurs more frequently ($p < .0005$) and at lower levels of intoxication ($p < .01$).



ADDITIONAL EFFECTS

- "Any hostile action or word is upsetting" (Usually, Fairly).
- "Relief of anxiety or restlessness" (Usually, Just).
- "Presence of anxiety attacks" (Rarely, Strongly).
- "Deep concern with injustices all over the world, regardless of my actual participation" (Very Often, Fairly).
- "A feeling of depression when coming down" (Usually).
- "Extremely sensitive to remarks or criticism" (Usually, Very Strongly).
- "My negative feelings upon being disturbed increase, like the feeling toward an alarm clock in the morning" (Usually, Fairly).
- "I cry more easily about appropriate things" (Very Often, Strongly). "Little emotional fear of pain" (Usually, Just).

"Annoyed awareness of ego posturings of other stoned people" (Very Often, Fairly).

LEVELS OF INTOXICATION FOR EMOTION

Figure 16-3 groups the various emotional phenomena by levels of intoxication. The overall grouping is highly significant ($p < .001$).

FIGURE 16-3. INTOXICATION LEVELS, EMOTIONAL PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
<div style="border: 1px solid black; padding: 5px; display: inline-block; width: 200px;"> <i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare </div>				
		LESS AWARE OF BODILY COMPONENTS OF EMOTION		
		GIGGLE A LOT		
		EMOTIONS FELT MORE STRONGLY		
		MORE AWARE OF BODILY COMPONENTS OF EMOTION		
		EMOTIONS FELT MORE WEAKLY		
		PRE-INTOXICATION EMOTIONS AMPLIFIED		
		Almost invariably feel bad when stoned		
		AMOST INVARIABLY FEEL GOOD WHEN STONED		

As the user becomes intoxicated, he characteristically feels good, a positive emotional tone that persists through all levels of intoxication unless he has strong emotions from his pre-intoxication state that are amplified in the intoxicated state. As he becomes more intoxicated, emotions are sometimes felt less strongly, but more usually emotions are felt more strongly. At Strong levels of intoxication and higher, the bodily components (muscle tensions, viscera feeling, etc.) of emotions may come into awareness, and the positive emotional tone may result in giggling. At very high levels negative emotions are more likely to overcome the positive emotional tone of intoxication if they are very strong or the user has poor control.

MODULATING FACTORS

All background variables had relatively linear effects on emotional phenomena. They are summarized in Table 16-4.

TABLE 16-4
EFFECTS OF BACKGROUND FACTORS ON EMOTIONS

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More intoxicated for: Usually feel bad Giggle a lot	
Meditation	More frequent: Pre-intoxication mood amplified	
Therapy & Growth	More frequent: Pre-intoxication mood amplified	
Males		Less frequent: Giggle a lot
Older		Less frequent: Feel emotions more strongly Less intoxicated for: Giggle a lot

SUMMARY

Marijuana intoxication characteristically produces a pleasant emotional state in the experienced users in this study. This pleasant feeling tone is sufficient to override the effects of moderate negative emotional states the user may have had just before becoming intoxicated.

The emotions, both positive and negative, noble and selfish, which the user does experience while intoxicated, are usually felt more strongly than in his ordinary state, although the personal and situational triggers for eliciting emotion may alter. At high levels of intoxication, where emotions are felt very strongly and decreased control of intoxication phenomena may sometimes occur, a user with a poor personality structure and/or one otherwise normal but involved in high temporary levels of emotional stress may "freak out," be temporarily overwhelmed by negative emotions. This has occurred to 20 percent of the users, but in only one case was it serious enough to require professional assistance; in others, the disturbance subsided by itself, or the reassurance and support of friends was sufficient to alleviate the user's distress.

Footnotes

1. Many informants mentioned that when they know they have a difficult emotional situation on their mind, which they do not feel ready or able to deal with, they will deliberately avoid using marijuana or, if they use it, stay at Low to Moderate levels of intoxication so they can stay out of the problem area. An exception to this is the use of intoxication for gaining insight into personal problems, where the user feels the risk of strong

negative emotions is worth taking. ([back](#))

2. I use the phrase "serious risk" deliberately here, as I am making a value judgment that being very upset for a few hours is not, per se, a serious risk. Life is full of things that upset us seriously for hours, days, weeks. Requiring professional help to deal with the upset, however, is more serious, and can be considered an indication of "risk." ([back](#))

Chapter 17

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 17. Control

MOST CURRENT IDEAS about the nature of marijuana intoxication seem to neglect the fact that since we exercise a fair amount of control over the contents of our minds in ordinary life, it might be expected that control would be similarly exercised by an experienced drug user. This study indicates that much control *is* exercised by experienced users, primarily by altering the direction and focus of attention. Aspects of this control will be discussed under the general headings of the particular phenomena of intoxication to be controlled and the level of intoxication.

CONTROL OF THE PHENOMENA OF INTOXICATION

Need for Control

In understanding the nature of control over the effects of marijuana intoxication, it is important to note that there is less need felt for tight control: *"I find it easy to accept whatever happens; I don't need to control it or feel in control of it."* This is a very characteristic effect (2%, 7%, 25%, 29%, 35%), generally manifested by the Moderate level of intoxication (19%, 34%, 27%, 10%, 4%).

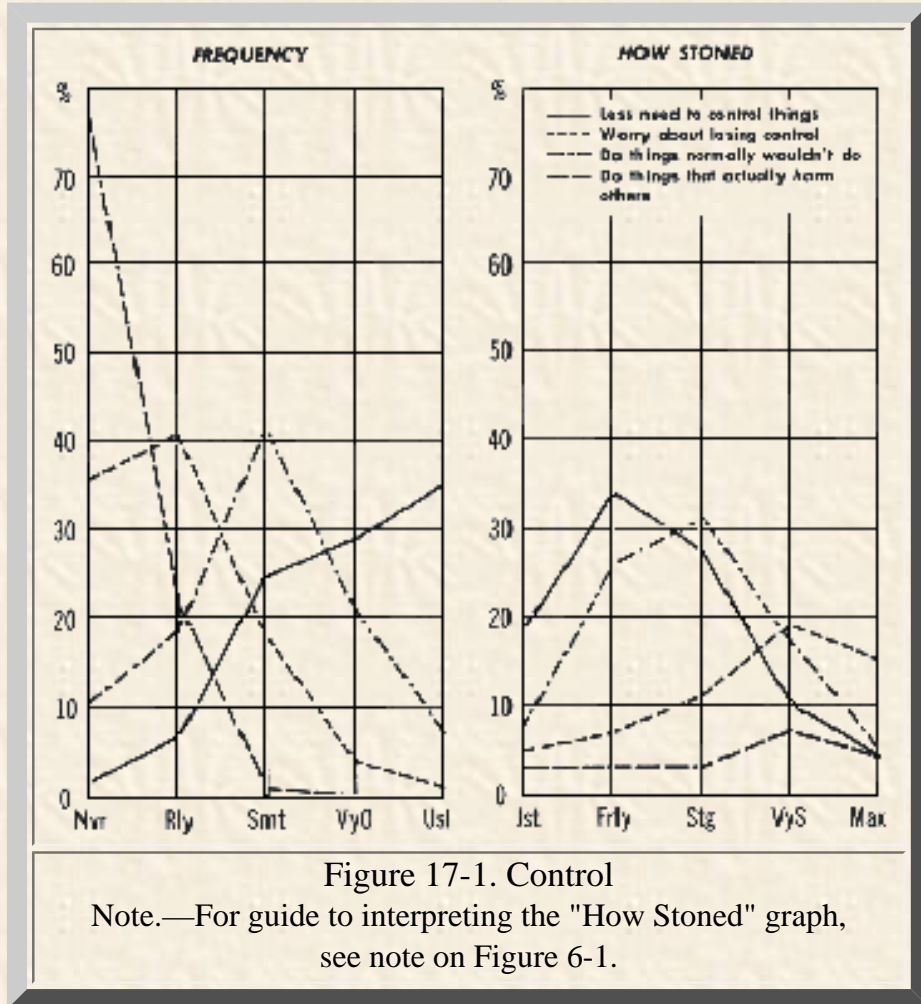
Concern about and Loss of Control

"I worry about losing control, such that I might do something I wouldn't want to do (regardless of whether you actually lose control)" is a rare phenomenon (36%, 41%, 18%, 4%, 1%), consonant with the characteristic feeling of accepting things. When it occurs, it generally begins at the Very Strong levels for those who could rate it (5%, 7%, 11%, 19%, 15%). Daily users worry about this the least, Weekly users next least, and Occasional users worry the most ($p < .05$, overall), albeit still infrequently.

Some change in behavior that reflects a lowering of normal inhibitions, a change in the criteria for what needs to be controlled, is expressed in the common phenomenon, "My inhibitions are lowered so that I do things I'm normally too inhibited to do (Note: this does not apply to antisocial acts but to acts that are generally acceptable, but that you can't normally do through shyness or the like)" (11%, 19%, 41%, 21%, 7%). This effect has been well expressed elsewhere: "The decrease of socially reinforced inhibitions also accounts for the actions of users which claim public attention: jumping over fireplugs and parking meters, uninhibited dancing (erotic and non-erotic), and playful behavior (which is subtly taboo in our society) [Anonymous, 1969, p. 348]." It generally begins to occur at Moderate to Strong levels (8%, 26%, 31%, 17%, 5%), with the younger users needing to be more intoxicated for this experience ($p < .05$).

Actual loss of control to the point of antisocial actions was the rarest effect found in the present study: "I lose control of my actions and do antisocial things (actions that harm other people) that I wouldn't normally do" (77%, 22%, 1%, 0%, 0%). For the few who could rate this, the minimal intoxication levels peaked at Very Strong (3%, 3%, 3%, 7%, 4%).

The relationships of the lessened need for control, concern over control, and losing control to various degrees are plotted in Figure 17-1, with overall differences highly significant ($p < < .0005$, for frequency, $p < < .0005$ for levels). Feeling less need to be in control of things is most frequent, inhibitions being lowered next most frequent, worrying about loss of control infrequent, and losing control to the point of actions that harm others least frequent. Worrying about losing control and actually losing it to the point of harm are very high level phenomena; inhibitions being lowered is a Moderate to Strong level phenomenon, and feeling less need to control things, a Low to Moderate level phenomenon.



Directions of Fantasies and Thoughts

Prolonged fantasies, enriched with spectacular imagery and intensely absorbing, often seeming as real as

nocturnal dreams or life itself, are a main pleasure of marijuana intoxication when the user indulges in them. What sort of control over these can the user exercise, if he is not content to let them develop spontaneously?

"I have little or no control over my fantasies; i.e., they flow along spontaneously, and even if I try, I can't change what I'm fantasizing about" is an infrequent effect (24%, 29%, 31%, 11%, 3%), albeit more frequent among the College-educated ($p < .05$) and the younger users ($p < .05$). It generally begins to occur at the Strong to Very Strong levels of intoxication (3%, 7%, 25%, 19%, 15%).

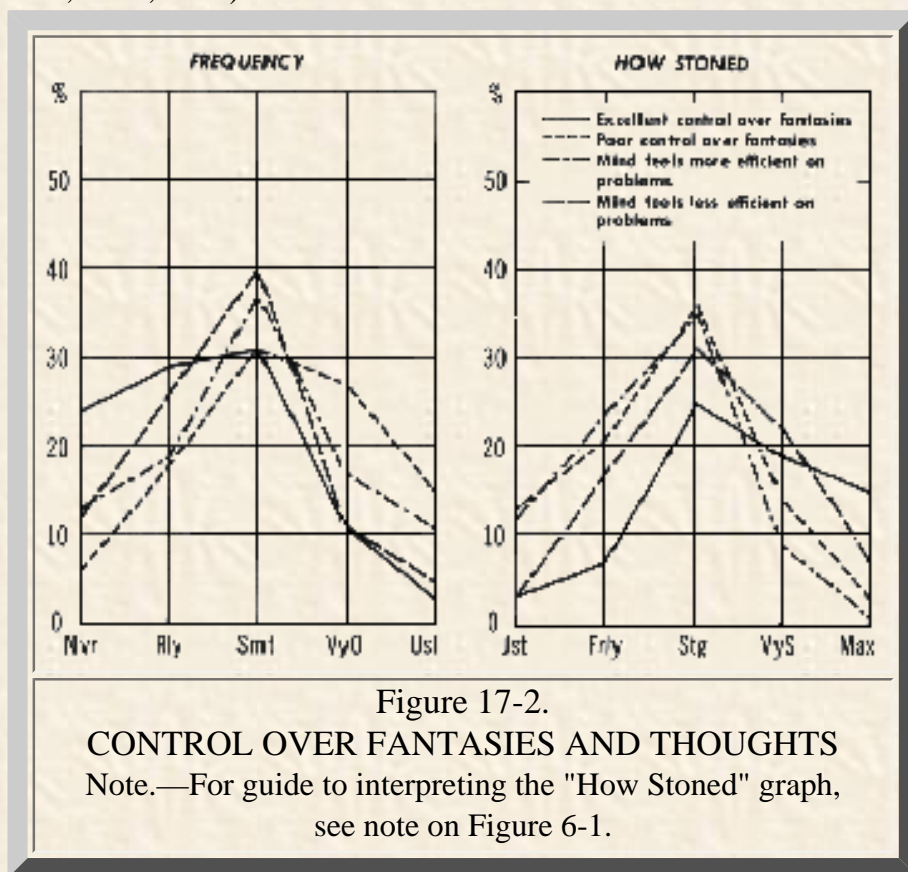
The converse effect, "I have excellent control over my fantasies: I can make them go in whatever direction I want" is a common effect (6%, 18%, 31%, 27%, 15%), also more frequent among the College-educated ($p < .01$). It generally begins to occur at Moderate to Strong levels (13%, 21%, 36%, 14%, 3%). A similar effect, "I feel as if I lose control over my thoughts; they just go on regardless of what I want (without reference to whether you like this or not)" occurs with essentially the same frequency and beginning at the same levels of intoxication as not having control over fantasy (21%, 23%, 39%, 11%, 2% for frequency and 1%, 10%, 16%, 23%, 18% for levels).^[1]

It is of interest to compare these feelings of control over fantasy with feeling of efficiency of the mind in problem solving (Chapter 15), where ability to direct thought properly is important. Figure 17-2 relates these four phenomena.

Excellent control over fantasies is reported more frequently than the mind's feeling more or less efficient in problem solving ($p < .05$ in either case) and much more frequently than poor control over fantasy ($p < .0005$). The latter three phenomena occur with about the same frequency. Both excellent control over fantasy and the mind's feeling more efficient are reported at lower levels of intoxication than poor control or inefficiency ($p < .0005$ in each case). Poor control over fantasy occurs at somewhat higher levels than the mind's feeling inefficient ($p < .05$). Thus there is a general feeling of decreasing control at higher levels.

Control of Emotional States

The general ability of users to control emotional states in order to produce a generally pleasant, even ecstatic experience, discussed in Chapter 16, should be mentioned again. As discussed above, there is generally little felt need to control emotions as they are usually pleasant. When control is necessary, it is easier at lower levels of intoxication than at the very high levels.



Control of Pain

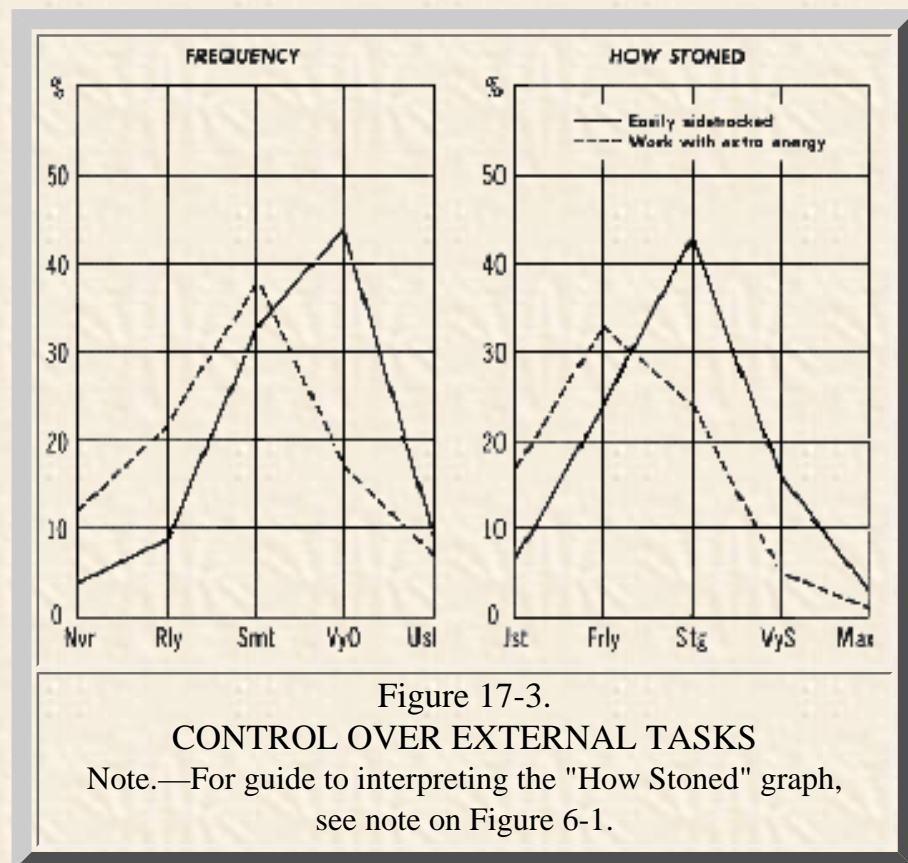
In Chapter 11 it was reported that pain was easy to tolerate if the user directs his attention elsewhere, but it was also a common effect for pain to be more intense if the user concentrated on it. This not only emphasizes the importance of directing attention in the control of intoxication effects, but the changes in criteria for what to control. Ordinarily most of us go to great lengths to avoid pain; in the intoxicated state, many users find the new experience that comes from concentrating on pain worth the discomfort, at least enough to try it once to see what it's like.

External Tasks

A characteristic effect of intoxication is *"I often forget to finish some task I've started, or get sidetracked more frequently than when straight"* (4%, 9%, 33%, 44%, 9%). This effect begins to occur at Strong levels (7%, 24%, 43%, 16%, 3%). It is experienced more frequently by the younger users ($p < .05$), the College-educated ($p < .05$), and the Users of Psychedelics ($p < .05$). It begins at higher levels for the College-educated ($p < .05$) and Users of Psychedelics ($p < .05$).

The converse effect, *"I can work at a necessary task with extra energy, absorption, and efficiency"* is a common effect (12%, 22%, 38%, 17%, 7%), which begins to occur at Moderate levels (17%, 33%, 24%, 5%, 1%). It is experienced more frequently by Users of Psychedelics ($p < .001$) and begins at higher levels for Heavy Total users ($p < .05$, overall).

Figure 17-3 shows the relationships between these two levels of control over external tasks. Getting sidetracked is more frequent ($p < .0005$), while having extra energy and being absorbed in a task occurs at lower levels of intoxication ($p < .0005$).



Possession

The experience of "possession," the temporary displacement of a person's mind by some outside "spirit" or force, is as old as mankind. Our culture generally rejects the notion of independently existing spirits able to possess someone and control his body; but, phenomenologically, possession is a real experience to those to whom it happens, even though we would consider the "spirit" as simply a manifestation of some split-off part of the person's personality. Two questions dealing with possession were included in the questionnaire as validity scale items, since I had not heard of the phenomenon in pilot interviews. As a number of users reported this phenomenon, the data are given here, as

well as a related effect, the user's body seeming to move by itself.

"I have lost control and been 'taken over' by an outside force or will, which is hostile or evil in intent, for a while" is a rare effect (79%, 14%, 4%, 0%, 0%), which occurs at Very Strong and Maximal levels for the few who could rate it (1%, 1%, 1%, 5%, 9%).

"I have lost control and been 'taken over' by an outside force or will, which is good or divine, for a while" is also a rare effect (63%, 16%, 9%, 5%, 1%), which occurs at very high levels of intoxication (1%, 3%, 9%, 9%, 7%). The Therapy and Growth group has experienced this more frequently ($p < .05$, overall).

The extent to which the users may be reporting experiences more aptly classified as "inspiration" rather than the feeling of possession is unknown.

"Parts of my body have moved on their own volition, have done something which I did not will" is also a rare effect (57%, 22%, 13%, 5%, 1%), which occurs more frequently among females than males ($p < .05$). When it occurs, it generally begins at the very high levels (1%, 3%, 7%, 14%, 10%).

Although the levels-of intoxication for these three possession phenomena were all very high and did not differ significantly, their frequency of occurrence did, as shown in Figure 17-4.

Parts of the body moving by themselves and being possessed by a good force occur with about equal frequency, and both occur more frequently than being possessed by an evil or hostile force ($p < .0005$ and $p < .05$, respectively).

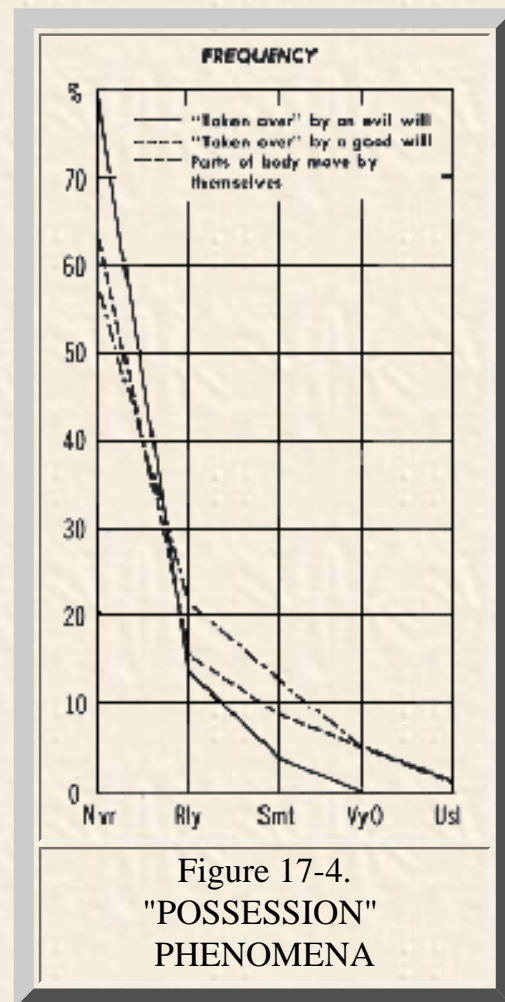


Figure 17-4.
"POSSESSION"
PHENOMENA

CONTROL OF THE LEVEL OF INTOXICATION

While users often are not concerned with what level of intoxication they will reach in any given session, especially if they have no problems on their minds, there are occasions on which a user will not want to get very intoxicated, e.g., if he expects to have to deal with some situation he is not sure he can handle while intoxicated. On the other hand, if the user does not expect to have to deal with straight people or perform complex tasks, he may wish to get as intoxicated as possible. If he wishes to control his level of intoxication, he may do so by controlling the amount of marijuana he smokes [2] and/or by using various psychological techniques to decrease his level (bringing himself "down") or increase his level (bringing himself "up"). The psychological techniques are particularly important when a situation unexpectedly occurs that makes the user feel he should come down.

Desire to Get Higher

Sometimes users at a given level of intoxication feel an intense need to become even more intoxicated: "I get a rather compulsive desire to get even higher after a certain stage: I will smoke much more if I can." This is an

infrequent effect (26%, 27%, 27%, 15%, 4%), which begins to occur at Moderate to Strong levels (11%, 22%, 24%, 12%, 3%). This desire occurs more frequently among younger users ($p < .05$), the College-educated ($p < .05$), Heavy Total users ($p < .01$, overall), and Daily users ($p < .05$). The young experience this at lower levels ($p < .05$).

Comments by my informants suggest that the primary motivation behind this effect is the anticipation of greater pleasure from being more intoxicated.

Experience with LSD

The users were asked, "*Since taking LSD (or mescaline, peyote, psilocybin, or another major psychedelic drug), I am able to get much higher on grass than I was before.*" Of the 104 users answering this, 56 said yes and 48 said no, so a substantial portion of users feel their experiences with more powerful psychedelic drugs have enabled them to have more experiences when subsequently using marijuana. Informants commented to the effect that psychedelic drug experiences showed them that certain types of experiences were possible; knowing this, they have then been able to direct attention toward them and attain them with marijuana. This nicely illustrates the nature of potential effects, discussed in Chapter 2, as an underlying model for drug intoxication states.

Other Drugs Used to Raise the Level of Intoxication

The users were asked to explain any yes answers to "*I have special ways of getting higher besides smoking more grass: (1) other drugs + grass; and (2) special mental techniques.*" For the first part of this question, 23 percent answered yes, 67 percent no, and 10 percent skipped it. Some users mentioned several drugs they had used in conjunction with marijuana.

Ten mentions were made of taking other psychedelic drugs, such as LSD or DMT, in addition to marijuana, and six mentions were made of using hashish, the more potent form of marijuana. That more powerful psychedelics than marijuana should potentiate its effect is not surprising, but one may wonder why the users bother to smoke marijuana if the more powerful drug is available, unless the marijuana effects add some special quality to the more powerful psychedelic.

There were eight mentions of amphetamines for potentiating the marijuana state. Although the method of administration was not mentioned, it is likely that it was by mouth.

Alcohol was mentioned as a potentiator in seven cases, often with indications that the ratio of the two drugs had to be just right, usually a small amount of alcohol with the usual quantity of marijuana smoked.

Among miscellaneous drugs mentioned were amyl nitrate (2) and opium (2).[\[3\]](#)

Mental Techniques for Raising the Level of Intoxication

Thirty-nine percent of the users indicated they had special mental techniques for getting higher. I have classified them into eleven types, with examples of each given below. The number of times various techniques were mentioned in the users' explanations is presented in Table 17-1.

Focusing, concentrating on current activity, refers to putting all of one's

TABLE 17-1
MENTAL TECHNIQUES FOR GETTING HIGHER

attention on what one is doing or a sensory stimulus one is receiving, e.g., "... staring at one object or some other spot of interest... ," or "cutting out extraneous concerns with past or future, remaining in here-and-now and digging it (grooving)...."

Contact with intoxicated companions refers to the speech and actions of the intoxicated persons' serving to remind the user of higher-level phenomena so that he can experience them, e.g., "thinking like whomever I'm with who's higher," or "talking to stoned people and being with them for a while." "Contact highs," when a user is straight at the time but feels many of the phenomena of intoxication simply by being in close contact with an intoxicated person, were also reported as a common effect (Chapter 12).

Meditation refers to actual use of this word by the user to describe his technique such as "Kundalini yoga—as energy flows up spine and reaches brain, I get higher... ," or "*Mantra* chanting, zazen."^[4]

Direct willing to get higher refers to reports of simply willing to reach a high level of intoxication without any specific mechanisms of such willing being described; e.g., "I move mentally through the same plane as a grass session, and then an LSD session, and finally, beyond both into a higher series of energy levels..."; or "Once fairly stoned I can get as high almost as I like with only the will and the knowledge ('You can fly, Wendy!' said Peter)."

Breathing techniques are illustrated in such comments as "Center on my breathing, close my eyes, and concentrate on getting higher"; or "I hold my breath for 30 seconds at a time and stare at a fixed point of light...." Several users specifically mentioned hyperventilating but noted it produced only a transient alteration in level of intoxication.

Music, especially if it is about other states of consciousness, can be used to get higher; e.g., "Listen to music and relax—especially Donovan—can get high without anything"; or "Listen to music, especially with stereo earphones; all else blocked out, get especially high."

Letting go, non-striving, relaxation are illustrated by "Just let mind loose," or "... allowing same thought processes to develop as when on acid... ," or "... just relaxing into it, like floating, not striving."

Fantasy refers to imagining specific events that lead into a higher state, such as "... guided daydream^[5]....," or "Sometimes smoke a regular cigarette and pass it around pretending it's a joint."

Inducing positive emotions to get higher is illustrated by "I think happy... ," or "... remind myself how incredible it is just to be alive in the first place...."

Hypnosis was mentioned by two users, without further explanation. Aaronson's work (1969) in inducing psychedelic-like states through hypnosis, and Baumann's (1970) technique of training adolescents to re-experience many of the pleasures of marijuana intoxication through hypnotic regression is relevant here.

TYPE OF TECHNIQUE

NUMBER OF TIMES MENTIONED

Focusing, concentrating on current activity	9
Contact with intoxicated companions	7
Meditation	7
Direct willing to get higher	7
Breathing techniques	6
Music	4
Letting go, non-striving, relaxation	4
Fantasy	4
Inducing positive emotions	4
Hypnosis	2
Miscellaneous	15

Lowering the Level—"Coming Down"

"I can 'come down' at will if I need to be straight for a minute to deal with some complicated reality problem (circle the point of highness above which can't do this)" is an extremely characteristic effect of marijuana intoxication (5%, 3%, 18%, 21%, 49%). [6] It is more frequent among males ($p < .05$), the Professionals ($p < .01$), and Users of Psychedelics ($p < .01$). Light Total users report it less frequently than Moderate or Heavy users ($p < .05$, overall), and the Daily users report it more frequently than the Weekly or Occasional users ($p < .05$, overall).

The Very Strong and Maximal levels were the main ones the users could not come down from at will (2%, 8%, 11%, 33%, 24%). Female users and Users of Psychedelics indicated being able to come down temporarily from higher levels of intoxication ($p < .05$ and $p < .01$, respectively).

A similar question was asked later in the questionnaire in opposite form, namely, "There is a certain degree of being stoned from above which I cannot come down quickly if I must come down to deal adequately with reality (circle level)." This is a fairly frequent effect (23%, 27%, 21%, 10%, 8%), more so with females ($p < .05$) and Non-users of Psychedelics ($p < .05$). The levels above which the user cannot come down quickly are almost exclusively the Very Strong and Maximal levels (0%, 1%, 3%, 21%, 37%), with a higher level being indicated by the Moderate Total users than the Light or Heavy Total users ($p < .05$, overall).

As shown in Figure 17-5, feeling able to come down at will is far more frequent than feeling unable to ($p < .0005$). Being unable to come down quickly when desired is rated as occurring at higher levels of intoxication than the point where the user can come down at will ($p < .0005$).

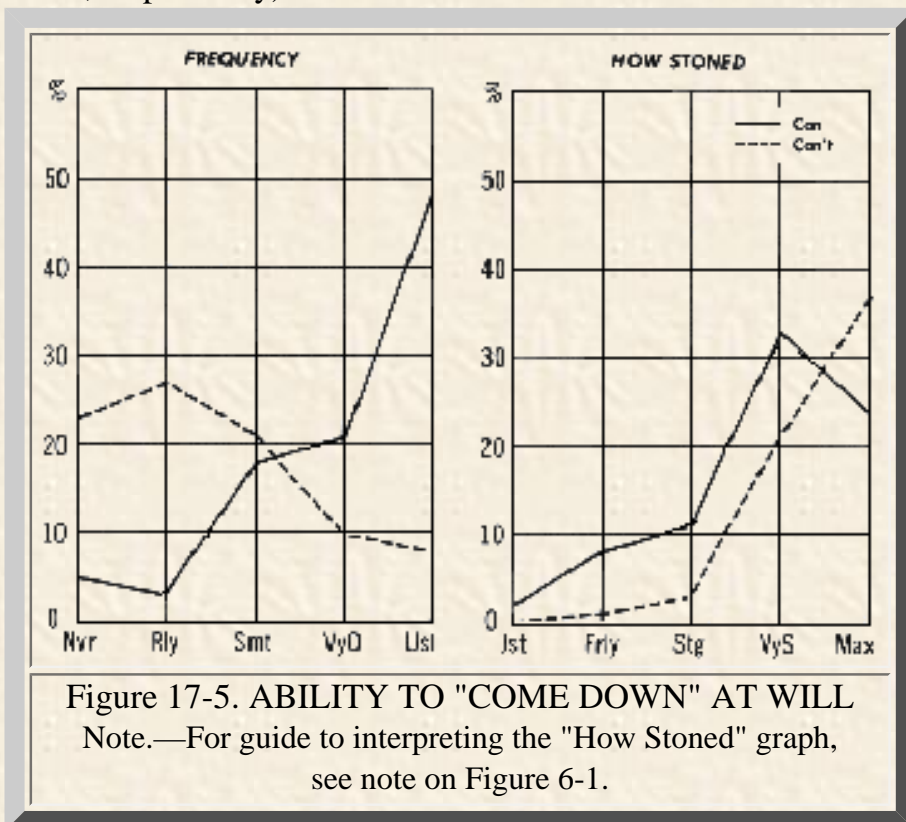


Figure 17-5. ABILITY TO "COME DOWN" AT WILL
 Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Techniques for Coming Down

Twenty-nine percent of the users answered yes to the question "I have special technique(s) for coming down rapidly if I need to be straight quickly (please describe)". Of those answering no, a number offered comments to the effect that they had never experienced a situation they couldn't handle adequately when intoxicated, and so had no need of techniques for coming down.

I have classified the 52 techniques described by users in Table 17-2 and illustrated the techniques in each category below.

Direct willing, concentration refers to simply willing oneself to be normal;

TABLE 17-2
TECHNIQUES FOR "COMING DOWN" RAPIDLY

e.g., "Just tell myself to straighten up and it works!"; or "... just telling myself *straighten out!!!..* ." A number of the techniques put in the miscellaneous category may also have been instances of direct willing, but it was not completely clear that they were.

Inducing negative emotions indicates techniques of frightening oneself and consequently coming down almost immediately, as "I 'freak' myself by imagining the consequences if I 'blow it' "; or "Think of cops and being busted and my family—if that doesn't do it, nothing will" or "Bug my partner, who then bums my trip: I snap back in a flash!"

Intense focus on current situation is illustrated by "... concentrate on the straight task which requires attention"; or "Concentration, deep concentration on the matter at hand can make one straight enough to cope with the situation." Focus on the situation was also used to increase the level of intoxication, but it was a different quality of focus, one of the "Suchness" of things rather than the reality demands they make on the user.

Acting normal, straight, putting on everyday role includes techniques of faking normality or putting on an everyday personality, which then brings the user down. Examples are ". .. put on my work-a-day intellectual persona"; or "By standing up... and lighting up a cigarette (more natural-looking, gives me something to hold my attention) and above all making a determined effort to appear 'straight.'"

Fantasy and suggestion involve creating an image or suggestion that alters the state of consciousness to normal, namely, "I pretend I am walking out of a fog or scene into another scene"; and "Wendy, you're on the ground."

Drugs, Thorazine and Niacin, were mentioned by an engineering student and a psychiatrist. respectively.

TYPE OF TECHNIQUE

NUMBER OF TIMES MENTIONED

Direct willing, concentration	13
Inducing negative emotions	9
Intense focus on current situation	8
Acting normal, straight, putting on everyday role	5
Fantasy, suggestion	2
Drugs	2
Miscellaneous	13

ADDITIONAL EFFECTS

"Presence of compulsive behavior or thoughts" (Rarely, Strongly).

"I syncopate rhythm when playing the guitar, sometimes unintentionally. This happens only stoned. I find syncopating intentionally difficult" (Very Often, Maximum).

"I get totally absorbed in the process of laughing for minutes at a time; I overreact to any sort of humor" (Usually, Fairly).

"I am suddenly aware of the unreality of my and other's behavior and become convulsed with laughter" (Usually, Fairly).

"Confidence and self-faith are plentiful" (Usually, Just).

"Cannot stop from smiling" (Usually, Fairly). "I enjoy acting out fantasies when stoned" (Very Often, Strongly). "Incessant flowing of verbiage—talking to myself, not out loud" (Very Often, Strongly).

LEVELS OF INTOXICATION FOR CONTROL

Various effects of marijuana intoxication on control are plotted by level of intoxication in Figure 17-6. The overall grouping is highly significant ($p \lll .0005$).

FIGURE 17-6. INTOXICATING LEVELS, CONTROL

Just	Fairly	Strongly	Very Strongly	Maximum				
<i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare					NO LONGER CAN COME DOWN AT WILL			
Possessed by evil force								
HIGHEST LEVEL, CAN COME DOWN AT WILL								
Body parts move by themselves								
Possessed by good force								
LOSE CONTROL OVER THOUGHTS								
Worry about losing control								
Harm other people								
POOR CONTROL OVER FANTASIES								
MIND FEELS LESS EFFICIENT IN PROBLEM SOLVING								
EASILY SIDETRACKED ON TASKS								
PAIN EASY TO TOLERATE IF ATTENTION DIRECTED ELSEWHERE								
EMOTIONS FELT MORE STRONGLY								
EXCELLENT CONTROL OVER FANTASIES								
STRONGLY INFLUENCED BY COMPANIONS								
INHIBITIONS LOWERED								
COMPULSIVE DESIRE TO GET HIGHER								
EMOTIONS FELT MORE WEAKLY								
MIND FEELS MORE EFFICIENT IN PROBLEM SOLVING ? *								
PRE-INTOXICATION MOOD AMPLIFIED								
LESS NEED TO FEEL IN CONTROL OF THINGS								
EXTRA ENERGY, EFFICIENCY, ABSORPTION IN TASKS ? *								
<hr/>								
Just	Fairly	Strongly	Very Strongly	Maximum				

*There is some question whether this effect is available at all levels above the minimal one.

Beginning at the Moderate and Moderate-to-Strong levels, there is characteristically a decreased need to feel

in control of things, an increased willingness to trust the situation and let things happen. Some ordinarily inhibited thoughts and behaviors will be allowed, and the user feels his mind is working very efficiently, a feeling that probably reinforces the lessening of need to control things. At the Strong level the user may feel his mind works less efficiently in dealing with problems, and he is easily sidetracked when working on external tasks. His emotions are generally felt more strongly, but he usually feels he has excellent control over his fantasies and so can guide his experiences in very pleasurable directions. Moving up to the Very Strongly intoxicated level, the user may begin to feel lessened control over his thoughts and, less frequently, lessened control over his fantasies, but most users still feel they can come down at will if required. At the highest levels users sometimes feel that they cannot come down at will. They may also, very rarely, feel "possessed" by an external force or will, more often good than evil.

MODULATING FACTORS

The effects of relatively linear background variables are summarized in Table 17-3. Users with more drug experience are less troubled with worries about losing control, and can come down more frequently and from higher levels than other users.

One background variable had a non-linear effect. Moderate Total users indicated a higher level above which they could not come down quickly than either Light or Heavy Total users.

TABLE 16-4
EFFECTS OF BACKGROUND FACTORS ON EMOTIONS

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	<p>More frequent:</p> <ul style="list-style-type: none"> Easily sidetracked Extra efficiency, energy for tasks Can come down at will Compulsive desire to get higher <p>More intoxicated for:</p> <ul style="list-style-type: none"> Easily sidetracked Extra efficiency, energy for tasks Can come down at will 	<p>Less frequent:</p> <ul style="list-style-type: none"> Worry about losing control Can't come down at will
Older	<p>More intoxicated for:</p> <ul style="list-style-type: none"> Compulsive desire to get higher 	<p>Less frequent:</p> <ul style="list-style-type: none"> Poor fantasy control Easily sidetracked Compulsive desire to get higher <p>Less intoxicated for:</p> <ul style="list-style-type: none"> Inhibitions lowered

More Educated	More frequent: Can come down at will	Less frequent: Poor fantasy control Good fantasy control Easily sidetracked Compulsive desire to get higher Less intoxicated for: Easily sidetracked
Males	More frequent: Can come down at will	Less frequent: Body parts move by themselves Can't come down at will Less intoxicated for: Can come down at will
Therapy & Growth	More frequent: Possessed by good force or will	

SUMMARY

Although they feel less need to be in control of things and are more willing to trust the situation, experienced marijuana users are able to control the nature of their intoxication experiences to a high degree. Direction of attention is the main way in which this is done; if one concentrates on a desired effect, it may very well occur, while directing concentration away from an undesired effect will frequently allow that effect to fade away.

Control is good through most of the range of intoxication, but begins to get poorer for some users at the very high levels.

Most users can generally come down at will from even the Very Strong level of intoxication. Various techniques for coming down include direct willing, inducing fear, or intense focusing on the reality situation that they need to deal with. Many users also can increase their level of intoxication by mental techniques: direct willing, meditating, or associating with others who are more intoxicated. These factors illustrate the importance of situational and psychological variables, over and above drug dosage, in determining level of intoxication at any given time. Also, more experienced drug users have more control of intoxication in general.

Footnotes

1. It is important to note that loss of control can be very pleasurable, according to many of my informants, depending on the personality of the user. They enjoy the spontaneous entertainment quality, the surprise of the unexpected and exotic places their thoughts and fantasies travel to. One informant expressed the enjoyment of loss of control as being analogous to riding a roller coaster; if you're sure the machine is in safe operating

condition, you climb on and enjoy the thrills of the ride. Once you're on, it's no longer a question of your control. Thus if the user feels his personality is in good operating condition, he trusts himself to become intoxicated and let the intoxicated state take him where it will. ([back](#))

2. With respect to controlling level of intoxication, smoking marijuana is preferred to eating it, as the user can control his level of intoxication very rapidly and precisely. If it is eaten, about three times as much is required for a given level, onset is much slower, duration is longer, offset is longer, and altering level by eating more is risky because of these time delays. Many of the cases of overdosing that my informants knew of resulted from eating marijuana. ([back](#))

3. Some of the users' experience with other drugs used to potentiate or alter the nature of marijuana intoxication results from the fact that some of the marijuana sold in the United States is adulterated with these drugs, either because some customers prefer it (although most of my informants do not like the idea of their marijuana being adulterated with unknown ingredients) or to "potentiate" marijuana that is otherwise too weak in active ingredients to be salable. ([back](#))

4. *Mantras* are special sounds for meditating on (see Govinda, 1960, e.g.), and *zazen* refers to the practice of Zen meditation (Suzuki, 1959). ([back](#))

5. The guided daydream is a psychotherapeutic technique for evoking deep levels of imagery. It is used primarily in Europe but is increasingly used in the United States. See Assagioli (1965) Desolille (1965), and Gerard (1961). ([back](#))

6. This widespread ability to "come down," i.e., suppress many of the effects of intoxication at will, raises an interesting methodological question for laboratory studies of the effect of marijuana or its derivatives on various performance measures. If the user believes, as a result of the demand characteristics of the experiment (Orne, 1962; Rosenthal, 1966), that he should do as well as possible, he may come down and try to perform as he would straight. On the other hand, if he thinks it important to perform as an intoxicated person should, he may not only not suppress effects, he may exaggerate them. If the demands are not clear to the subjects, great variability in performance will occur that could wipe out real effects. If the demands have consistent effects on the subjects, but are not clear to the experimenter or the readers of the report on the experiment, error will result from confusing one of many potential effects (drug plus particular demands) with "natural" effects.

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On Being Stoned

Charles T. Tart, Ph. D.

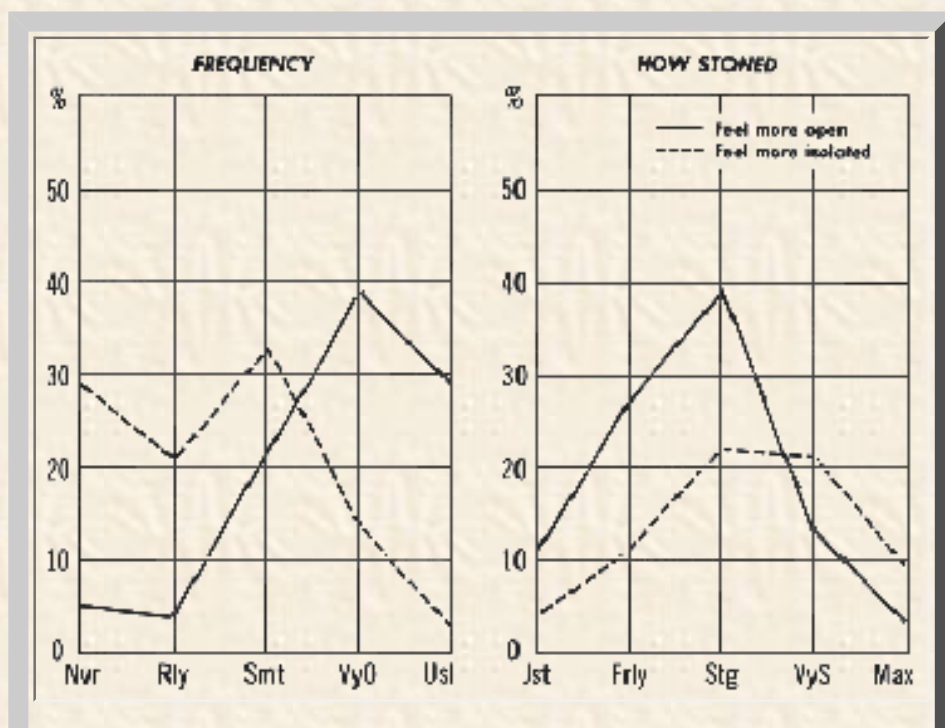
Chapter 18. Identity

EACH OF US feels he is a unique person, an integrated whole, with long-and short-term values, likes, dislikes, and goals, and a unique set of memories, which constitute our personal history. Above and beyond these components, there is a certain sense of what we might call "I-ness," an immediate feeling quality added to experience that makes it my experience. Important changes can occur in this feeling of identity during marijuana intoxication.

MAJOR EFFECTS

Openness

"I feel more childlike, more open to experience of all kinds, more filled with wonder and awe at the nature of things" is one of the most characteristic effects of marijuana intoxication (5%, 4%, 22%, 39%, 29%). Females experience it more frequently than males ($p < .05$). It begins to occur at Moderate to Strong levels (11%, 27%, 39%, 13%, 3%). This is in marked contrast to the infrequent effect "I feel isolated from things around me..." discussed in Chapter 12. Isolation occurs far less frequently ($p < .0005$) and at



higher levels ($p < .0005$) than openness, as shown in Figure 18-1.

Figure 18-1. OPENNESS VS. ISOLATION
Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Loss of Separateness

Two experiences represent an even greater dropping of the feeling of separation from others and the world. *"I have been so absorbed in looking at or contemplating an object or person that I felt as if I were that object or person; i.e., temporarily the split between it-and-me or they-and-me was transcended"* is an infrequent effect (31%, 30%, 29%, 7%, 2%), which begins to occur, among those who could rate it, at Very Strong to Maximal levels (1%, 4%, 13%, 21%, 21%). The Meditators have experienced this more frequently ($p < .01$, overall). The young and the College-educated need to be more intoxicated to experience this merging ($p < .05$ in each case).

"I lose all sense of self of being a separate ego, and feel at one with the world" is a common effect (19%, 25%, 31%, 21%, 3%), again more so with the Meditators ($p < .01$). It begins to occur at Strong to Very Strong levels (1%, 8%, 23%, 20%, 17%).

An effect quite different from diminution of the ego sense and at-oneness with the world is the enhancement of the feeling of uniqueness, differentness. *"I feel completely unique; there is no one like me; I feel as if I am much better than ordinary people when stoned"* is an infrequent effect (25%, 25%, 29%, 10%, 7%). It generally begins to occur at the Strong levels (7%, 15%, 22%, 19%, 5%).

The relationships between these three phenomena are shown in Figure 18-2. Feeling at one with the world occurs more frequently than merging with the contemplated object or person ($p < .01$), but the latter phenomenon and feeling unique occur about equally. Merging and feeling at one with the world occur at about equally high levels of intoxication, and both are at significantly higher levels than feeling unique ($p < .0005$ and $p < .001$, respectively).

Alteration of Identity

A common experience is *"I feel very powerful, capable, and intelligent when stoned"* (16%, 11%, 49%, 16%, 7%), more so with Heavy Total users ($p < .05$, overall). This generally begins to occur at the Strong level of intoxication (7%, 18%, 35%, 16%, 3%), with Heavy Total users and Daily users experiencing this at lower levels ($p < .01$, $p < .05$, overall, respectively).

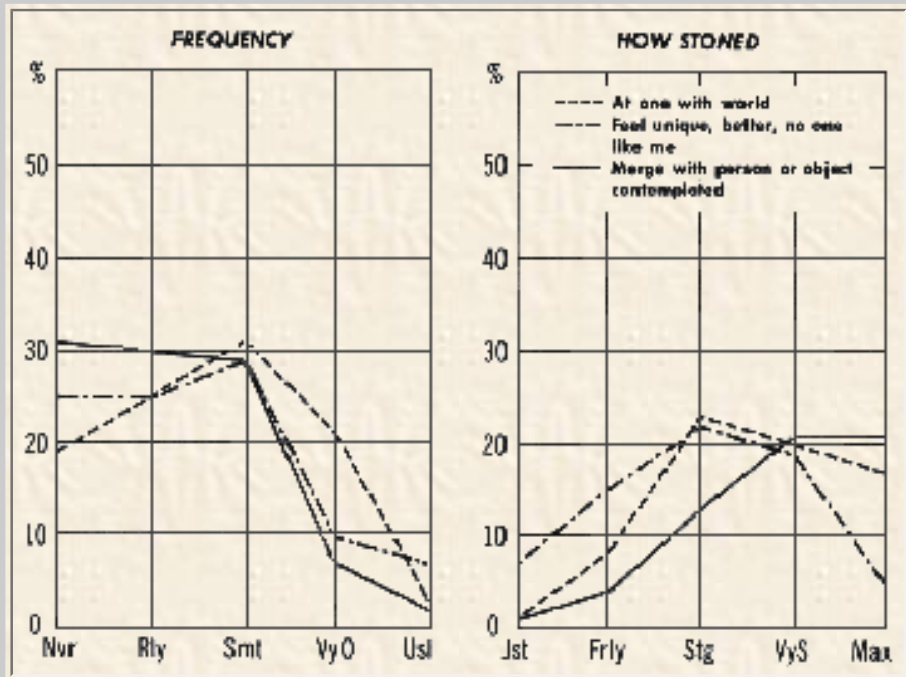


Figure 18-2. MERGING AND SEPARATENESS
Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

A much more dramatic change is represented by: *"Some events become archetypal, part of the basic way Man has always done things. That is, instead of me (John Doe, ego) doing something, it is just Man Doing What Man Has Always Done. That is, my actions become part of the pattern that man has always been part of instead of me, a particular individual, carrying out a particular act at a particular moment in space/time."* This is a common effect (23%, 19%, 38%, 16%, 3%), experienced more frequently by Users of Psychedelics ($p < .05$). It begins to occur at Strong and Very Strong levels (4%, 5%, 25%, 25%, 10%), with Males having to be more intoxicated than Females for this experience ($p < .05$).

This effect is highly valued by many users; they feel they can temporarily transcend the limitations of their ego, their hangups (neurotic problems), and their culture, and can participate in a more fundamental, natural way of existence. This effect is related to some of those discussed in Chapter 19 on Spiritual Experiences.

"My personality changes a lot temporarily while I'm stoned, so that in many important ways I am a different person for that time" is an infrequent effect (23%, 32%, 25%, 13%, 3%), which may begin to occur at the Strong to Very Strong levels (1%, 11%, 20%, 21%, 13%). The Occasional users experience it less frequently than the Weekly or Daily users ($p < .05$, overall). A related, infrequent effect, the feeling that the location of consciousness has moved within the body, has been presented in Chapter 11.

ADDITIONAL EFFECTS

"I become very introspective, trying to see who I am, what I'm doing" (Usually, Fairly).

"I feel as though myself and one other person (usually my lover) form a sort of island around which all other action flows" (Usually, Fairly).

"I feel as though I and/or the group I am with are the only people in the world" (Very Often, Very Strongly).

"I feel 'more like myself,' the quintessence of me" (Sometimes, Strongly).

"My whole self seems to be standing inside my skull, leaning forward and looking out through the eye-holes" (Sometimes, Very Strongly).

"When stoned I get very introspective and see the 'real' me" (Very Often, Maximum).

LEVELS OF INTOXICATION FOR IDENTITY

The various effects on identity of marijuana intoxication are arranged by level in Figure 18-3. The overall ordering is highly significant ($p < < 0005$).

FIGURE 18-3. INTOXICATION LEVELS, IDENTITY PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
-------------	---------------	-----------------	--------------------------	----------------

MERGE WITH OBJECTS, OTHERS CONTEMPLATED

AT ONE WITH THE WORLD

DIFFERENT PERSON WHILE STONED

Type size code:

CHARACTERISTIC
COMMON
INFREQUENT
Rare

LOCATION OF CONSCIOUSNESS IN BODY CHANGES

EVENTS, ACTIONS BECOME ARCHETYPAL
 FEEL ISOLATED

FEEL MORE UNIQUE

FEEL POWERFUL, CAPABLE, INTELLIGENT

MORE CHILDLIKE, OPEN TO EXPERIENCE

Beginning in the Moderate to Strong range, the user becomes more childlike, open to experience, interested in all sorts of things that might ordinarily be regarded as unimportant. As he reaches the Strong level, the user often begins to feel more powerful, capable, intelligent, and may feel especially unique and special, a kind of ego enhancement. As he moves up toward the very high levels of intoxication, however, the sense of ego often fades, and the user often finds his experiences and actions less unique or individual and more archetypal, with a feeling of at-one-ness with the universe frequently replacing the ordinary sense of separation. Near Maximal levels this may sometimes include the feeling of merging with others.

MODULATING FACTORS

The relatively linear effects of various background variables are summarized in Table 18-1. As might be expected, Meditators have more frequent experiences of transcending the limitations of the individual ego.

TABLE 18-1
EFFECTS OF BACKGROUND FACTORS ON IDENTITY

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More Frequent: Events become archetypal Personality changes Feel powerful, capable	Less intoxicated for: Feel powerful, capable

More Educated		Less intoxicated for: Merge with others Location of consciousness in body changes
Older		Less intoxicated for: Merge with others
Males	More intoxicated for: Events become archetypal	Less frequent: More childlike, open
Meditators	More frequent: Merge with others At one with world Feel isolated	
Therapy & Growth	More frequent: Possessed by a good force	

SUMMARY

Marijuana intoxication characteristically produces a childlike openness to experience and a sense of wonder and awe, in contrast to the usual businesslike manner in which we classify events and people strictly in terms of their importance to us. At moderate levels of intoxication this may also be accompanied by feelings of ego enhancement, of feeling powerful, capable, unique. At the high levels of intoxication, however, the sense of separateness, of being an individual ego, is often replaced by feelings of oneness with the world, of actions and experiences becoming archetypal, and occasionally, of merging with people or objects. These high level effects are greatly valued by users and are one of the important reasons why they consider marijuana intoxication a "higher" state of consciousness.

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 19. Spiritual Experiences

IN DEALING WITH spiritual experiences it is important to remember that the sample consists primarily of young college students of the West Coast, a very idealistic, serious, and religiously unconventional group. To many such students religion is not a question of going to church on Sunday but a seeking after mystical experience and a daily living of religious principles, many of which are derived from Oriental religions and philosophies (an excellent reference on the impact of the new religions is Needleman, 1970).

MAJOR EFFECTS

Contact with the Divine

"I feel in touch with a Higher Power or a Divine Being to some extent when stoned; I feel more in contact with the 'spiritual' side of things" is an infrequent effect (39%, 13%, 24%, 12%, 10%), which begins to occur primarily at Strong to Very Strong levels of intoxication (1%, 7%, 18%, 17%, 9%) in those able to rate this.

Meditators and the Therapy and Growth group experience it less frequently than Ordinary Users ($p < .01$, overall), the College-educated ($p < .05$) and Users of Psychedelics ($p < .01$) more frequently.

Meditation

A number of users feel they can meditate[1] more effectively when intoxicated: *"I am able to meditate more effectively than when straight (if yes, please describe what sort of meditation you do on the back of this page)."* This is an infrequent effect (46%, 10%, 13%, 7%, 9%). As might be expected, it is more frequent among Meditators ($p < .05$, overall). Daily users also experience it more frequently ($p < .01$, overall). Users of Psychedelics do not have to be as intoxicated to experience meditating more effectively ($p < .05$). This effect peaks at the Strong level of intoxication (5%, 5%, 15%, 7%, 1%). Note that many more users than the number formally classified as Meditators are giving positive responses here with respect to their occasional or informal meditation practice.

Most of the comments offered by Meditators on this item simply repeated the name of the type of meditation they regularly did, but a few were more specific concerning *how* marijuana intoxication affected their meditation. These comments are given below.

A 21-year-old masseuse who practices T'ai-Chi[2] and Hatha Yoga[3] writes:

*At times I have felt that I have gotten a better feeling for T'ai-Chi while stoned. I have felt the *chi* [4] more fully and have been able to let it flow through me in a way that enabled my mind to give up control of my body. I have not actually meditated while stoned. But I have experienced while stoned the mindless serenity that I hope to be able to attain through zazen sitting.*

A male artist who practices Subud[5] writes:

Pot allows me to empty out, to drop the ego and immediate mundane concerns. A peace ensues and a rapport with eternity arises. It is as if a pressure valve was opened, and I am able to slough off the tensions and considerations of this three-dimensional "reality" and experience what seems to be a four-dimensional state of essentials, with flexible time and space. Pot is a sacrament when such cleansing states are reached. It is also religious (4-D) in that it goes from the most base to the sublime, from microcosm to macrocosm, Yin to Yang.

A 19-year-old male student who practices meditation on mandalas[6] writes that when intoxicated he experiences "long perceptual jags of continuous absorption into and penetration of the perceived field."

A 29-year-old electrical technician who describes his meditation practice as an eclectic mixture of early Christian and oriental techniques writes: "I find my ability to center in while stoned is increased. This is also the factor of 'letting go' which is enhanced during meditation. To me getting stoned is a communion of sorts with the God-head."

A number of users mentioned that they practiced Zen[7] meditation exercises on occasion and that marijuana intoxication occasionally helped. This opinion would probably not be shared by regular practitioners of Zen.

Spiritual Experiences

"I have spiritual experiences, discrete experiences which have had a powerful, long-term religious effect on me, while stoned (If so, please describe)" was answered yes by 33 percent of the users. Meditators answered yes and no in the ratio of two to one, while for Ordinary users the ratio was one to three ($p < .0005$).

These figures overestimate the occurrence of religious experiences with marijuana intoxication per se because some users indicated in their answers that they were referring to experiences induced by LSD or similar powerful psychedelics. Subtracting these, we have 25 percent of the users reporting significant spiritual experience while intoxicated with marijuana.

The distribution of several categories of spiritual experience is shown in Table 19-1, with experiences resulting from LSD rather than marijuana shown in a separate column. Examples of experiences in each category are given below.

Unity refers to the experience of feeling at one with the universe, God, others, the overall plan of things. Examples are: "... death would be a process by which I allowed myself to be absorbed into the light; at that point I felt as if a large part of me was the light. This experience gave me a lasting, more positive feeling about death and giving up the ego"; or "Mystical one with the all-knowing."

Stimulation of long-term interest in religion refers to reports where the emphasis was put not on the experience itself, although it may have been impressive, but on the fact that it forced the user to confront basic religious questions

and resulted in a long-term involvement in religious practices. Examples are: "Not really religious—but more like an *important* thing because it can mellow people down make them think about what they're doing. In this way hostility can be decreased; people appreciate each other more and can generally get their heads and hearts together. I guess that's kind of religious at that!"; or "I experienced the Kundalini force^[8] twice when stoned; this has influenced me to begin seriously studying Indian sacred writings...."

Contact with divine beings is illustrated by "I have seen Christ and spoken to Him; He's the one who knows me and I need Him"; or "Powerful feelings of the presence of a loving, powerful, helpful being, often. I should say, at this point I do not believe these effects occur because of the grass; I think they are experiences, which are sharper because of less surface noise and anxiety (grass seems very often to make concentration easier and more lasting)."

TABLE 19-1
SPIRITUAL EXPERIENCES WHILE INTOXICATED

TYPE OF EXPERIENCE	NUMBER OF USERS REPORTING	
	Marijuana	LSD
Unity	10	3
Stimulation of long-term interest in religion	7	2
Contact with divine beings	4	2
Long-term positive changes in life-style	3	3
Deep peace, joy	2	0
Miscellaneous	6	2

Long-term positive changes in life-style of the type highly valued in religious teachings are illustrated by "Usually assumes form of a high degree of 'spiritual' empathy with others present"; or "... the communion and God-contact has caused me to alter my life-style; e.g., I don't lock our house, although there is expensive sound equipment, records, books, and art supplies in it. A willingness to share our food and home with people. Not saying no to people who ask for time and help. A calmer, serene attitude on life, but filled with more positive action, e.g., teaching sensory awareness to the Free University set."

Deep peace, joy, represented by "... on pot I have experienced peace and joy from God"; and "Mostly the experiences are of a nature concerning a peaceful state of mind."

Among the more interesting miscellaneous cases is one of purported recall of past life: "... strong identification with ocean led to doctrines of reincarnation[9]—also sound experiences of previous lives."

Another interesting case was a humbling experience which also would qualify as a classical account of an out-of-the-body (OOBE) experience, although the user did not classify it as such in the earlier item dealing with such experiences (Chapter 10). Such experiences frequently lead the experiencer to a deep belief in the immortality of his own soul, usually expressed in the form that he no longer *believes* in survival of death, he *knows* it to be true because he has experienced being alive while "out" of his physical body. This does not logically follow, but the logic of it is usually not important to someone who has had the experience. The experience of this 19-year-old student was as follows.

I had quite an interesting experience while camping. I got stoned on grass, and as I was about to go to sleep, I came completely awake and aware of my surroundings. It was pitch black in the tent, yet I could see as if it were daylight. I felt as if my body were covered with eyes and I could see in all directions. I slowly floated up through the top of the tent, looking at the whole area. I got farther away, moving towards space. I got very realistic views of the earth. I kept moving up until I could see half of the earth, then the earth and the moon, continuing until I stood at the edge of space, inspecting the whole universe. I was all of a sudden struck by man's insignificance. Then I proceeded to move until I could see hundreds of universes glinting like stars. None of these universes was any larger than the head of a pin. It was incredibly beautiful. I began laughing almost hysterically because now our own universe, immense as it seems to us, was no bigger than the head of a pin and one among millions besides. I described the whole experience as it happened to several other people; and I believe from the reactions I got, I thoroughly scared the hell out of them.

Experiences Sometimes Interpreted as Spiritual

A number of the intoxication experiences already reported on in other chapters are sometimes interpreted by users as manifestations of higher forces or spiritual forces, or as the workings of the user's own dormant spiritual nature.

Auras around people (Chapter 6) may be considered manifestations of spiritual energy perceptible by psychic sight or, in the cases of saints and holy men, sometimes visible to ordinary people.

Ostensible paranormal phenomena, namely, *telepathy*, *precognition*, and *magical operations*, discussed in Chapter 10 may also be interpreted as budding spiritual faculties.

Out-of-the-body experiences may be considered by users as direct proof of the existence of the soul and budding spiritual faculties, especially when coupled with mystical experiences of the sort reported above.

Floating in limitless space may be interpreted in the same manner as OOBEs and have a humbling effect.

Sexual intercourse seeming more a *union of souls* (Chapter 13) may seem a way of being more in accordance with the divine plan.

Possession (Chapter 17), especially by a force which seems good, is a classic religious phenomenon.

At-one-ness with the world and *archetypal experience* (Chapter 18) may be seen in religious terms as greater attunement with the way of the divine, as can *increased openness, childlikeness* ("... except ye be as little children...").

Readers further interested in the effect of psychedelic drugs in inducing mystical experience under proper conditions should see [Pahnke's classic study](#) (Pahnke, 1966; Pahnke and Richards, 1969) and Huxley's [The Doors of Perception](#) (1954). An interesting contrast to Huxley is Zaehner's experience of completely suppressing the effects of mescaline intoxication in order to prove that Huxley was wrong (Zaehner, 1957)!

RELIGIOUS SIGNIFICANCE OF BECOMING INTOXICATED

Although not all users who had had spiritual experiences while intoxicated felt this had made getting intoxicated an act of religious significance for them, 22 percent of the users did: "*Getting stoned has acquired a religious significance for me.*" Another 4 percent indicated LSD use, rather than marijuana, had acquired religious significance.

The Meditators indicated much more frequently than ordinary users that getting intoxicated had acquired a religious significance for them ($p < .01$).

The reasons given for this were quite varied. The simplest sorts of explanations were on the order of "I now pray daily and have faith and a need for religion, which I didn't feel a year ago"; or "Grass is a way to reach God"; or "Very simply, I can talk to God." The more complex explanations of yes answers indicated that the insights and experiences arrived at while intoxicated had led to the formulation of a set of religious beliefs; e.g., "In many ways I feel that when stoned I have released myself from some of the hassling of the 'real' world and can be more at one with what is lasting or ultimate—that is, I feel I have more of a chance of considering it... It's an analytical contemplation tool—see deeply if not broadly—any answers found must check out down in the 'real' world... The view of myself and the world I get is also much more peaceful, less filled with petty distractions..."

Many users also indicated that using marijuana was religious to them, but not in the conventionally understood meaning of the term; e.g., "Grass can definitely serve as a sacrament for me; that is, I frequently feel more religious after smoking and will often smoke to achieve this effect. I doubt if this would work in the same way if I simply smoked and then went to church; feeling religious is something personal that you cannot turn on every Sunday morning." Or, "When I am stoned, I am more *aware* of who I am spiritually. Grass has helped along the way of self-realization, and in this sense it is a sacrament."

ADDITIONAL EFFECTS

"Everything in nature appears to be good. I have great feelings for all of nature and feel that all things (plants, bugs, people, etc.) are of the same substance and makeup, doing the best they can in their struggle to hold onto life and find happiness. Everything takes on this 'struggle for existence' theme and meaning, and this

is all very beautiful" (Usually, Strongly).

"Am able to experience the blinding white light[10] of universal soul" (Rarely, Maximum).

"Zen, Tea Ceremony, ritual charm apparent for the first time" (no specification of frequency or level).

"Feeling of reaching 'it,' white void or infinity, or point where yin/yang, life/death, yes/no meet" (Usually, Very Strongly).

LEVELS OF INTOXICATION FOR SPIRITUAL EXPERIENCES

Figure 19-1 orders various spiritual experiences and related phenomena by level of intoxication. The overall ordering is highly significant ($p \lll .0005$).

FIGURE 19-1. INTOXICATION LEVELS, SPIRITUAL EXPERIENCES

Just	Fairly	Strongly	Very Strongly	Maximum
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare </div>				
	FLOAT IN LIMITLESS SPACE			
	Possessed by evil force			
	TIME STOPS			
	AURAS AROUND PEOPLE			
			Aware of <i>chakras</i>	
			Possessed by good force	
			ENERGY IN SPINAL COLUMN	
			Precognition	
		AT ONE WITH THE WORLD		
		IN TOUCH WITH A HIGHER POWER		
		EVENTS BECOME ARCHETYPAL		
		ENERGY, POWER IN BODY		
		TELEPATHY		
	VERY AWARE OF BREATHING			
	CAN MEDITATE MORE EFFECTIVELY			
	MORE CHILDLIKE OPEN, FILLED WITH WONDER			
	SEXUAL LOVE A UNION OF SOULS AS WELL AS BODIES			

Just Fairly Strongly Very Strongly Maximum

At the Moderate to Strong levels, spiritual experiences tend to be concerned with the way the world is perceived, such as being open and childlike, being closer to one's sexual partner. Meditation may begin to seem more effective. Moving toward the Very Strong level, the nature of the perceived world begins to change, so that events may become archetypal, the user may feel at one with the world or in touch with a higher power, and psychic or spiritual events may begin to occur. Going higher, time begins to be transcended by stopping in many cases or by ostensible precognition in rare cases. The user may feel himself possessed by outside forces on rare occasions, and the ordinary world may be completely left behind. Mystical experiences may occur at these very high levels that the users cannot describe for lack of words.

MODULATING FACTORS

Table 19-2 summarizes the relatively linear effects of various background variables.

A general pattern of more frequent spiritual experiences for the Meditators and those with more drug experiences is clear.

TABLE 19-2
EFFECTS OF BACKGROUND FACTORS ON SPIRITUAL EXPERIENCES

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequent: In touch with Higher Power Meditate more effectively Events archetypal Sex a union of souls Perform magic Precognition Telepathy Auras around people	Less intoxicated for: Meditate more effectively Sex a union of souls

Meditation	More frequent: In touch with Higher Power Meditate more effectively Spiritual experiences Religious significance to getting intoxicated At one with the world	
Therapy & Growth	More frequent: In touch with Higher Power OOBEs Multiple OOBEs Possessed by good force	
More Educated		Less frequent: Sex a union of souls In touch with Higher Power
Older		Less intoxicated for: Float in limitless space
Males	More frequent: Multiple OOBEs More intoxicated for: Events archetypal	Less frequent: OOBEs Childlike, open

SUMMARY

For some users, important spiritual experiences have taken place while they were intoxicated with marijuana, or as a result of marijuana use. Some of these have been spontaneous, others deliberately sought through meditation, which many users feel is enhanced by intoxication. Because of these experiences, the use of marijuana has acquired a religious significance to some users.

Whether these drug-induced spiritual experiences are "genuine" is a question that academics and theologians can argue about forever. The best experimental data on this question are [Pahnke's \(1966\)](#), which indicated that the characteristics described for drug-induced mystical experiences did not differ significantly from those of naturally-occurring mystical experiences, but that study dealt with much more powerful psychedelics than marijuana.

Certainly some of the users have made marijuana or LSD use a religious sacrament for themselves, and two respectable churches in the United States have considerable experience in the sacramental use of the more powerful psychedelics (Aiken, 1970; [Clark, 1970](#); [Osmond, 1970](#); [Watts, 1970](#)).

My informants, who have extensive drug experience and have devoted much time to serious spiritual interests, note, however, the use of psychedelic drugs for spiritual growth has both advantages and

disadvantages. The advantages center around the possibility of the drug experience serving as an "opening," an experience of possibilities and potentialities. The spiritual possibilities seen must be developed and worked with in the user's everyday life, however. Constantly seeking to reinduce these spiritual experiences with drugs may lead to a substitution of thrilling experiences for real work.

Footnotes

1. For readers interested in the psychology of meditation, I recommend Ornstein and Naranjo's (1971) new book highly. ([back](#))
2. T'ai-Chi is an ancient Chinese discipline of moving the body in certain ways while practicing mental centering and direction of psychic energy (*chi, ki, prana*). Descriptions may be found in Chang and Smith (1967) and Feng and Kirk (1970). ([back](#))
3. Hatha yoga, as distinguished from other branches of yoga, is primarily concerned with development and control of the physical body. Some of the unusual-looking positions used by its practitioners have been the basis of the popular stereotype of yogis as people who are contortionists. It may be practiced alone for its health benefits, but in terms of the overall yoga system it is considered a basic and beginning form of yoga; it is necessary to strengthen and control the physical body so it will not be a source of distraction during more advanced meditation. The reader interested in yoga may see Behanan (1937), Blofeld (1970), Chang (1963), Evans-Wentz (1958), Garrison (1964), Johnston (1968), Muses (1961), Wood (1954), and Yeats-Brown (1958). ([back](#))
4. *Chi* is the spiritual energy that the practitioner attempts to direct through his body. See the discussion of experiences of energy in Chapter 11. ([back](#))
5. Subud is a modified form of Sufism (See Shah, 1964, 1968 for general information on Sufism) which uses a form of opening meditation (Ornstein and Naranjo, 1971) known as the *latihan* for direct contact with higher forces (Needleman, 1970). ([back](#))
6. The mandala is a visual meditation symbol whose essentials consist of a center and a patterned periphery. The overall symbol may be very simple or exceptionally complex. It embodies certain symbolic principles in its design as well as forming a fixation point for the meditator. See Arguelles and Arguelles (in press), Tucci (1969), and Wilhelm and Jung (1962). ([back](#))
7. Good introductions to Zen Buddhism may be found in Suzuki (1959, 1962) and Watts (1957). ([back](#))
8. The *Kundalini force* refers to the ancient Indian idea of a special sort of power (*prana ki chi*—see Chapter 11) which is stored in a special center at the base of the spine. Certain meditation exercises or drugs are supposed to be able to liberate this energy so it can flow up the spinal column, activating various *chakra* centers on the way and finally producing a state of consciousness conducive to liberation and enlightenment in the *properly prepared* yogi. It is considered highly dangerous to release the *Kundalini force* without proper training under the guidance of a master. See Gamson (1964), Govinda (1960), Krishna (1970), and Woodruffe (1931). ([back](#))
9. Beliefs about the idea of reincarnation in the West are generally so distorted as to be ludicrous. The reader interested in some accurate presentations of Eastern ideas and an introduction to the scant scientific literature on the subject should see Chari (1967), Ducasse (1960), Head and Cranston (1967), and Stevenson (1966). ([back](#))
10. The perception of the clear light or the white light is an advanced type of mystical experience sought

after in many Oriental approaches to liberation. See Blofeld (1970), Govinda (1960), or Leary, Metzner, and Alpert (1964). ([back](#))

Chapter 20

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 20. Sleep and Dreams

MAJOR EFFECTS

Falling Asleep

One of the most characteristic effects of marijuana intoxication is *"I find it very easy to go to sleep at my usual bedtime when stoned"* (3%, 7%, 7%, 19%, 57%), which begins to occur at the lowest level of intoxication (28%, 27%, 19%, 5%, 5%). The linked opposite effect, *"I find it very difficult to get to sleep when stoned, even if it's my usual bedtime"* (45%, 23%, 14%, 5%, 8%) occurs far less frequently ($p < .001$), and from Strong to Maximal levels (4%, 5%, 14%, 12%, 11%), as shown in Figure 20-1 below. Ease of going to sleep is generally associated with a much lower minimal level of intoxication ($p < .001$) than is difficulty, also shown in Figure 20-1, although many (53 percent) of the users could not rate the minimal level of intoxication of the latter effect.

The Professionals indicate somewhat lower levels of intoxication for ease in falling asleep, compared to the College-educated ($p < .05$).

Early drowsiness is very common: *"I get very drowsy even though it's not late or otherwise close to my usual bedtime,"* (2%, 13%, 45%, 25%, 12%). The modal minimal degree of intoxication for this is Strongly, with 76% of the users rating this in the Fairly to Very Strongly Stoned range (9%, 17%, 38%, 21%, 7%). Several background factors strongly affect the level of intoxication for this phenomenon.

Heavy Total users have Very Strongly/ Maximum as modal response categories of intoxication levels, while Medium and Light Total users have Fair/Strong as modal categories ($p < .001$, overall). A similar finding occurs when frequency of use in the last six months is the background factor ($p < .01$, overall), the Daily users again indicating Very Strongly/Maximum as modal levels, the Weekly users indicating Fairly and Strongly

modally (with Very Strongly and Maximum also quite frequent), and the Occasional users having a mode at Fairly/Strongly.

Meditators experience early evening drowsiness at lower levels of intoxication ($p < .001$).

A related, rare phenomenon dealt with fully in Chapter 15 is *"My mind goes completely blank for long periods (15 minutes or more); even though I'm not asleep, I have no thoughts or images or anything going on my mind."* It may very well be that this high-level phenomenon actually represents sudden periods of sleep overwhelming the user.

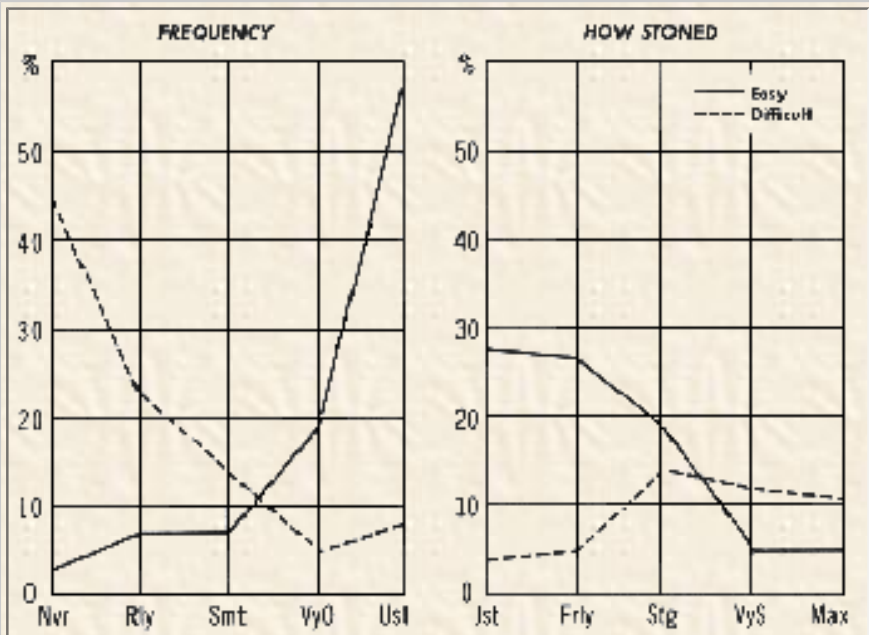


Figure 20-1. GETTING TO SLEEP STONED
 Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Quality of Sleep

The effect of marijuana intoxication on ease or difficulty of going to sleep is paralleled by the reported effects on the quality of sleep: *"My sleep is particularly refreshing if I go to bed stoned,"* (7%, 7%, 35%, 20%, 26%) is very common, while the linked opposite, *"My sleep is restless and poor if I go to bed stoned,"* (49%, 28%, 13%, 4%, 3%) is rare ($p < .001$). Figure 20-2, below, presents the distributions for frequency of occurrence and minimal level of intoxication for these effects. Disturbed sleep usually begins at higher levels of intoxication ($p < .001$); levels are 17%, 27%, 33%, 5%, 1% for refreshing sleep and 4%, 7%, 13%, 13%, 8% for disturbed sleep.

The refreshing quality of sleep is affected by frequency of use; Weekly and Daily users have somewhat higher minimal levels of intoxication for this than Occasional users ($p < .05$, overall).

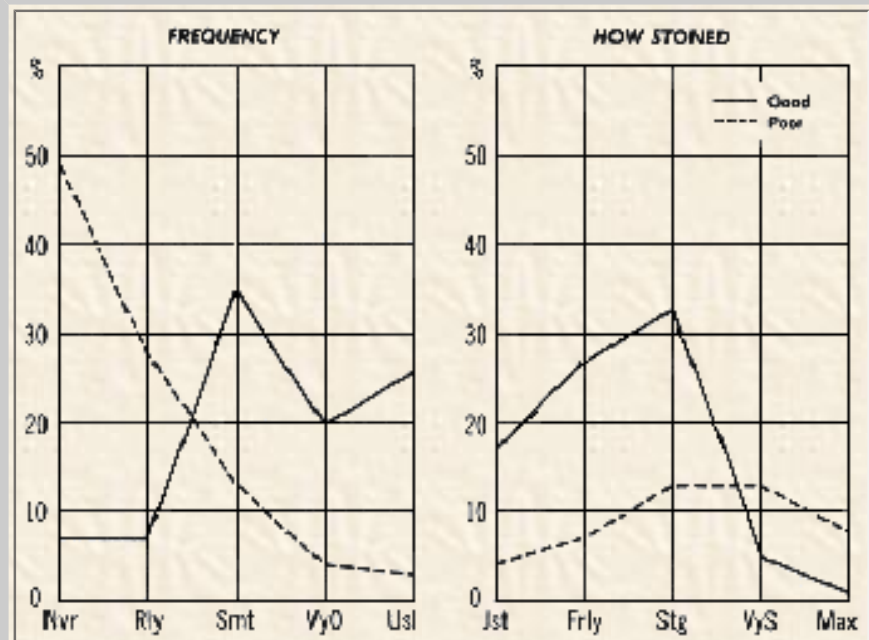


Figure 20-2. QUALITY OF NIGHT'S SLEEP AFTER GOING TO BED STONED
 Note.—For guide to interpreting the "How Stoned" graph, see note on Figure 6-1.

Dreaming

Two questions dealt with the effect of marijuana on recalled dreaming. "My dreams are more vivid if I go to bed stoned" is common (23%, 18%, 23%, 16%, 12%), but its opposite, "My dreams are less vivid or forgotten if I go to bed stoned" (23%, 27%, 21%, 7%, 13%) occurs about as frequently. Both effects have the same distribution of minimal intoxication levels (7%, 18%, 28%, 9%, 2% and 11%, 23%, 17%, 10%, 3%, respectively). Thus the effects of marijuana on the dreaming process must be modulated by immediate situational and psychological factors rather than dosage *per se*. Heavy Total users rate Fairly/Strongly and Very Strongly/Maximum about equally for less vivid dreaming, while Low and Moderate Total users peak sharply at Fairly/Strongly ($p < .05$).

LEVELS OF INTOXICATION FOR SLEEP PHENOMENA

The effects of marijuana intoxication on sleeping and dreaming are ordered by level of intoxication in Figure 20-3. Overall differences between levels are highly significant ($p < << .0005$). At the lower levels we find ease of falling asleep at bedtime. As we go up a level, effects on dreams may manifest and a refreshing quality may be added to sleep. The next higher level indicates possible early evening drowsiness, and the next two levels above that possible poor sleep and difficulty in going to sleep, respectively. Unrecognized sleep attacks may occasionally occur at the highest levels. Early evening drowsiness being in the midrange of the intoxication levels might indicate a change in the nature of intoxication from a tranquilizing or sedative effect to a predominantly excitatory effect at high levels. [1]

FIGURE 20-3. INTOXICATION LEVELS, SLEEP AND DREAM PHENOMENA

Just	Fairly	Strongly	Very Strongly	Maximum
-------------	---------------	-----------------	----------------------	----------------

<p>Type size code: CHARACTERISTIC COMMON INFREQUENT Rare</p>				
				Mind goes blank
				DIFFICULT TO FALL ASLEEP
			Sleep poor, restless	
		EARLY DROWSINESS		
	DREAMS MORE VIVID			
	DREAMS LESS VIVID			
	SLEEP PARTICULARLY REFRESHING			
	EASY TO GO TO SLEEP AT BEDTIME...?.*			

*There is some question whether this effect is available at all levels above the minimal one.

MODULATING FACTORS

All the background factors affecting sleep and dream phenomena had relatively linear effects. They are summarized in Table 20-1.

In general, more experience with drugs tends to push some of the disagreeable phenomena of marijuana intoxication to higher levels of intoxication.

TABLE 20-1
EFFECTS OF BACKGROUND FACTORS ON SLEEP AND DREAMS

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More Intoxicated for: Early drowsiness Sleep particularly refreshing Dreams less vivid	
Older		Less intoxicated for: Mind goes blank
More Educated		Less intoxicated for: Easy to go to sleep at bedtime
Meditation		Less intoxicated for: Early drowsiness
Males		Less frequent: Mind goes blank

SUMMARY

In general, users report that marijuana frequently produces early drowsiness, ease of going to sleep at bedtime, and an especially refreshing sleep. Given the widespread existence of problems of sleeping in this country, reflected in immense sales of both proprietary and prescription medications for aiding sleep, further investigation of the sedative effects of marijuana is called for. Further, most of the effective sleeping medications available as prescription drugs have undesirable side effects, such as lethargy the following morning. [2] Although not specifically dealt with on the questionnaire, my informants have indicated that lethargy following an evening of marijuana intoxication is rare and usually associated with very high levels of

intoxication.

The general effects of drowsiness, ease or difficulty of going to sleep, and quality of sleep are modulated by a number of factors, which suggest a general dimension of control over the marijuana state. In the intoxicated state a great deal of mental activity and experience is occurring, more so at higher levels of intoxication. With too much mental activity, drowsiness is warded off, and sleep may be poor. Also, as emotional states tend to be amplified by marijuana, an unpleasant emotional state may demand more attention, be harder to inhibit. Thus users who have more experience generally with marijuana or other psychedelic drugs apparently acquire more familiarity with the working of the state and more ability to control its manifestation, and so are not troubled as frequently with negative effects such as difficulty with sleep, except at higher levels of intoxication where control is more difficult.

Footnotes

1. Note that these effects are for the level of intoxication at the time of going to sleep. Since most users smoke marijuana early in the evening, they may experience high level effects for the first couple of hours, but have come down to a lower level by bedtime, avoiding the problem of the adverse effects of high levels of intoxication on sleep. ([back](#))

2. Numerous studies have found that effective sedative drugs uniformly disrupt the natural sleep-dream cycle (see Kales, 1969, for some recent summaries of these effects). No data is available at the time of this writing on whether marijuana does this also. ([back](#))

[Chapter 21](#)

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 21. "Desirable" and "Undesirable" Effects

BASIS OF CLASSIFICATION

Non-Objectivity of Classification

Classifying the 214 possible effect descriptions^[1] as "desirable" or "undesirable" is the least objective analysis of the entire study, and probably represents my personal values as much as or more than any general standards of what is desirable and undesirable.

For example, are visual hallucinations—seeing things that aren't there—(Chapter 6) per se undesirable? Many persons, especially those influenced by traditional medical models of disease, would say yes, yet my pilot subjects and informants indicated that this was usually a pleasurable and interesting effect. To sit at home, know that you are under the influence of marijuana, and see, for example, a flowing, colored ball floating in the air is most interesting, if not joyful.

What about emotional crises, "freaking out" (Chapter 16)? Again, comments by the users in describing their experiences and comments of informants indicated that while this may have been quite unpleasant at the time, it may also be highly valued in retrospect as providing necessary catharsis and/or insights into problem areas.

Criteria for "Undesirable" Effects

The criteria I finally chose for selecting what I hoped would be unequivocally negative effects, i.e., effects which no one would value, were that: (1) the effect is clearly unpleasant to experience; and (2) it has no later

redeeming value, other than the user probably learns to avoid it in the future. Of the 214 effects, 19 met these criteria.

Others will include more or fewer in their own "undesirable" list, depending on their own values.

LEVELS OF INTOXICATION FOR UNDESIRABLE EFFECTS

The 19 "undesirable" effects are plotted with respect to level of intoxication in Figure 21-1. Descriptions will not be repeated here as they have all been presented in other chapters. Question numbers are given in the figure if the reader wishes to refresh himself on the exact wording of the question. The overall ordering of effects is highly significant ($p \lll .0005$).

FIGURE 21-1. "UNDESIRABLE" EFFECTS AND LEVELS OF INTOXICATION

Just	Fairly	Strongly	Very Strongly	Maximum
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> <i>Type size code:</i> CHARACTERISTIC COMMON INFREQUENT Rare </div>				
				Vomit (Q210)
				Feel dizzy, nauseated (Q74)
				CAN'T COME DOWN (Q205)
				Possessed, hostile force (Q180)
				Sounds blurry (Q26)
				SENSE OF BALANCE ERRATIC (Q103)
				HARD TO ORGANIZE NEXT DAY (Q209)
				Worry about losing control (Q171)
				HARD TO FALL ASLEEP (Q196)
				Vision blurry (Q11)
				CAN'T THINK CLEARLY, THOUGHTS SLIP AWAY (Q134)
				Sleep poor, restless (Q200)
				FEEL PARANOID ABOUT COMPANIONS (Q108)
				MIND FEELS LESS EFFICIENT ON PROBLEMS (Q142)
				FEEL PHYSICALLY WEAKER (Q9H)
				EASILY SIDETRACKED (Q175)
				MEMORY WORSE FOR FORGOTTEN EVENTS (Q152)
				WORK LESS ACCURATELY ON PROBLEMS, LATER EVALUATION (Q144)
				Invariably feel bad when stoned (Q166)

Undesirable effects are not frequent. Of the 19 effects, one was characteristic, four were common, six were infrequent, and eight were rare. For the other 184 effects, which could be rated for frequency of occurrence and which were pleasant, emotionally interesting, or *equivocally* undesirable, 29 were characteristic, 91 were common, 51 were infrequent, and 13 were rare. The clearly undesirable effects thus occur much less frequently ($p < .0005$) than the general run of effects. This is, of course, not surprising, as selecting experienced marijuana users for the present study assures getting a sample for whom pleasant effects predominate over unpleasant ones.

As Figure 21-1 shows, the relatively frequent "undesirable" effects, four dealing with decreased efficiency on problem solving[2] and one with feeling physically weak, begin to occur around the Strong level of intoxication. All the undesirable effects beginning at Very Strong and higher are infrequent or rare.

MODULATING FACTORS

The relatively linear effects of various background factors[3] are summarized in Table 21-1.

Moderate Total users indicated higher levels for not being able to come down when necessary than either Light or Heavy Total users.

It is of interest to note that many of the undesirable effects of intoxication in inexperienced users may be transitional ones that fade out with greater experience. Of the 19 effects, almost half are either significantly less frequent or occur at significantly higher levels for more experienced drug users. TABLE 21-1 EFFECTS OF BACKGROUND FACTORS ON

TABLE 21-1
EFFECTS OF BACKGROUND FACTORS ON "UNDESIRABLE" EFFECTS

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequent: Get sidetracked More Intoxicated for: Vision blurry Invariably feel bad Get sidetracked	Less frequent: Feel paranoid Thoughts slip away before fully grasped Mind feels less efficient Worry about losing control Hard to organize next day Can't come down when necessary
Older	More frequent: Hard to organize next day More intoxicated for: Sense of balance erratic	Less frequent: Get sidetracked

More Educated		Less frequent: Memory worse Get sidetracked Less intoxicated for: Get sidetracked Hard to organize next day
Males		Less frequent: Vision blurry Sense of balance erratic Can't come down when necessary
Meditators		Less intoxicated for: Feel paranoid

SUMMARY

Less than 10 percent of the effects of intoxication investigated in this study seemed unequivocally "undesirable" in nature, and these effects were primarily infrequent and rare. With greater drug experience, almost half of these became even less frequent or were shifted to very high levels of intoxication. The pleasures of intoxication far outweigh the drawbacks in reports of experienced users.

Footnotes

1. This includes the regular 206 items plus 8 validity scale items which were reported on in the text because of their inherent interest. ([back](#))

2. One of my more sophisticated informants suggests that it is misleading to classify difficulty in problem solving as an unequivocally "undesirable" effect. This is so in a situation where the user is strongly intoxicated and suddenly forced to work on conventional problems, but ordinarily the user will not get intoxicated if he expects to have to work on conventional problems. He may get moderately intoxicated to work on a problem requiring much deliberate work and original points of view, or very strongly intoxicated if originality of solution but not sustained concentration on the problem is required. ([back](#))

3. For statistical reasons, the background analyses are not very sensitive here. Since most of the "undesirable" effects were infrequent or rare, only very large differences would show up in the background analyses. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 22. Aftereffects

A FEW OF THE ITEMS dealt with possible aftereffects of marijuana intoxication, even though aftereffects were seldom mentioned in the pilot interviews.

MAJOR AFTEREFFECTS

Memory for Periods of Intoxication

Two questions (158 and 159), already discussed in Chapter 14, dealt with memory for the period of intoxication. Both improved and worsened memory were common effects, occurring with equal frequency, but worsened memory tended to begin at the higher levels of intoxication.

Memory for material read while intoxicated was discussed in the same chapter. Poor memory was a common effect, improved memory an infrequent one. Levels of intoxication did not differ significantly, although comments from informants suggested that the very lowest levels of intoxication were associated with improved memory, but all levels above this with worsened memory for read material.

Changes in Religious, Philosophical Values

In Chapter 19 we found that 25 percent of the users reported spiritual experiences that had had a long-term

religious effect on them, and 22 percent reported that getting intoxicated with marijuana had acquired a religious significance. Other users indicated their dislike of the term "religious" but indicated that insights about themselves and the world during intoxication had greatly affected their philosophy of life.

Sleep

As discussed in Chapter 20, ease in going to sleep after being intoxicated for an evening is a characteristic effect, and having an especially refreshing night's sleep is very common. The converse effects were infrequent and rare, respectively, and occurred at much higher levels of intoxication.

Trembling

"I tremble a lot in my hands for a while after having been stoned" was added to the questionnaire as a validity scale item, as I had never heard of such an effect in pilot interviews. It turned out to be a rare effect in this sample (71%, 20%, 7%, 0%, 1%), associated with Very Strong levels of intoxication among the few who rated it (1%, 1%, 7%, 9%, 7%).

Next Day's Activity

"I find it very hard to get organized or accomplish anything I want to the day after smoking grass. (Circle lowest level at which this occurs)" is an infrequent effect (39%, 27%, 23%, 6%, 3%), which mainly begins to occur at the Very Strong level for those who could rate it (0%, 6%, 15%, 19%, 15%). It is reported as occurring more frequently by older users ($p < .05$), and less frequently by Heavy Total users ($p < .05$ overall and Users of Psychedelics ($p < .01$). The College-educated indicate higher levels of intoxication for this aftereffect ($p < .05$).

LEVELS OF INTOXICATION FOR AFTEREFFECTS

Figure 22-1 orders the various aftereffects by level of intoxication. The overall ordering is highly significant ($p < .0005$).

FIGURE 22-1. INTOXICATION LEVELS, AFTEREFFECTS

Just	Fairly	Strongly	Very Strongly	Maximum
-------------	---------------	-----------------	--------------------------	----------------

Tremble in hands after

Type size code:

CHARACTERISTIC
COMMON
INFREQUENT
Rare

HARD TO ORGANIZE NEXT DAY

DIFFICULT TO GET TO SLEEP

Sleep poor, restless

POOR MEMORY FOR PERIODS OF INTOXICATION

GOOD MEMORY FOR PERIODS OF INTOXICATION

SLEEP PARTICULARLY REFRESHING

WORSENERD MEMORY FOR READ MATERIAL

EASY TO GO TO SLEEP...?.*

BETTER MEMORY FOB READ MATERIAL..?.*

*There is some question whether this effect is available at all levels above the minimal one.

At the lower levels, we have some aftereffects that can be characterized as desirable, namely, ease of going to sleep, particularly refreshing sleep, and good memory for periods of intoxication. Poor recall of material read is the major exception to this.

At the Strong level we have the only other common aftereffect beginning to occur, poor memory for periods of intoxication.

At the higher levels there are a number of undesirable aftereffects, all infrequent or rare.

MODULATING FACTORS

The relatively linear effects of various background factors on aftereffects of intoxication are summarized in Table 22-1.

TABLE 20-1
EFFECTS OF BACKGROUND FACTORS ON AFTEREFFECTS

BACKGROUND FACTORS	EFFECTS	
More Drug Experience	More frequent: Good memory for period of intoxication Good memory for read material More Intoxicated for: Sleep particularly refreshing	Less frequent: Hard to organize next day

Older	More frequent:	Less frequent: Poor memory for read material
More Educated		Less frequent: Good memory for period of intoxication Less intoxicated for: Hard to organize next day Easy to go to sleep
Males		Less frequent: Good memory for period of intoxication
Meditation	More frequent: Spiritual experiences while intoxicated Religious significance to getting intoxicated	Less frequent: Poor memory for read material
Therapy & Growth	More frequent: Good memory for read material	Less frequent: Poor memory for read material

SUMMARY

There are very few aftereffects reported for marijuana intoxication, and many of these occur infrequently or rarely.

There is nothing comparable to the hangover of alcohol intoxication, although finding it hard to get organized and accomplish things the next day infrequently follows intoxication at the very high levels. This occurs less frequently among more experienced users.

It is easy to get to sleep and sleep is usually very refreshing following periods of intoxication.

The aftereffect hardest to assess is the long-term alteration of religious and philosophical beliefs of the users. Insights and spiritual experiences occurring during intoxication initiate many such changes.

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 23. Miscellaneous Effects

SEVERAL EFFECTS that did not fit with any of the categories used to organize other chapters are reported here. No overall comparison of intoxication levels or modulating factors will be made.

COMMON EFFECTS

Involvement

"I get much more involved in ordinary tasks than when I'm straight; they're completely absorbing" is a very common effect (7%, 11%, 33%, 33%, 14%), which begins to occur at Moderate to Strong levels (7%, 27%, 42%, 12%, 1%). It is experienced more frequently by the College-educated ($p < .01$) and at somewhat lower levels of intoxication by the Heavy Total users ($p < .05$).

Optimism-Pessimism

"I feel that the world is all right, that everything is pretty much the way it should be when stoned"

(*except for the marijuana laws*)" is a common effect (14%, 19%, 33%, 13%, 16%), which generally begins to occur at Moderate to Strong levels (9%, 27%, 29%, 11%, 3%). Meditators are highly variable on the level for this ($p < .01$, overall), while the Therapy and Growth group and the ordinary users peak sharply at the Fairly/Strongly level.

The converse effect, "*I feel the world is in pretty bad shape, that all sorts of changes need to be made in the social order to make it a decent place to live in (for things besides the marijuana laws)*" is also a common effect (8%, 17%, 26%, 23%, 19%), which occurs at the lowest levels (25%, 25%, 23%, 4%, 3%). The College-educated and the older users experience this more frequently ($p < .05$ in each case).

Both optimism and pessimism occur with about equal frequency, but optimism begins to occur at higher levels ($p < .01$).

Reality of Fantasies

"*With my eyes closed, my inner visions and fantasies become extremely real, as real as nighttime dreams.*" This is a common effect (11%, 19%, 27%, 27%, 14%) that begins to occur at the Strong and Very Strong levels (1%, 15%, 23%, 31%, 12%). The College-educated experience it more frequently ($p < .05$), but Daily users experience it less frequently than Weekly or Occasional users ($p < .05$, overall).

An even greater intensity of experience is expressed by "*Some of my inner trips, eyes-closed fantasies, have been so vivid and real that, even though I know logically they couldn't be real, they feel real; they are as real as ordinary waking-life experience.*" This is also a common experience (21%, 19%, 35%, 15%, 7%), which occurs at Very Strong levels (0%, 7%, 20%, 29%, 15%). The Professionals need to be more intoxicated for this ($p < .05$). It occurs less frequently than fantasies being as real as dreams ($p < .01$), but at essentially the same levels.

Going Up

Although users usually feel a smooth, continuous increase in level of intoxication as they smoke more marijuana, this is not always the case. "*I move up to higher levels of consciousness in jumps, sudden increases, rather than smoothly*" is a common experience effect (19%, 18%, 39%, 14%, 5%). This is experienced more often by Heavy Total users ($p < .05$, overall) and by Users of Psychedelics ($p < .01$).

ADDITIONAL EFFECTS

Included here are all miscellaneous effects volunteered by the users at the end of the questionnaire, which have not already been mentioned in previous chapters.

"Hashish produces a clear, cleaner, and more mental high than even high quality grass, like the

difference between beer and 100 proof vodka" (Usually, Strongly).

"My nose runs and sinuses clear if I have a cold" (Usually, Fairly).

"Heat, like in a sauna bath, heightens the psychedelic experience" (Rarely, Very Strongly).

"I take grass to get away from a painful situation, to escape for a while" (Rarely, Strongly).

"Stomach tranquilizer" (Very Often, Fairly).

"My nose gets stopped up" (Usually, Just).

"Fantastic vortices of energy form around me. Time/space warp, dissolve into quietude as I relax" (Rarely, Maximum).

"Creates interest and motivation in my work" (Usually, Just).

"A need to be surrounded by aesthetically beautiful surroundings all the time" (Usually, Just).

"Everyday events and experiences, such as riding in a car, walking, etc., take on a much greater meaning and pleasure" (Usually, Fairly).

"I love to look at natural, living things in great depth for a long time, even more than when I'm straight" (Usually, Just).

"All antinomies are reconciled in a march back toward an absolute" (Very Often, Just).

"Walking along a street becomes magical" (Sometimes, Fairly).

"I can close my eyes and shut out the world, i.e., it ceases to exist" (Usually, Strongly).

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On Being Stoned

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Chapter 24. Levels of Intoxication

THIS CHAPTER will summarize the data on minimal levels of intoxication for the various effects of marijuana intoxication. The first three sections will deal with overall views of the material, and the final section will present a detailed summary of *all* effects by minimal level of intoxication.

THE MINIMAL LEVEL MODEL AND TOTAL EFFECTS

The basic model of marijuana intoxication effects, discussed at length in Chapter 2, assumed that any given effect became available for the user to experience once he was intoxicated to some certain minimal degree *and* when the variables other than level of intoxication assumed necessary configurations. Above this minimal level, the model assumes that the effect is always available as long as the other variables maintain the necessary configurations.

Examination of the present data, combined with interviews with informants, has convinced me that this model is valid for the vast majority of the effects presented. In a few cases, however, it seems that at some level higher than the minimal level the effect may no longer be available. Ease of reading is an example; at the low levels of intoxication an increased fluency of reading may be experienced, but this drops out above the Moderate level and is replaced by reading difficulty (Chapter 15).

Further discussions will assume the general validity of the minimal level model unless otherwise noted. An important consequence of the minimal level model is that the nature of the marijuana experience at

any one time becomes more variable at higher levels of intoxication. That is, at higher levels of intoxication more and more effects are *potentially* available. In terms of experimental studies of intoxication, this means that non-drug variables (personality, set and setting, etc.) become increasingly important at high doses.

This is illustrated in Figure 24-1, a plot of the cumulative distributions of various types of effects by the minimal level of intoxication presented earlier for each individual effect.

At the Just to Fair levels, only five effects are available; by the time the Maximum level is reached, over two hundred effects are potentially available.

Looking at types of effects, we see that

Characteristic Effects almost all become available by the Fairly/Strongly level, Common Effects by the Strongly/Very Strongly level, Infrequent Effects by the Very Strongly level, and Rare Effects at the Very Strongly/Maximum level. Thus the experiences of a user who is mildly intoxicated are fairly predictable from this knowledge of level alone, but predictability drops off rapidly with increasing level.

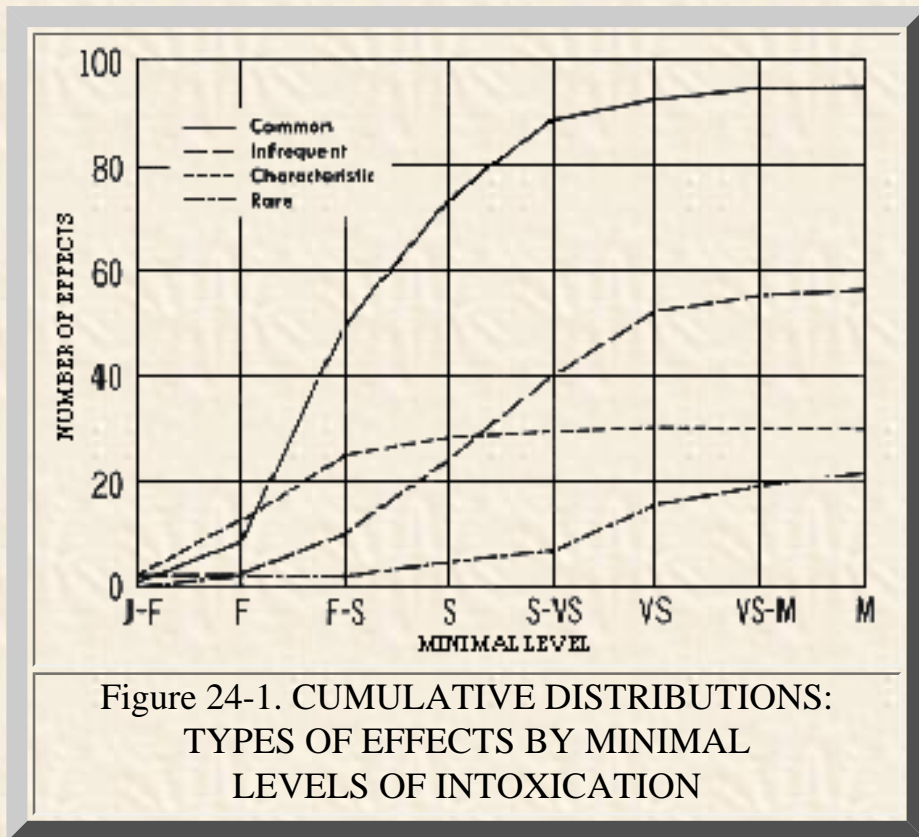


Figure 24-1. CUMULATIVE DISTRIBUTIONS: TYPES OF EFFECTS BY MINIMAL LEVELS OF INTOXICATION

LEVELS OF INTOXICATION AND CHARACTERISTIC EFFECTS

The 30 effects rated as occurring so frequently they were called *characteristic* (at least 50 percent of users rated them Very Often or Usually) are ordered by minimal level of intoxication in Figure 24-2. They range from the lowest level, Just/Fairly, up to the Very Strongly level. Most characteristic effects begin at the Fairly and Fairly/Strongly levels.

Characteristic effects come as close as we can presently get to indicating what the "pure drug effects" of marijuana might be. That is, because they occur so commonly, either they must result from very powerful effects of the drug that manifest regardless of other determining factors, or the necessary configuration of non-drug factors on which they depend for manifestation is extremely common within our culture. To some extent, then, Figure 24-2 represents the relationship of relatively "pure drug effects" to level of intoxication.

FIGURE 24-2. LEVELS OF INTOXICATION, CHARACTERISTIC EFFECTS

Just Fairly Strongly Very Strongly Maximum

Type size code:

MOST CHARACTERISTIC

VERY CHARACTERISTIC

CHARACTERISTIC

FORGET START OF CONVERSATION

NEW QUALITIES TO SEXUAL ORGASM

EASILY SIDETRACKED

MORE HERE-AND-NOW

SEE PATTERNS IN NORMALLY AMBIGUOUS VISUAL MATERIAL

TIME PASSES MORE SLOWLY

DISTANCE IN WALKING CHANGED

SPONTANEOUS INSIGHTS ABOUT SELF

MORE CHILDLIKE, OPEN TO EXPERIENCE

DIFFICULT TO READ

PHYSICALLY RELAXED

NEW QUALITIES TO TOUCH

MOVEMENT EXCEPTIONALLY SMOOTH WHEN DANCING

TOUCH MORE EXCITING, SENSUAL

GREATER SPATIAL SEPARATION BETWEEN MUSICAL INSTRUMENTS

DEEP INSIGHTS INTO OTHERS

VISUAL IMAGERY MORE INTENSE

APPRECIATE VERY SUBTLE HUMOR

HARD TO PLAY ORDINARY SOCIAL GAMES

LESS NOISY AT PARTIES THAN WHEN STRAIGHT

LESS NEED TO FEEL IN CONTROL OF THINGS

MORE TOLERANT OF CONTRADICTIONS

INVARIABLY FEEL GOOD FROM TURNING ON

TASTE SENSATIONS HAVE NEW QUALITIES

EASY TO GET TO SLEEP AT BEDTIME..?..?..?*

UNDERSTAND WORDS OF SONGS BETTER

ENJOY EATING A LOT

LESS NOISY AT PARTIES THAN WHEN TIPSY OR DRUNK

NEW, SUBTLE QUALITIES TO SOUNDS

CAN COME DOWN AT WILL

Just

Fairly

Strongly

**Very
Strongly** **Maximum**

*There is some question whether this effect is available at all levels above the minimal one.

Marijuana users usually test the quality of the marijuana they are buying. This is done either by smoking a fixed amount of it and rating the level of intoxication reached or by smoking until a desired level of intoxication is reached and noting how much marijuana was required. While each marijuana user probably has certain idiosyncratic effects he uses to judge how intoxicated he is, some of the characteristic effects presented in Figure 24-2 probably function commonly as a guide to level and thus to the potency of the marijuana.

Because so few characteristic effects have a minimal level above the Strong level, Figure 24-2 does not provide useful information about what else, in addition to these characteristic effects, may occur at the higher levels of intoxication. Such data is found in the final two sections of this chapter.

LEVELS OF INTOXICATION AND TYPES OF EFFECTS

To determine what sorts of effects may begin to occur at each of the eight levels of intoxications distinguished in this study, one could tabulate the effects beginning for each level, and this has been done in the next section. This is a cumbersome procedure, however, and it also tends to overwhelm the general reader with material, even if very useful for the researcher.

I have condensed most of the effects reported on earlier into sixteen general categories, explained below. I then determined the minimal level of intoxication where at least 50 percent of the effects in the category had begun. [2] These categories and their average minimal levels are plotted in Figure 24-3. No attempt was made to include frequency of occurrence information in this graph, as was done in earlier graphs of this sort.

FIGURE 24-3. TYPES OF EFFECTS AND MINIMAL LEVEL OF INTOXICATION

Just	Fairly	Strongly	Very Strongly	Maximum
				NAUSEA
				MYSTICAL & PARANORMAL EXPERIENCES
				IDENTITY CHANGES
				LOSS OF CONTACT
				MEMORY ALTERATIONS
				INTERNAL BODY AWARENESS
				DRIFTING, LOSS OF CONTROL, INEFFICIENCY
				INTENSIFIED IMAGERY, FANTASY, HALLUCINATIONS
				SPACE TIME ALTERATIONS

AFTEREFFECTS
 INSIGHTS INTO SELF AND ALTERATIONS IN COGNITIVE PROCESSES
 FOCUSING, CENTERING, EFFICIENCY.??.*
 GREATER SENSITIVITY AND SUBTLETY IN INTERPERSONAL RELATIONSHIPS
 SENSORY ENHANCEMENT
 RELAXING, QUIETING, OPENING
 RESTLESSNESS

Just **Fairly** **Strongly** **Very Strongly** **Maximum**

*There is some question whether this effect is available at all levels above the minimal one.

Restlessness includes six effects[3] indicating restlessness, a desire to move about to do things.

Comments by informants indicated that these types of effects probably do not fit the minimal level model; i.e., restlessness is often a transitory phenomenon of the very low levels of intoxication and is replaced by relaxation and lethargy as soon as the user becomes more intoxicated. This is indicated by the use of question marks on the graph.

Relaxing, quieting, opening includes 52 effects indicating feeling physically relaxed, content, open to whatever happens, less striving, less active.

Sensory enhancement includes 72 items dealing with new, enhanced, or more subtle qualities of sensory perceptions of the external world.

Greater sensitivity and subtlety in interpersonal relationships includes 26 items dealing with feelings of insights into others, increased empathy with them, and the ability to interact in very subtle and sensitive ways, to play subtle "games" *Focusing, centering, efficiency* includes 28 items dealing with focusing more clearly on tasks at hand, being more here-and-now, being centered in oneself in a situation rather than pulled off balance, and feeling more capable and efficient at tasks. This is another category of effects that probably does not fit the minimal level model in all respects, with feelings of inefficiency being more likely at the higher levels of intoxication.

Insights into self and alteration of cognitive processes includes 32 items dealing with heightened awareness of one's mental processes and one's personality characteristics, often including the awareness of alteration in functioning of these processes.

Aftereffects includes some 14 effects occurring the day following a session of marijuana intoxication, without regard as to whether these are desirable or undesirable. *Space/time alterations* includes 37 effects dealing with changes in perception of space, spatial relationships, and time.

Intensified imagery, fantasy, hallucinations includes 41 effects indicating greatly intensified imagery in all sensory modalities, intensified and more absorbing fantasy activity, synesthesia, and visual hallucination.

Drifting, loss of control, inefficiency includes 36 effects reflecting an inability to concentrate, to perform tasks well, or to recall desired memories.

Internal body awareness includes 65 effects dealing with enhanced awareness of sensations and

processes inside one's body.

Memory alterations includes some 19 effects concerned with false memories, déjà vu, alterations in memory retrieval, state-specific memory, and the like. Simple worsening or bettering of recall has been included in the inefficiency or efficiency categories above.

Loss of contact includes 29 effects dealing with loss of contact with the external environment or one's own body, often resulting from absorption in internal activities.

Identity changes includes 9 effects dealing with temporary changes in personality, archetypal qualities to events, and changes in the relationship of self-concept to the body.

Mystical and paranormal experiences includes 12 effects dealing with spiritual experiences and ostensibly paranormal effects such as telepathy.

Nausea includes 2 effects dealing with the feeling of nausea and actual vomiting.

Considering the relation of types of effects to minimal level of intoxication as a whole, then, we see the following:

At the lowest levels there may be a mild restlessness, but this is replaced with relaxation, calmness, and quieting at only slightly higher levels. Sensory enhancement begins at low levels, coupled with feelings of being centered and efficient. While this sensory enhancement persists through all levels, feelings of efficiency may be replaced by those of inefficiency, inability to concentrate on a task, at Strong levels.

The Fairly/Strongly level also is characterized with feelings of insight into one's own and others' psychological processes, so that both thought and social interaction seem very subtle, clever, and different. Some aftereffects the next day follow intoxication at the Fairly/Strongly level, increasingly so at the very high levels.

At the Strong level major alterations in the perception of space and time may occur, and the user can become very absorbed in an inner world of thought, fantasy, and intensified bodily sensations, although social interaction is still easily possible.

At the Strongly/Very Strongly level and higher, memory is altered in its functioning, and the user may become so absorbed in inner experience that he temporarily loses contact with his own body and/or the environment. Mystical and ostensibly paranormal experiences sometimes occur.

Nausea and vomiting (both rare effects) may occur at the maximal level.

LEVELS OF INTOXICATION: DETAILED DATA

The following table presents all the effects of the present study classified by the average minimal level of intoxication. Within the table, the effects are ordered by the arithmetic mean of intoxication level ratings, with the effect having the lowest mean at the bottom.

Frequency data are given by type style in the usual convention; i.e., characteristic effects in boldface, infrequent effects in small caps, and rare effects in lower case. The question number of each effect is also given after the item as an aid to the reader.

TABLE 24-1
EFFECTS BY MINIMAL LEVEL OF INTOXICATION

Effects Beginning at the Just/Fairly Level:

HIGHER PEOPLE GET ME HIGHER (Q121)
LESS NOISY AT PARTIES THAN WHEN DRUNK (Q110)
REMEMBER MORE OF WHAT IS READ (Q20)
HEAR MORE SUBTLE CHANGES IN SOUNDS (Q24)
EASIER TO READ THAN WHEN STRAIGHT (Q19)

Effects Beginning at the Fairly Level:

LEARN A LOT ABOUT PSYCHOLOGICAL PROCESSES (Q138)
Invariably feel bad when intoxicated (Q166)
Colors get duller (Q2)
HARD TO PLAY ORDINARY SOCIAL GAMES (Q106)
CONTOURS GET SHARPER (Q10)
LESS NOISY AT PARTIES THAN WHEN STRAIGHT (Q109)
EASIER TO ACCEPT WHATEVER HAPPENS, LESS NEED TO CONTROL (Q170)
EASIER TO ACCEPT CONTRADICTIONS (Q137)
CRAVE SWEET THINGS TO EAT (Q46)
REMEMBER LESS OF WHAT IS READ (Q21)
TALK A LOT MORE THAN WHEN STRAIGHT (Q117)
WORK AT TASKS WITH EXTRA ENERGY AND ABSORPTION (Q179)
INVARIABLY FEEL GOOD WHEN INTOXICATED (Q165)
NEW QUALITIES TO TASTE (Q39)
FEEL THE WORLD IS IN BAD SHAPE (Q215)
EASY TO GO TO SLEEP AT BEDTIME (Q197)
UNDERSTAND THE WORDS OF SONGS BETTER (Q25)
MORE SOCIABLE (Q115)
ENJOY EATING AND EAT A LOT (Q44)

Effects Beginning at the Fairly/Strongly Level:

DISTANCES SEEM GREATER (Q52)
MEMORY FOR OTHERWISE FORGOTTEN EVENTS IS WORSE (Q152)
SEE PATTERNS, FORMS IN OTHERWISE AMBIGUOUS VISUAL MATERIAL (Q13)
TIME PASSES MORE SLOWLY (Q58)
LESS SOCIABLE (Q116)
PICTURES ACQUIRE A THIRD DIMENSION OF DEPTH (Q4)
STRONGLY INFLUENCED BY COMPANIONS (Q120)
TALK A LOT LESS (Q118)

DISTANCES IN WALKING CHANGED (Q51)

SPONTANEOUSLY HAVE INSIGHTS ABOUT MYSELF (Q139)

WORK ON TASKS LESS ACCURATELY, JUDGED BY LATER EVALUATION (Q144)

INHIBITIONS LOWERED (Q173)

SMELL HAS NEW QUALITIES (Q47)

VISUAL IMAGES AUTOMATICALLY ACCOMPANY THINKING (Q148)

SMELLS RICHER, MORE UNIQUE (Q48)

THINK IN A MORE INTUITIVE FASHION (Q149)

SURFACES SEEM ROUGHER, FORM INTERESTING PATTERNS (Q34)

BETTER PERSON TO MAKE LOVE WITH WHEN STONED (Q127)

PLEASANT, WARM TINGLING INSIDE BODY (Q81)

DREAMS MORE VIVID (Q201)

PAIN MORE INTENSE IF CONCENTRATED ON (Q89)

MORE INVOLVED IN ORDINARY TASKS (Q217)

OBJECTS SEEM HEAVIER (Q35)

FEEL MORE CHILDLIKE, OPEN TO EXPERIENCE (Q207)

CLOSER MENTAL CONTACT WITH PARTNER WHEN MAKING LOVE (Q125)

MORE DIFFICULT TO READ (Q18)

PLAY CHILDISH GAMES (Q105)

FEEL THE WORLD IS IN GOOD SHAPE (Q214)

PHYSICALLY RELAXED (Q99)

IDEAS MORE ORIGINAL, CREATIVE THAN WHEN STRAIGHT (Q145)

INSIGHTS ABOUT MYSELF IF I DELIBERATELY TRY TO HAVE THEM (Q140)

MEMORY FOR OTHERWISE FORGOTTEN EVENTS BETTER (Q151)

MOVEMENTS VERY SMOOTH, COORDINATED (Q100)

NEW QUALITIES TO TOUCH (Q31)

COMPULSIVE DESIRE TO GET HIGHER (Q176)

SURFACES FEEL SMOOTHER, SILKIER (Q33)

FEEL EMOTIONS MORE WEAKLY (Q162)

EVENTS AND THOUGHTS FLOW MORE SMOOTHLY (Q61)

TOUCH MORE EXCITING, SENSUAL (Q32)

DREAMS LESS VIVID (Q202)

NEED FOR SEX GOES UP (Q122)

GOOD MEMORY FOR PERIOD OF INTOXICATION (Q158)

GET PHYSICALLY RESTLESS, WANT TO MOVE AROUND (Q98)

GREATER SEPARATION BETWEEN INSTRUMENTS WHEN LISTENING TO STEREO (Q29)

EMPATHIZE STRONGLY WITH OTHERS (Q114)

FEELS AS IF MIND IS WORKING MORE EFFICIENTLY (Q141)

VIVID TASTE IMAGERY (Q45)

DEEP INSIGHTS INTO OTHERS (Q113)

SAY MORE PROFOUND THINGS (Q111)

AUDITORY IMAGERY MORE VIVID (Q27)

VISUAL IMAGERY MORE VIVID (Q8)

APPRECIATE MORE SUBTLE HUMOR (Q146)

MOOD BEFORE INTOXICATION AMPLIFIED BY INTOXICATION (Q160)

PLAY VERY ELABORATE GAMES (Q147)

WORK ON TASKS MORE ACCURATELY, JUDGED BY LATER EVALUATION (Q143)

NEW COLORS, SHADES OF COLOR (Q1)

SALIVATE A LOT (Q42)

MARKED INCREASE IN SEXUAL DESIRE IF SITUATION IS APPROPRIATE (Q124)

GROUP TAKES ON A SENSE OF UNITY WHEN STONED (Q112)

SLEEP MORE REFRESHING THAN USUAL (Q199)

MORE VISUAL IMAGERY WHILE READING (Q22)

RETASTE FOOD WHEN BELCHING (Q43)

Effects Beginning at the Strongly Level:

BODY FEELS LIGHT, FLOATY (Q79)

BODY FEELS HEAVY (Q80)

LOSE AWARENESS OF BODY UNLESS STRONG STIMULUS OCCURS(Q70)

VISUAL DEPTH MAGNIFIED (Q14)

SPACE BECOMES AN AUDITORY SPACE (Q30)

Others seem dead, lifeless (Q119)

POOR MEMORY FOR PERIOD OF INTOXICATION (Q159)

DEJA VU (Q63)

FEELS AS IF MIND IS WORKING LESS EFFICIENTLY (Q142)

LONG TIME DELAY BETWEEN CHEWING AND TASTING (Q41)

Less desire for sex (Q123)

VIVID TACTUAL IMAGERY (Q37)

EVENTS AND THOUGHTS FOLLOW JERKILY (Q62)

SKIP INTERMEDIATE STEPS IN PROBLEM SOLVING (Q133)

TIME PASSES MORE RAPIDLY (Q59)

VERY AWARE OF BREATHING (Q73)

SOUND OF OWN VOICE CHANGES (Q28)

FOCUSED SIGHTS VERY REAL, OTHERS DIM—VISUAL CENTRALITY (Q12)

World looks flat, lacks depth (Q5)

MOVEMENTS AWKWARD (Q 101)

DROWSY EARLY IN EVENING (Q198)

FEEL WEAKER (Q96)

DISTANCES SEEM SHORTER (Q53)

FEEL UNIQUE, NO ONE IS LIKE ME (Q188)

THINGS IN PERIPHERY LOOK DIFFERENT (Q9)

AWARE OF HEART BEATING (Q92)

FEEL STRONGER (Q95)

SPONTANEOUSLY REMEMBER THINGS LONG FORGOTTEN (Q150)

LESS AWARE OF BODILY COMPONENTS OF EMOTION (Q164)
VIVID SMELL IMAGERY (Q50)
NEW QUALITIES TO TEMPERATURE (Q38)
PAIN EASY TO TOLERATE IF ATTENTION DIVERTED (Q88)
GIVE LESS THOUGHT TO CONSEQUENCES OF ACTIONS (Q131)
FEEL VERY POWERFUL. CAPABLE (Q190)
NEW QUALITIES TO SEXUAL ORGASM (Q128)
OBJECTS SEEM LIGHTER (Q36)
CAN MEDITATE MORE EFFECTIVELY (Q193)
EASILY SIDETRACKED, FORGET TO FINISH TASKS (Q175)
MORE HERE-AND-NOW (Q136)
GIGGLE A LOT (Q174)
NEW MEANING TO COMMONPLACE SAYING, EVENTS (Q135)
FEEL EMOTIONS MORE STRONGLY (Q161)
EXCELLENT CONTROL OF FANTASIES (Q178)
MORE AWARE OF BODILY COMPONENTS OF EMOTION (Q163)

Effects Beginning at the Strongly/Very Strongly Level:

SPACE TAKES ON A SOLID QUALITY (Q56)
AWARE OF INTERNAL ORGANS NORMALLY UNAWARE OF (Q75)
FORGET START OF SENTENCE (Q154)
LOSE SENSE OF SEPARATE SELF, AT ONE WITH WORLD (Q189)
MUSCLES DEVELOP A TREMOR (Q86)
PERSONALITY CHANGES A LOT WHILE STONED (Q185)
IN TOUCH WITH A HIGHER POWER (Q177)
POOR CONTROL OF FANTASIES (Q177)
LOCATION OF CONSCIOUSNESS IN BODY SHIFTS (Q77)
SO ABSORBED IN FANTASY THAT ATTENTION MUST BE GOTTEN FORCIBLY (Q129)
VISION BLURRY (Q11)
CAN'T THINK CLEARLY, THOUGHTS SLIP AWAY BEFORE GRASPED (Q134)
EVENTS BECOME ARCHETYPAL (Q191)
INNER VISIONS AS REAL AS NOCTURNAL DREAMS (Q218)
THINK I'VE SAID SOMETHING WHEN I'VE ONLY THOUGHT ABOUT IT (Q156)
THINGS GET NEAR OR FURTHER AS I LOOK AT THEM—DEPTH JIGGLE (Q15)
VIBRATION OR TINGLING IN BODY, NOT PHYSICAL TREMOR (Q85)
VERY AWARE OF INTERNAL ORGANS WHILE DEFECATING OR URINATING (Q78)
BODY FEELS LARGER (Q90)
BODY FEELS SMALLER (Q91)
Sleep poor and restless (Q200)
POWER, FORCE, ENERGY SENSATIONS IN BODY (Q82)
FEEL ISOLATED FROM THINGS AROUND ME (Q107)

CAN CONVERSE INTELLIGENTLY DESPITE SHORTENED MEMORY SPAN (Q155)

Smell sensations broken into components (Q49)

FORGET START OF CONVERSATION (Q153)

FINISH PHYSICAL TASK EVEN THOUGH MENTALLY LOST TRACK OF (Q130)

BODY PART ATTENDED TO STANDS OUT MUCH MORE (Q71)

SENSUAL QUALITY TO VISION (Q3)

FEEL ISOLATED FROM PARTNER WHILE MAKING LOVE (Q126)

OTHERS HAVEN'T NOTICED I'M STONED (Q212)

FEEL PARANOID, SUSPICIOUS ABOUT OTHERS WITH ME (Q108)

So AWARE OF PEOPLE'S THOUGHTS IT MUST BE TELEPATHY (Q65)

TASTE SENSATIONS DIVIDED INTO COMPONENTS (Q40)

Effects Beginning at the Very Strongly Level:

CAN'T COME DOWN QUICKLY ABOVE THIS LEVEL (Q205)

BODY NUMB (Q76)

GET SO LOST IN FANTASY IT TAKES A WHILE TO REORIENT AFTER (Q55)

ANOTHER PERSON'S FACE WILL CHANGE AS I WATCH IT (Q16)

CAN COME DOWN AT WILL IF NECESSARY (Q184)

OBJECTS VIBRATE OR PULSE AS IF THEY HAD A LIFE OF THEIR OWN (Q 17)

Parts of body have moved by themselves (Q182)

SENSE OF BALANCE ERRATIC (Q103)

Tremble a lot in hands after having been stoned (Q102)

HARD TO GET ORGANIZED NEXT DAY (Q209)

Can perform magical operations to affect things or people (Q68)

AURAS AROUND OBJECTS (Q7)

INNER TRIPS, FANTASIES AS REAL AS REALITY (Q208)

Possessed by a good force (Q181)

LOSE CONTROL OVER THOUGHTS (Q183)

OTHERS HAVE NOTICED I ACT DIFFERENTLY WHEN STONED (Q211)

PROLONGED BLANK PERIODS (Q219)

FELT SHAPE OF BODY DOESN'T CORRESPOND TO ACTUAL FORM (Q69)

SYNESTHESIA: SOUNDS HAVE VISUAL IMAGES ASSOCIATED (Q216)

Worry about losing control (Q171)

Aware of energy flowing in spine (Q83)

THINK SOMETHING IS A MEMORY THAT TURNS OUT TO BE A FANTASY (Q157)

DIFFICULT TO GET TO SLEEP AT BEDTIME (Q196)

Do antisocial things that hurt others (Q172)

Precognition, able to foretell future (Q66)

Effects Beginning at the Very Strongly/Maximum Level:

Possessed by an evil force (Q180)
MERGE WITH OBJECT OR PERSON CONTEMPLATED (Q186)
HAVE LOST ALL CONSCIOUSNESS OF BODY DURING FANTASY TRIPS (Q94)
TIME SEEMS TO STOP (Q60)
AURAS AROUND PEOPLE (Q6)
HALLUCINATIONS (Q23)
Aware of *chakra* centers along spine (Q84)
Sounds are blurry, indistinct (Q26)

Effects Beginning at the Maximum Level:

Felt nauseated and vomited (Q210)
Felt dizzy or nauseated (Q74)
LOST ALL CONSCIOUSNESS OF BODY, FLOATED IN LIMITLESS SPACE (Q93)

Footnotes

1. No effect was commonly rated as beginning at the Just level. ([back](#))
2. I shall not present the methods for this tabulation in any detail, as it involved a good deal of my personal judgment, and I am not certain others would classify individual effects the same way. Figure 24-3 is offered more as a suggestion to research than as a final account. ([back](#))
3. Note that the number of times constituting a given category has no necessary relation to the commonness of such effects; it was determined by the construction of the questionnaire. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 25. Experience in Using Drugs

THE 150 USERS had a wide range of experience in drug use. Marijuana use ran from less than six months experience to more than eleven years use. Seventy-two percent had tried major psychedelic drugs such as LSD.

Three background analyses for drug use were carried out, namely, by total amount of use of marijuana, frequency of use of marijuana in the six months immediately preceding filling out the questionnaire, and use or non-use of major psychedelics.

Total marijuana use was divided, according to the method described in Chapter 5, so as to yield three groups, termed Heavy Total users, Moderate Total users, and Light Total users. Frequency of use in the preceding six months also produced three groups, the Daily, Weekly, and Occasional users. Users of Psychedelics were those who had tried any major psychedelic drug at least once.

The number of significant comparisons for each of these background variables is presented in Table 25-1, below. While Frequency of Use yielded only a few more significant comparisons than might be expected by chance, Total Use and Psychedelic Use yielded many more, and so are highly significant factors affecting marijuana intoxication.

TABLE 25-1
NUMBER OF SIGNIFICANT COMPARISONS,
VARIOUS BACKGROUND VARIABLES

SIGNIFICANCE LEVEL	TOTAL USE	FREQUENCY OF USE	USE OF PSYCHEDELICS	EXPECTED BY CHANCE
-------------------------------	------------------	-----------------------------	--------------------------------	-------------------------------

</= .05	42	21	33	19
</= .01	9	7	13	4
</= .001	5	1	4	0

As detailed descriptions of the effects of each of the three background variables have been presented with each item description, this chapter will summarize these effects on a dimension of greater or lesser drug experience. That is, Users of Psychedelics have more drug experience than Non-users, Heavy Total users more than Moderate Total users, Weekly users more than Occasional users, etc. Most of the three category comparisons (Total Use and Frequency of Use) showed a linear trend, i.e., the Heavy or Daily category users showing the greatest frequency or highest minimal level, the Moderate or Weekly next highest, and the Light or Occasional users the least. Thus the summary statements in the following tables that "users with more drug experience report effect X more or less frequently or at higher or lower levels than users with less drug experience" generally adequately summarizes a finding.

Ten percent of the significant differences were not linear: the Moderate or Weekly users showed the highest or lowest value. These nonlinear effects, mostly from the Frequency of Use analyses, are shown in a separate table.

Table 25-2 summarizes 40 effects experienced more frequently by users with greater drug experience. Overall frequency of occurrence is summarized in the usual type style code.

TABLE 25-2
EFFECTS MORE FREQUENT IN USERS WITH MORE DRUG EXPERIENCE

CATEGORY	INTOXICATION EFFECT [a]	SIGNIFICANCE LEVEL
	SENSUAL QUALITY TO VISION, T	.01
	AURAS AROUND PEOPLE, P	.0005
Vision	AURAS AROUND OBJECTS, T, P	.05, .05
	FACE CHANGES, P	.01
	VISUAL HALLUCINATIONS, T	.05
Hearing	SPACE BECOMES AN AUDITORY SPACE, P	.05
Touch	VIVID TACTILE IMAGERY, T	.05
Taste	SALIVATE A LOT, T	.01
	RETASTE FOOD WHEN BELCHING, T	.05
Smell	NEW QUALITIES TO SMELL, T	.05
	SMELLS, RICHER, MORE UNIQUE, T. P	.05, .05
Space/Time	TIME PASSES RAPIDLY, T	.05

	TELEPATHY, T	.01
Paranormal	Precognition, T, F	.05, .001
	Magical operations, F	.01
	AWARE INTERNAL ORGANS IN DEFECATING, T	.05
	FEELINGS OF ENERGY IN BODY, P	.05
Body	Feel energy in spine, P	.05
	Aware of <i>chakra</i> centers, T	.05
	BODY FEELS SMALLER, T	.05
	FEEL STRONGER, T	.01
	MOVEMENTS AWKWARD, UNCOORDINATED, T, F, P	.05, .05, .01
Social	LESS NOISY AT PARTIES THAN WHEN STRAIGHT, F	.05
Sex	MORE NEED FOR SEX IF SITUATION APPROPRIATE, P	.05
	CLOSER TO SEXUAL PARTNER, UNION OF SOULS, P	.0005
Thought	ABSORBED, ATTENTION MUST BE GOTTEN FORCIBLY, P	.05
	MORE SUBTLE HUMOR, T	.05
	EASIER TO READ, T	.05
Memory	RECALL MORE OF MATERIAL READ, T, F, P	.001 .05, .05
	GOOD MEMORY FOR PERIODS OF INTOXICATION, F	.01
	EASILY SIDETRACKED, P	.05
Control	COMPULSIVE DESIRE TO GET HIGHER, T, F	.01, .05
	EXTRA ENERGY, EFFICIENCY FOR TASKS, T	.001
	CAN COME DOWN AT WILL, T, F, P	.05, .05, .01
Identity	PERSONALITY CHANGES TEMPORARILY, F	.05
	FEEL POWERFUL, CAPABLE, INTELLIGENT, T	.05
	EVENTS, ACTIONS ARCHETYPAL, P	.05
Spiritual	IN TOUCH WITH A HIGHER POWER, P	.01
	MEDITATE MORE EFFECTIVELY, F	.01
Miscellaneous	GO UP IN JUMPS, T	.05

[a] The letter T (Total Use), F (Frequency of Use), or P (Use of Psychedelics) following each effect indicates which background variables were the significant ones.

One would expect that users with more drug experience would have experienced a wider variety of effects. Three rare effects and 18 infrequent effects are indeed experienced more frequently by users with more drug experience.

Table 25-3 summarizes 23 effects experienced less frequently by the more experienced users; Table 25-4, the 20 effects for which more experienced users have a higher minimal level of intoxication; and Table 25-5, the 18 effects for which they have a lower minimal level.

TABLE 25-3

EFFECTS LESS FREQUENT IN USERS WITH MORE DRUG EXPERIENCE

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
Vision	PERIPHERAL VISION CHANGES, P	.01
Hearing	UNDERSTOOD WORDS OF SONGS BETTER, T, P	.05, .01
Touch	OBJECTS SEEM HEAVIER, MASSIVE, P	.05
Taste	DELAY BETWEEN CHEWING AND TASTING, P	.01
	ENJOY EATING AND EAT A LOT, P	.05
Space/Time	LOSE TRACK, NEED TO REORIENT, P	.05
	LOSE AWARENESS OF BODY PARTS NOT FOCUSED, P	.0005
	PAIN MORE INTENSE IF CONCENTRATED ON, P	.05
Body	LOSE ALL CONSCIOUSNESS OF BODY DURING FANTASY TRIPS, F	.01
	MOVEMENT EXCEPTIONALLY SMOOTH, P	.01
Social	HARD TO PLAY ORDINARY SOCIAL GAMES, T	.0005
	FEEL PARANOID, P	.01
	LESS THOUGHT TO CONSEQUENCES OF ACTIONS, T	.001
	THOUGHTS SLIP AWAY BEFORE GRASPED, F, P	.05, .05
Thought	HERE AND NOW, T	.01
	MIND FEELS LESS EFFICIENT, T, P	.05, .05
	HARDER TO READ, T	.01
	MIND GOES BLANK, P	.05
Memory	THINK SAID SOMETHING WHEN HAVEN'T, T, P	.05
Control	Worry about losing control, F	.05
	CAN'T COME DOWN AT WILL, P	.05
Aftereffects	HARD TO ORGANIZE NEXT DAY, T, P	.05, .01
Miscellaneous	INNER VISIONS AS REAL AS NOCTURNAL DREAMS, F	.05

TABLE 25-4
EFFECTS THAT USERS WITH MORE DRUG EXPERIENCE
MUST BE MORE INTOXICATED TO EXPERIENCE

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
-----------------	----------------------------	---------------------------

Vision	PERIPHERAL VISION CHANGES, P	.05
	BLURRING OF VISION, F	.05
	MORE CENTRALITY OF VISION, F	.05
	PULSING OF VISION, P	.05
Hearing	SPACE BECOMES AN AUDITORY SPACE, T	.05
Space/Time	TIME PASSES MORE SLOWLY, T	.05
	EVENTS FOLLOW EACH OTHER JERKILY, P	.05
Social	TALK MORE, P	.01
	PEOPLE HAVEN'T NOTICED I'M STONED, T, P	.05, .05
Thought	ABSORBED, ATTENTION MUST BE GOTTEN FORCIBLY T	.05
Memory	FORGET START OF CONVERSATION, T	.05
	THINK I'VE SAID SOMETHING WHEN HAVEN'T, P	.05
Emotion	Usually feel bad when stoned, T	.05
	GIGGLE A LOT, T	.05
Control	EASILY SIDETRACKED, P	.05
	EXTRA ENERGY, EFFICIENCY FOR TASKS, T	.05
	CAN COME DOWN AT WILL, P	.01
Sleep	EARLY EVENING DROWSINESS, T, F	.001, .01
	SLEEP PARTICULARLY REFRESHING, F	.05
	DREAMS LESS VIVID OR FORGOTTEN, T	.05

TABLE 25-5
EFFECTS THAT USERS WITH MORE DRUG EXPERIENCE
CAN EXPERIENCE AT LOWER LEVELS OF INTOXICATION

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
Vision	SENSUAL QUALITY TO VISION, T	.05
Taste	VIVID TASTE IMAGERY, P	.05
Space/Time	TIME STOPS, P	.05
Paranormal	TELEPATHY, P	.05
Body	PAIN MORE INTENSE IF CONCENTRATED ON, T	.05
	LESS NOISY AT PARTIES THAN WHEN STRAIGHT, P	.05
Social	SAY MORE PROFOUND THINGS, P	.05
	People seem like robots, P	.05
	PLAY ELABORATE GAMES, T, P	.05, .05

Sex	MORE NEED FOR SEX, P	.0005
	CLOSER TO SEXUAL PARTNER, T, F	.05, .05
Thought	LESS THOUGHT TO CONSEQUENCES OF ACTIONS, F	.05
	INSIGHTS INTO OTHERS, T	.05
	SPONTANEOUS INSIGHTS INTO SELF, P	.01
Memory	MISTAKE FANTASY FOR MEMORY, T	.05
Identity	FEEL POWERFUL, CAPABLE, INTELLIGENT, T, F	.01, .05
Spiritual	MEDITATE MORE EFFECTIVELY, P	.05
Miscellaneous	MORE INVOLVED IN ORDINARY TASKS, T	.05

In the basic model of drug intoxication set forth in Chapter 2, it was hypothesized that increasing experience with drug-induced states of consciousness would generally result in the user's experiencing fewer negative, unpleasant effects and/or that such negative effects would be pushed to higher levels of intoxication. This is generally confirmed by the data. Of the 19 unequivocally "undesirable" effects (discussed fully in Chapter 21), about half are experienced significantly less frequently or have higher minimal levels for the users with more drug experience, with only one comparison being significant in the opposite direction.

It was also hypothesized that increased drug experience would generally lead to increased control of the intoxicated state. This is also confirmed by the data. Experienced users worry less frequently about losing control, find less frequently that they can't come down if necessary, must be more intoxicated to be sidetracked, and can come down at will more frequently and from higher levels. The one finding contrary to this hypothesis is that they experienced being easily sidetracked more frequently.

A heavy marijuana user would also have many more occasions on which he had to function in ordinary (non-drug subculture) situations with ordinary people. A number of background differences, in addition to increased control, would seem to reflect this need to function frequently in ordinary situations, namely, increased frequency of ease in reading and good memory for periods of intoxication; decreased frequency of losing track and needing to reorient, finding it hard to play ordinary social games, feelings of paranoia about companions, giving less thought to consequences of actions, here-and-now-ness (too much would interfere with planning), and thinking you've said something when you haven't.

The thirteen non-linear effects of background variables are summarized in Table 25-6.

TABLE 25-6
NON-LINEAR EFFECTS OF TOTAL USE AND FREQUENCY OF USE

CATEGORY	INTOXICATION EFFECT: WEEKLY OR MODERATE USERS	SIGNIFICANCE LEVEL
<i>More frequently experience:</i>		
Space/Time	SPACE, AIR TAKES ON SOLID QUALITY, F	.05

Social	LESS NOISY AT PARTIES THAN WHEN DRUNK, T	.05
	STRONGLY INFLUENCED BY COMPANIONS, F	.05
<i>Less frequently experience:</i>		
Thought	MORE WILLING TO ACCEPT CONTRADICTIONS, T	.01
<i>Must be more intoxicated to experience:</i>		
Vision	VISUAL JIGGLE, T, F	.05, .01
	IMAGERY WHILE READING, F	.05
Body	PHYSICALLY RELAXED, DON'T WANT TO MOVE, F	.05
	MOTIONS EXCEPTIONALLY SMOOTH, F	.05
Thought	FINISH TASK EVEN THOUGH MENTALLY LOST TRACK OF, T	.05
Memory	CONVERSE INTELLIGENTLY DESPITE SHORTENING OF MEMORY SPAN, F	.05
	THINK SAID SOMETHING WHEN HAVEN'T, F	.01
<i>Need be less intoxicated to experience:</i>		
Hearing	SPACE BECOMES AN AUDITORY SPACE, T	.05
Taste	CRAVE SWEET THINGS, T	.05

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Charles T. Tart, Ph. D.

Chapter 26. Meditation and Growth

THE QUESTIONNAIRE asked whether the users regularly practiced any sort of meditation or non-drug discipline for spiritual or personal growth. Sixteen percent indicated regular practice of some form of Oriental or Occidental meditation. Seven percent indicated they were or had been regularly involved in some form of conventional psychotherapy (2 percent) or growth discipline (5 percent), such as psychoanalysis, Gestalt therapy, sensitivity training, encounter groups, etc. Users indicating irregular practice were not included in either the Meditation group or the Therapy and Growth group.

Overall, the three-way chi-square analyses comparing the Meditators and the Therapy and Growth group against all other users were quite significant. Twenty-eight analyses were significant at the .05 level (19 expected by chance), 14 at the .01 level (4 expected by chance) and 2 at the .001 level (none expected by chance).

In most analyses, either the Meditators or the Therapy and Growth group were clearly higher or lower than Ordinary Users. Occasionally both these groups were higher or lower than the Ordinary Users, and in such cases both groups have been indicated in the summary tables as significantly different from Ordinary Users.^[1]

Most often the Meditators were clearly higher or lower on various effects than the Therapy and Growth group or the Ordinary users. Tables 26-1 and 26-2 summarize significant differences for the Meditators. The Meditators more frequently experience a variety of effects, which we would expect in such a group of fairly disciplined^[2] people.

Table 26-3 summarizes significant differences for the Therapy and Growth group. This is a rather mixed group in terms of disciplines followed, making the results difficult to interpret.

TABLE 26-1
MEDITATION AND FREQUENCY OF VARIOUS INTOXICATION EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
Meditators <i>more</i> frequently experience:		
Vision	FACE OF ANOTHER PERSON CHANGES	.05
Taste	RETASTE FOOD WHEN BELCHING	.01
Space/Time	AIR, SPACE BECOMES SOLID	.05
Paranormal	<i>*OOBEs before beginning marijuana use</i>	.01
Body	ENERGY FEELINGS IN BODY	.05
	Energy in spine	.05
	Aware of <i>chakra</i> centers	.01
Emotion	PRE-INTOXICATION MOOD AMPLIFIED	.05
Identity	MERGE WITH OBJECT OR PERSON CONTEMPLATED	.01
	AT ONE WITH THE WORLD	.01
Spiritual	IN TOUCH WITH A HIGHER POWER	.01
	MEDITATE MORE EFFECTIVELY	.05
	a. Spiritual experiences while intoxicated	.0005
	a. Religious significance to getting intoxicated	.01
Meditators <i>less</i> frequently experience:		
Hearing	AUDITORY IMAGERY BETTER	.01
Taste	VIVID TASTE IMAGERY	.05
Space/Time	JERKINESS OF FLOW OF EVENTS	.05
Social	FEEL ISOLATED	.01
	TALK MORE	.05
Sex	NEW QUALITIES TO ORGASM	.01
Thought	RECALL LESS OF MATERIAL READ	.05

[a]Not coded as to frequency of occurrence by type style.

TABLE 26-2
MEDITATION AND LEVELS OF INTOXICATION FOR VARIOUS EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
Meditators must be <i>more</i> intoxicated to experience:		
Hearing	AUDITORY IMAGERY ENHANCED	.05
Social	LESS SOCIABLE	.05
Miscellaneous	FEEL THE WORLD IS ALL RIGHT	.01
Meditators need be <i>less</i> intoxicated to experience:		
Hearing	AUDITORY SPACE	.05
Touch	NEW QUALITIES TO TOUCH	.05
	TOUCH MORE SENSUAL	.01
Taste	VIVID TASTE IMAGERY	.01
Space/Time	WALKING DISTANCE CHANGED	.01
Body	HYPERAWARENESS OF BREATHING	.01
Social	FEEL PARANOID	.05
Thought	MORE HERE-AND-NOW	.05
	THINK MORE INTUITIVELY	.05
Sleep	EARLY EVENING DROWSINESS	.001

TABLE 26-3
THERAPY AND GROWTH GROUP AND
FREQUENCY OF VARIOUS INTOXICATION EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
Therapy & Growth Group <i>less</i> frequently experiences:		
Vision	NEW COLORS	.05
Thought	HARDER TO READ	.05
Memory	RECALL LESS OF MATERIAL READ	.05
Therapy & Growth Group <i>more</i> frequently experience:		
Paranormal	<i>a. OOBES</i>	.05

	<i>a. Multiple OOBes</i>	.05
Body	AWARE OF INTERNAL ORGANS WHEN DEFECATING	.05
Memory	RECALL MORE OF MATERIAL READ	.05
Emotion	PRE-INTOXICATION MOOD AMPLIFIED	.05
Identity	Possessed by a good force or will	.05
Spiritual	IN TOUCH WITH A HIGHER POWER	.01

Therapy & Growth Group must be *more* intoxicated to experience:

Space/Time	EVENTS FLOW SMOOTHLY	.05
------------	----------------------	-----

Therapy & Growth Group need be *less* intoxicated to experience:

Space/Time	WALKING DISTANCE CHANGED	.01
Sex	MORE NEED FOR SEX	.05

[a]Indicates not coded as to frequency of occurrence by type style.

Footnotes

1. One consequence of this is that there are more significant effects listed in the tables. because of duplication, than are reported below. ([back](#))

2. Given the generally young age of the sample, the Meditation group should not be considered representative of what sorts of results might be gotten with *highly* trained meditators. ([back](#))

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Charles T. Tart, Ph. D.

Chapter 27. Age, Sex, and Educational Level

AGE

BECAUSE MOST RESPONDENTS were young, only two age ranges could be used for analysis purposes, namely, those younger than 25 (72 percent of the sample) and those 25 or older (28 percent of the sample).

Overall, the age variable was not particularly significant. Twenty-three analyses were significant at the .05 level, where about 19 would be expected by chance; and 5 were significant at the .01 level, when 4 would be expected by chance. None were significant at the .001 level. This may result from the restricted range. Thus many of the differences summarized below are probably artifactual. These differences must be regarded primarily as possible guides to further research, rather than as solid findings.

Table 27-1 summarizes significant differences in frequency of occurrence of 18 various effects, and Table 27-2 summarizes 10 significant differences in minimal level of intoxication. General frequency of occurrence data is also presented in the usual type style code.

MALE AND FEMALE

Forty-nine percent of the respondents were males, 27 percent were females. The rest could not be classified because of a clerical error that omitted the sex blank on some of the questionnaires.

Overall, the sex variable was not very significant. Twenty-five analyses were significant at the .05 level when about 19 would be expected by chance, and only one was significant at the .01 level, when about four would be expected by chance. The differences summarized in Table 27-3 and 27-4 should be taken only as guidelines for further research.

Overall frequencies of occurrence are coded in the tables by the usual type style convention.

EDUCATIONAL LEVEL

Seventy-two percent of the users were in college or had a bachelor's degree of some sort. Twenty-one percent were in graduate school or had advanced degrees (M.A., M.S., M.D., Ed.D., or Ph.D.). These are the College-educated and the Professional groups, respectively, in our analysis. Seven percent of the users were in various educational level groups too small to be analyzable.

Educational level was a significant background variable. Thirty-four analyses were significant at the .05 level instead of the 19 expected by chance, and 11 at the .01 level, rather than the four expected by chance. Thus many of the differences summarized in the following two tables are potentially replicable findings as well as guides to research.

Tables 27-5 and 27-6 summarize significant differences in frequency of occurrence and minimal level of intoxication, respectively. General frequency of occurrence data is preserved in the type style code.

Although it is risky to comment on the overall patterning of results when a fair number of them may be due to chance, there is a general pattern of the College-educated having more sensory enhancement types of experiences.

TABLE 27-1
AGE AND FREQUENCY OF VARIOUS INTOXICATION EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
Older users (25+) <i>more</i> frequently experience:		
Hearing	AUDITORY IMAGERY MORE VIVID	.05
Social	OTHERS HAVEN'T NOTICED I'M STONED	.01
Aftereffects	HARD TO GET ORGANIZED NEXT DAY	.05
Older users (25+) <i>less</i> frequently experience:		
Vision	AURAS AROUND OBJECTS	.05
	THINGS IN PERIPHERY LOOK DIFFERENT	.05
	HALLUCINATIONS	.01

Hearing	QUALITY OF OWN VOICE CHANGES	.05
Paranormal	[a]OOBE's after starting to use marijuana	.05
Body	BODY SEEMS VERY HEAVY	.05
	PAIN MORE INTENSE IF CONCENTRATED ON	.01
	GET PHYSICALLY RESTLESS	.05
Thought	ABSORBED, ATTENTION MUST BE FORCIBLY GOTTEN	.05
Memory	SPONTANEOUSLY RECALL THINGS LONG FORGOTTEN	.05
	REMEMBER LESS OF WHAT IS READ	.01
Emotion	FEEL EMOTIONS MORE STRONGLY	.05
Control	EASILY SIDETRACKED ON TASKS	.05
	COMPULSIVE DESIRE TO GET HIGHER	.05
	POOR CONTROL OVER FANTASIES	.05
Miscellaneous	FEEL WORLD IS IN BAD SHAPE	.05

[a]Not coded as to frequency of occurrence by type style. (See Chapter 10.)

TABLE 27-2
AGE AND LEVELS OF INTOXICATION FOR VARIOUS EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
<hr/>		
Older users (25+) must be <i>more</i> intoxicated to experience:		
Body	PAIN MORE INTENSIVE IF CONCENTRATED ON	.05
Control	COMPULSIVE DESIRE TO GET HIGHER	.05
Older users (25+) need be <i>less</i> intoxicated to experience:		
Body	LOSE AWARENESS OF BODY UNLESS STRONG STIMULUS DEMANDS ATTENTION	.05
	LOSE CONSCIOUSNESS OF BODY, FLOAT IN LIMITLESS SPACE	.05
	SENSE OF BALANCE ERRATIC	.05
Thought	Prolonged blank periods	.01
Memory	WORSE LONG-TERM MEMORY	.05
Control	INHIBITIONS LOWERED	.05
Identity	MERGE WITH CONTEMPLATED OBJECT OR PERSON	.05

TABLE 27-3
SEX AND FREQUENCY OF VARIOUS INTOXICATION EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
<i>Males</i> more frequently experience:		
Paranormal	[a]Multiple OOBES	.05
Body	BODY GETS NUMB	.05
Social	STRONGLY INFLUENCED BY COMPANIONS	.05
Control	CAN COME DOWN AT WILL	.05
<i>Females</i> more frequently experience:		
Vision	VISION BLURRY	.05
Touch	OBJECTS SEEM HEAVIER	.05
Paranormal	[a]OOBE's per se	.05
Space/Time	TIME PASSES RAPIDLY	.05
	TIME STOPS	.05
Body	AWARE OF HEART BEATING	.05
	MOVEMENTS EXCEPTIONALLY SMOOTH AND COORDINATED	.05
	SENSE OF BALANCE ERRATIC	.05
Thought	Prolonged blank periods	.05
	SKIP INTERMEDIATE STEPS IN PROBLEM SOLVING	.05
Memory	GOOD MEMORY FOR PERIODS OF INTOXICATION	.05
Emotion	GIGGLE A LOT	.05
Control	Body parts move by themselves	.05
	CAN'T COME DOWN AT WILL	.05
Identity	MORE CHILDLIKE, OPEN TO EXPERIENCE	.05

[a]Not coded as to frequency of occurrence by type style. (See Chapter 10.)

TABLE 27-4
SEX AND LEVELS OF INTOXICATION FOR VARIOUS EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
<i>Males</i> must be more intoxicated to experience:		
Hearing	SYNESTHESIA	.05
	MORE AWARE OF INTERNAL ORGANS	.05
Body	BODY GETS NUMB	.01
	BODY FEELS SMALLER	.05
Memory	FORGET START OF SENTENCE	.05
Identity	EVENTS BECOME ARCHETYPAL	.05
<i>Females</i> must be more intoxicated to experience:		
Control	CAN COME DOWN AT WILL	.05

TABLE 27-5
EDUCATIONAL LEVEL AND FREQUENCY OF VARIOUS INTOXICATION EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
<i>Professionals</i> more frequently experience:		
Control	CAN COME DOWN AT WILL	.01
<i>College-educated</i> more frequently experience:		
Vision	SENSUAL QUALITY TO VISION	.05
	PATTERNS IN VISUALLY AMBIGUOUS MATERIAL	.05
Touch	SURFACES FEEL ROUGH, INTERESTING	.01
	NEW QUALITIES TO TEMPERATURE	.01
Body	HYPERAWARE OF BREATHING	.05
	BODY FEELS LIGHT	.01
	PAIN MORE INTENSE IF CONCENTRATED ON	.05

	BODY FEELS SMALLER	.05
	PHYSICALLY RESTLESS	.01
Social	HARD TO PLAY ORDINARY SOCIAL GAMES	.05
Sex	CLOSER TO SEXUAL PARTNER, UNION OF SOULS	.05
	NEW QUALITIES TO ORGASM	.01
Thought	ABSORBED, ATTENTION MUST BE GOTTEN FORCIBLY	.01
	LOSE MENTAL TRACK OF TASK BUT FINISH IT ANYWAY	.05
Memory	WORSENER LONG-TERM MEMORY	.05
	GOOD MEMORY FOR PERIODS OF INTOXICATION	.05
Control	EASILY SIDETRACKED	.05
	COMPULSIVE DESIRE TO GET HIGHER	.05
	POOR FANTASY CONTROL	.05
	GOOD FANTASY CONTROL	.05
Spiritual	IN TOUCH WITH A HIGHER POWER	.05
Miscellaneous	WORLD SEEMS IN PRETTY BAD SHAPE	.05
	MORE INVOLVED IN ORDINARY TASKS	.01
	INNER FANTASIES AS REAL AS NOCTURNAL DREAMS	.05

TABLE 27-6
EDUCATIONAL LEVEL AND LEVELS OF INTOXICATION
FOR VARIOUS EFFECTS

CATEGORY	INTOXICATION EFFECT	SIGNIFICANCE LEVEL
<i>Professionals</i> need to be more intoxicated to experience:		
Vision	Colors get duller	.05
Touch	OBJECTS SEEM MORE MASSIVE	.05
Space/Time	AIR, SPACE TAKES ON SOLID QUALITY	.05
Body	MOVEMENTS AWKWARD, UNCOORDINATED	.05
Miscellaneous	SOME INNER TRIPS SEEM COMPLETELY REAL	.05
<i>College-educated</i> need to be more intoxicated to experience:		
Hearing	SPACE BECOMES AN AUDITORY SPACE	.05

Touch	SURFACES FEEL SMOOTHER, SILKIER	.05
	SURFACES FEEL ROUGH, INTERESTING	.01
Space/Time	DISTANCES SEEM SHORTER	.05
Body	LOCATION OF CONSCIOUSNESS CHANGES	.01
	AWARE OF HEARTBEAT	.05
Social	TALK MORE	.05
Sex	Need sex less	.05
	BETTER LOVER WHEN STONED	.05
Thought	Prolonged blank periods	.05
Memory	CONVERSE INTELLIGENTLY DESPITE FORGETTING START OF WHAT I SAID	.05
Control	EASILY SIDETRACKED	.05
Sleep	EASY TO GO TO SLEEP AT BEDTIME	.05
Aftereffects	HARD TO GET ORGANIZED NEXT DAY	.05
Identity	MERGE WITH OBJECT OR PERSON CONTEMPLATED	.05

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 28. Alcohol and Marijuana

THE 150 USERS had been drinking alcohol longer than they had used marijuana, but for the six months preceding their filling out the questionnaire, they had been using marijuana with greater frequency. Given a free choice, 43 percent would never use alcohol, and 37 percent would use alcohol in preference to marijuana less than a quarter of the time (see Chapter 4).

To the question, "*Could you compare the effects of alcohol and marijuana on yourself? When do you prefer to use the one, when the other?*" eighty-three percent of the users volunteered answers, from very short ones ("Alcohol makes my mind fuzzy, and I prefer not to use it anymore") to long and detailed comparisons. I shall report the major comparisons in several categories, giving a ratio in each case (M/A) where the first number is the number of users mentioning the effect for marijuana and the second the number mentioning it for alcohol.

COMPARATIVE EFFECTS

Sensory and Bodily Effects

Alcohol was more frequently reported to worsen sensory perception and appreciation (0/29), produce unpleasant physical sensations such as nausea (2/19), and have negative aftereffects (0/27). Marijuana was more frequently reported as enhancing sensory perception (27/3). Effects mentioned with about equal

frequency were pleasant physical sensations (4/4), relaxed or sleepy feelings (17/20), or energetic feelings (5/6).

Interpersonal Relations

Alcohol was reported to more frequently induce chatter and laughter in groups (1/7), as well as boisterous aggression and violence (0/9) and childishness (1/15). Group effects mentioned with about equal frequency for marijuana and alcohol were extroversion (9/12), serious conversation (2/1), and enhanced sexual desire (6/5).

Cognitive Effects

Marijuana was reported to improve cognitive processes (31/1), and lead to personal and spiritual insights (17/0), while alcohol was reported to worsen cognitive processes (2/11).

Emotional Effects

Marijuana and alcohol were mentioned as inducing pleasant emotions equally frequently (16/15), and unpleasant emotions equally frequently (3/4).

Control

Marijuana was generally praised because the user did not lose control of himself and could "sober up" immediately if necessary (9/1).

Situations

The users indicated that alcohol was best used in large or impersonal groups as a social lubricant (3/25), but that marijuana was best for getting intoxicated alone or in small, intimate groups (14/4).

Legal Consequences

Concern with being arrested was mentioned as an effect of marijuana intoxication but not for alcohol (9/1).

OTHER DATA

Several years before the present study, with the aid of Carl Klein, I carried out a survey of the incidence of marijuana use at a West Coast university. Many of the users of the present study were later obtained from the same university. These students were asked, in the questionnaire of the earlier study, to describe the major effects of alcohol and marijuana on themselves. As they were rustled for time, most of them gave very brief answers. Comparisons of qualities reported for alcohol and marijuana in that (unpublished) study are summarized in Table 28-1. The table summarizes answers from 150 students who had used alcohol, 86 of whom also had used marijuana at least once.

These older data are generally consistent with the present data.

SUMMARY

People who have used both alcohol and marijuana to intoxicate themselves perceive the effects as different in a number of ways.

Marijuana is preferred for becoming intoxicated alone or in small intimate groups, and reportedly leads to enhancement of sensation, pleasant physical sensations, both improved and worsened interpersonal relations, improved cognitive processes, personal and spiritual insights, and fears about being arrested more frequently than for alcohol.

Alcohol is preferred for large and impersonal group situations and reportedly leads to worsened sensory perception, unpleasant physical sensations, childishness and lowering of inhibitions, violence, worsened cognitive processes, and more unpleasant aftereffects than marijuana.

Users generally choose marijuana if given a free choice and/or tend to restrict their use of alcohol to small amounts.

TABLE 28-1
COMPARISON OF ALCOHOL AND MARIJUANA INTOXICATION
Tart-Klein Study, 1968

EFFECT	ALCOHOL	MARIJUANA	SIGNIFICANCE OF DIFFERENCE[a]
---------------	----------------	------------------	--

Sensory & Bodily Effects:

Sensory enhancement	1%	35%	.001
Sensory worsening	13%	0%	.001
Pleasant physical sensations	2%	8%	.05
Unpleasant physical sensations	13%	7%	NS

Interpersonal Relations:

Improved	3%	9%	.05
Worsened	1%	10%	.01
Inhibitions lowered	15%	2%	.01

Cognitive Effects:

Improved cognitive processes	2%	21%	.001
Worsened cognitive processes	10%	5%	NS
Personal insights	1%	8%	.01
Spiritual experiences	0%	2%	NS

Emotional Effects:

Pleasant mood	18%	31%	NS
Unpleasant mood	5%	13%	NS
Fear of being arrested	0%	6%	.01

Note.—The percentages in this table do not add up to exactly 100% due to rounding errors and/or some users skipping the question.

[a] Because of the brief answers given in this earlier study, the figures in the various categories represent one answer per student

and were therefore amenable to statistical tests of the significance of the differences.

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 29. More Powerful Psychedelics (LSD) and Marijuana

MANY USERS of both marijuana and the more powerful psychedelic drugs such as LSD believe that the drugs are qualitatively different. Others believe that all or some of the effects from marijuana can also be experienced with the more powerful psychedelics along with many other effects, which cannot be experienced with marijuana.

This chapter provides some data on similarities and differences between marijuana intoxication effects and those of more powerful psychedelics.

The instructions for the questionnaire (Chapter 3) explained that:

... There is one other category on the "How Stoned" scale marked "LSD." You are to circle this category *only* if you have experienced that effect after having taken one of the very powerful psychedelic drugs like LSD, DMT, DET, mescaline, peyote, psilocybin, or STP. Thus there will probably be a number of things described that you've never experienced with pot but have with one of the more powerful psychedelics (if you've had one of the more powerful psychedelics).

Seventy-two percent of the sample (108 users) had used more powerful psychedelics at least once, and of this group, 54 were classified as *heavy* psychedelic users in that they had used one or more of the more powerful psychedelic drugs at least half a dozen times. This heavy psychedelic use group may be presumed to have had reasonable opportunity to experience a variety of effects with the more powerful psychedelics. The percentage of them experiencing the various effects while intoxicated with the more

powerful psychedelics provides some interesting data to compare with the marijuana data.

Note that these data cannot be more than suggestive, for two reasons. First, the measure of percentage of users experiencing something *at all* for the more powerful psychedelics is not the same as the frequency of occurrence ratings of the same effects for marijuana. Second, Users of Psychedelics differed from Non-users on frequency of occurrence on marijuana for many items (Chapter 25), so there is a lack of statistical independence between the measures.^[1] Nevertheless, a look at what effects are frequent for the more powerful psychedelics while infrequent for marijuana, and vice versa, is of considerable interest.

Complete data of this sort of users of psychedelics per se as well as the heavy users of psychedelics are presented in Appendix I. Here we shall deal only with the heavy psychedelic user group.

Table 29-1 lists the common and characteristic effects of marijuana intoxication, which are not frequent for more powerful psychedelics in that less than 10 percent of the heavy psychedelic user group reports them as having been experienced while intoxicated on the more powerful drugs.

Many of these effects may not be frequent with the more powerful psychedelics because the user intoxicated on them avoids many ordinary situations and tasks that seem too trite or too difficult for his state of consciousness. Eating, going to parties, working on tasks, seem a waste of time to many users; if they are intoxicated with LSD, they are too involved in feelings of profound insights and the like to waste time on such things.

The difficulties with sleep probably are due to the much longer lasting effects of most of the more powerful psychedelics, so the user is still experiencing many drug effects at his usual bedtime, which prevent him from sleeping well.

Table 29-2 presents 25 effects, which at least 20 percent of the Heavy user group have experienced with more powerful psychedelics, but which are infrequent or rare effects for marijuana intoxication. These include a variety of more exotic effects, such as telepathy, hallucinations, and feelings of contact with a Higher Power, as well as several effects reflecting concern about control.

TABLE 29-1
COMMON AND CHARACTERISTIC EFFECTS OF MARIJUANA INTOXICATION
NOT FREQUENT WITH MORE POWERFUL PSYCHEDELICS

INTOXICATION EFFECT	PERCENTAGE OF USERS EXPERIENCING THIS WITH MORE POWERFUL PSYCHEDELICS
CONVERSE INTELLIGENTLY DESPITE FORGETTING (Q155)	9%
FINISH PHYSICAL TASK EVEN THOUGH LOSE TRACK OF IT MENTALLY Q130)	9%
PAIN MORE INTENSE IF CONCENTRATED ON (Q89)	9%
ENJOY EATING AND EAT A LOT (Q44)	9%
GET MORE INVOLVED IN ORDINARY TASKS (Q217)	7%

DREAMS MORE VIVID (Q201)	7%
GOOD MEMORY FOR PERIODS OF INTOXICATION (Q158)	7%
PLAY VERY ELABORATE GAMES WITH OTHERS (Q147)	7%
LESS NOISY AT PARTIES THAN WHEN STRAIGHT (Q109)	7%
VIVID VISUAL IMAGERY WITH READING (Q22)	6%
EASY TO GO TO SLEEP AT BEDTIME (Q197)	6%
WORK LESS ACCURATELY BY LATER EVALUATION (Q144)	6%
OBJECTS SEEM HEAVIER (Q35)	6%
RECALL LESS OF MATERIAL READ (Q21)	6%
SLEEP PARTICULARLY REFRESHING (Q199)	4%
EARLY EVENING DROWSINESS (Q198)	4%
EXTRA ENERGY, ABSORPTION IN TASKS (Q179)	4%
HIGHER PEOPLE GET ME HIGHER (Q121)	4%
LESS NOISY AT PARTIES THAN WHEN DRUNK (Q110)	4%
CRAVE SWEET THINGS TO EAT (Q46)	4%
VIVID TASTE IMAGERY (Q45)	2%

TABLE 29-2
EFFECTS FAIRLY FREQUENT WITH MORE POWERFUL PSYCHEDELICS
BUT INFREQUENT OR RARE WITH MARIJUANA

INTOXICATION EFFECT	PERCENTAGE OF USERS EXPERIENCING THIS WITH MORE POWERFUL PSYCHEDELICS
PULSING OF VISION (Q17)	56%
FACE OF ANOTHER CHANGES AS WATCHED (Q16)	52%
VISUAL HALLUCINATIONS (Q23)	48%
LOSE TOUCH WITH BODY, FLOAT IN LIMITLESS SPACE (Q93)	46%
CAN T COME DOWN AT WILL (Q205)	43%
DIFFICULT TO GET TO SLEEP (Q196)	41%
AURAS AROUND PEOPLE (Q6)	41%
ACT DIFFERENTLY ACCORDING TO OTHERS (Q211)	39%

AURAS AROUND OBJECTS (Q7)	39%
FEEL IN TOUCH WITH A HIGHER POWER (Q211)	37%
MERGE WITH OBJECT OR PERSON CONTEMPLATED (Q186)	37%
AWARE OF INTERNAL ORGANS NORMALLY UNAWARE OF (Q75)	30%
Feel dizzy, nauseated (Q74)	30%
FELT SHAPE DOESN T CORRESPOND TO ACTUAL BODY (Q69)	30%
VISUAL JIGGLE (Q15)	30%
POOR CONTROL OF FANTASIES (Q177)	26%
Worry about losing control (Q171)	26%
Sleep following intoxication poor, restless (Q200)	24%
TELEPATHY (Q65)	24%
PERSONALITY CHANGES A LOT TEMPORARILY (Q185)	22%
Prolonged blank periods (Q132)	20%
MUSCLES DEVELOP VISUALLY OBSERVABLE TREMORS (Q86)	20%
AWARE OF INTERNAL ORGANS WHEN DEFECATING (Q78)	20%
BODY NUMB (Q76)	20%
SPACE, AIR SOLID, "FILLED" (Q56)	20%

Footnotes

[1]This relation would seem practically impossible to avoid as it would be difficult to find people with much experience with more powerful psychedelics and little with marijuana. ([back](#))

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 30. Factor Analysis: Dimensions of Intoxication

ALL THE DATA on marijuana intoxication presented so far have been based on how experienced users describe their experiences; i.e., it is primarily descriptive. One naturally wonders if there are more basic dimensions of the intoxication experience that could account for the many different specific effects, that would reduce many effects to a smaller, more basic number.

Factor analysis is a statistical technique that begins to answer such questions. All the different items of information are correlated with each other; a factor analysis then ascertains whether some sets of items form natural groupings that might represent more basic dimensions.

The data format of the present study is not well suited to factor analysis; the five-point frequency scale is rather limited, is not normally distributed, and does not constitute an interval or ratio scale. Thus the data given below are the weakest of the present study and are presented only for the sake of completeness and the guidance of other investigators.

In order to reduce the number of items to a level the computerized factor analysis program of the University of California at Berkeley's Computer Center could handle, every other item, starting with Q1, was selected. This included two items (Q67 and Q167) that were not answered in the same form as the others and so are not considered in interpreting the factors. Thus the analysis is based on 104 frequency of occurrence items.

RESULTS

The principal components analysis revealed one main factor (Eigenvalues for the first twelve factors were 13.953, 4.842, 3.956, 3.489, 3.191, 2.927, 2.758, 2.673, 2.443, 2.377, 2.255, and 2.171). Items loading .400 or greater on this first factor are presented in Table 30-1. The usual type-style code for overall frequency of occurrence is used. AS principal component rotations are primarily of mathematical rather than psychological interest, no interpretation of this factor will be made.

A Varimax rotation for 12 factors revealed one small-sized factor and eleven others that were not too much smaller. The proportion of the total communality accounted for by each factor was .078, .048, .044, .035, .033, .032, .031, .030, .028, .028, and .025. Each factor is described in Table 30-2.

Factor I seems to consist mainly of feelings of competence, perceptiveness, and intuitive-archetypal approaches to the environment. We might call it "Being High," as it fits many descriptions by users of the virtues of marijuana intoxication.

Factor II reflects enhancement of touch, taste, and smell sensations and imagery. It has been tentatively called "Enhancement of Nondominant Senses," as these senses generally play a minor role compared to vision and hearing in most of our transactions with the world. One could also consider these as close-up or "intimate" senses, as contrasted with the functioning of vision and hearing at much greater distances.

Factor III deals primarily with increased awareness of various internal processes, such as body tensions, dreams, feelings of the location of consciousness, and thoughts. It has tentatively been named "Enhanced Internal Awareness."

Factor IV consists of items describing increased absorption in internal processes and a (consequent) loss of contact with the external world. It has tentatively been called "Internalization of Awareness."

Factor V does not seem to have a common theme, and Factor VI has only three items loading heavily enough to define it. It seems to represent unpleasant, dysphoric effects. Factor VII seems to represent perceptual instability in the visual system.

Factor VIII does not show any clear pattern, unless it be memory decrement. Factor IX also seems to represent memory decrement, although it is defined by only two items. The remaining three factors that were analyzed for in the Varimax rotation show no particular patterns that can readily be named.

TABLE 30-1
FIRST FACTOR, PRINCIPAL COMPONENTS

LOADING	Q#	BRIEF DESCRIPTION
.613	191	EVENTS BECOME ARCHETYPAL
.612	111	SAY MORE PROFOUND THINGS
.610	141	MIND FEELS MORE EFFICIENT IN PROBLEM SOLVING
.587	15	VISUAL JIGGLE

.582	133	SKIP INTERMEDIATE STEPS IN PROBLEM SOLVING
.563	65	TELEPATHY
.560	151	BETTER LONG-TERM MEMORY
.538	113	INSIGHTS INTO OTHERS
.527	3	SENSUAL QUALITY TO VISION
.526	49	Different smell components at different locations
.519	45	VIVID TASTE IMAGERY
.514	37	VIVID TACTUAL IMAGERY
.514	147	PLAY ELABORATE GAMES
.506	139	SPONTANEOUS INSIGHTS INTO SELF
.498	95	FEEL STRONGER
.486	17	PULSING OF VISION
.484	163	MORE AWARE OF BODILY COMPONENTS OF EMOTION
.471	143	WORK MORE ACCURATELY ON PROBLEMS
.486	145	IDEAS MORE ORIGINAL
.467	89	PAIN MORE INTENSE IF CONCENTRATED ON
.462	13	PATTERNS, MEANING IN AMBIGUOUS VISUAL MATERIAL
.459	149	THOUGHT MORE INTUITIVE
.459	63	DEJA VU
.459	47	NEW QUALITIES TO SMELL
.452	85	VIBRATION IN BODY THAT IS NOT MUSCLE TREMOR
.445	125	CLOSER CONTACT WITH PARTNER IN MAKING LOVE
.444	135	NEW SIGNIFICANCE TO COMMONPLACE CONVERSATIONS
.438	91	BODY FEELS SMALLER
.431	216	SYNESTHESIA
.424	218	INNER VISIONS AS REAL AS NOCTURNAL DREAMS
.421	189	AT ONE WITH WORLD
.404	193	MEDIATE MORE EFFECTIVELY
.402	27	AUDITORY IMAGES MORE VIVID

TABLE 30-2
VARIMAX ROTATION FACTORS

LOADING	Q#	BRIEF DESCRIPTION
<i>Factor I. "Being High"</i>		
.698	191	EVENTS BECOME ARCHETYPAL
.682	111	SAY MORE PROFOUND THINGS
.599	113	INSIGHTS INTO OTHERS
.592	151	BETTER LONG-TERM MEMORY
.553	141	MIND FEELS MORE EFFICIENT IN PROBLEM SOLVING
.547	115	MORE SOCIABLE
.526	147	PLAY ELABORATE GAMES
.520	189	AT ONE WITH WORLD
.511	135	NEW SIGNIFICANCE TO COMMONPLACE CONVERSATIONS
.489	143	WORK MORE ACCURATELY ON PROBLEMS
.487	117	TALK MORE
.483	95	FEEL STRONGER
.482	133	SKIP INTERMEDIATE STEPS IN PROBLEM SOLVING
.481	145	IDEAS MORE ORIGINAL
.440	127	BETTER LOVER THAN WHEN STRAIGHT
.430	163	MORE AWARE OF BODILY COMPONENTS OF EMOTION
.424	65	TELEPATHY
.411	125	CLOSER CONTACT WITH PARTNER IN MAKING LOVE
.401	27	AUDITORY IMAGES MORE VIVID
.400	161	FEEL EMOTIONS MORE STRONGLY

Factor II. "Enhancement of Non-dominant Senses"

.707	31	NEW QUALITIES TO TOUCH
.649	33	SURFACES FEEL SMOOTHER, SILKIER
.599	47	NEW QUALITIES TO SMELL
.539	37	VIVID TACTUAL IMAGERY
.553	45	VIVID TASTE IMAGERY
.432	49	Different smell components at different locations
.430	39	NEW QUALITIES TO TASTE

Factor III. "Enhanced Internal Awareness"

.552	193	MEDITAIE MORE EFFECTIVELY
.534	183	LOSE CONTROL OVER THOUGHTS
.469	197	EASY TO GO TO SLEEP AT BEDTIME
.448	75	MORE AWARE OF INTERNAL ORGANS GENERALLY
.448	201	DREAMS MORE VIVID
.444	163	MORE AWARE OF BODILY COMPONENTS OF EMOTION
.435	216	SYNESTHESIA
.419	77	LOCATION OF CONSCIOUSNESS IN BODY CHANGES

Factor IV. "internalization of Awareness"

.543	129	ABSORBED, ATTENTION MVST BE FORCIBLY GOTTEN
.521	55	SO ABSORBED IN THOUGHT NEED TO REORIENT AFTERWARDS
.491	93	LOSE TOUCH WITH BODY, FLOAT IN LIMITLESS SPACE
.462	89	PAIN MORE INTENSE IF CONCENTRATED ON
.437	73	VERY AWARE OF BREATHING
.429	123	Less need for sex
.416	23	VISUAL HALLUCINATIONS

Factor V. No common theme apparent

.673	171	Worry about losing control
.579	208	SOME INNER TRIPS SEEM <i>REAL</i> , EVEN THOUGH THEY COULDN'T BE REAL
.544	137	ACCEPT CONTRADICTIONS MORE READILY
.487	61	EVENTS FLOW MORE SMOOTHLY
.468	165	INVARIABLY FEEL GOOD WHEN STONED

Factor VI. "Dysphoria"

.600	5	World looks flat
.534	101	MOVEMENTS AWKWARD, UNCOORDINATED
.531	119	People seem dead, like robots

Factor VII. "Visual Instability"

.575	9	PERIPHERAL VISION CHANGES
.450	103	SENSE OF BALANCE ERRATIC
.410	7	AURAS AROUND OBJECTS

-.423 185 DIFFERENT PERSON WHILE STONED

Factor VIII. No common theme apparent

.680 175 **EASILY SIDETRACKED**
.565 105 PLAY CHILDISH GAMES
.458 210 GOTTEN NAUSEATED, VOMITED
.420 153 **FORGET START OF CONVERSATION**

Factor IX. No common theme apparent

.650 21 REMEMBER LESS OF WHAT IS READ
.462 153 **FORGET START OF CONVERSATION**

Factors X, XI, and XII. No common themes apparent

Factor X:

.612 59 TIME PASSES RAPIDLY
.444 11 VISION BLURRY
.428 85 VIBRATION IN BODY THAT IS NOT MUSCLE TREMOR

Factor XI:

.470 25 **UNDERSTAND WORDS OF SONGS BETTER**
.452 205 CAN'T COME DOWN AT WILL
.440 99 **PHYSICALLY RELAXED, DON'T WANT TO MOVE**
-.468 121 HIGHER PEOPLE GET ME HIGHER (CONTACT HIGH)

Factor XII:

.513 214 FEEL WORLD IS OK
-.495 177 POOR CONTROL OVER FANTASIES
-.400 19 EASIER TO READ

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On Being Stoned

Charles T. Tart, Ph. D.

Chapter 31. Summary

THE NATURE OF MARIJUANA INTOXICATION

ALTHOUGH MARIJUANA has been known to man for countless centuries, our scientific knowledge of its effects is meager. A major source of confusion that has hindered research has been the general failure to recognize that most effects of marijuana are potential effects rather than inherent properties of the drug itself. That is, a variety of non-drug factors can markedly influence which potential effects manifest at any given time (see Chapter 2). Thus most laboratory studies and personal anecdotes are of limited value, because the limited range of laboratory conditions and the particular personality characteristics of the writers, acting on the state of consciousness produced by marijuana, produced only some of the potential effects and inhibited others. The personal anecdotes often tell us more about the writer than anything else, and the laboratory studies have produced effects generally unrepresentative of those found in ordinary marijuana use.

THE PRESENT STUDY

The aim of the present study was to find out the total range of potential effects that could be experienced and described by experienced users of marijuana. By systematically asking them about their

experiences over a six-month period, the non-drug factors, which determine the manifestation of potential effects, would have assumed practically all possible combinations of values many times, thus eliciting the total range of effects. By asking the users about the frequency of various effects, it was possible to classify various potential effects as characteristic, common, infrequent, or rare, under conditions of ordinary marijuana use. Similar questioning about minimal level of intoxication (see Chapter 2 for details of this model) allowed rough classification of effects by the level of intoxication above which most experienced users could experience them (if the various non-drug factors assumed the right configurations).

THE USERS

The 150 experienced users who returned satisfactory questionnaires (see Chapter 4) had all used marijuana at least a dozen times in order to be eligible for the study. Thus the effects of learning to cope with the unfamiliarity of marijuana intoxication were deliberately eliminated from the present study (although worthy of study in their own right), and the results presented here should not be applied to naive users.

Our 150 users are a predominantly young, highly educated group of Californians, primarily students, but with a fair number of older persons and professionals among them. Overall they have a high interest in self-improvement (meditation or therapy), considerable experience with more powerful psychedelic drugs like LSD, and little experience with hard narcotics. Most of them used marijuana once a week or more during the six-month period of the present study. By combining various self-reports on marijuana use, we can estimate that they have used marijuana about 37,000 times, for a total of 421 years of experience.

The remainder of this summary chapter will cover the major effects of marijuana intoxication (in terms of the users' self-reported experiences) under five major headings, namely, the perception of the external environment, interpersonal relations, internal mental processes, the perceiver (self-concept and identity of the user), and levels of intoxication. To keep this chapter brief, I shall not summarize the various miscellaneous effects of Chapters 20 to 23 nor the analyses of various relationships and background factors covered in Part III.

PERCEPTION OF THE EXTERNAL ENVIRONMENT

Vision

With respect to vision, *seeing forms, meaningful patterns in visual material that normally is ambiguous*, and *finding visual imagery more vivid than usual* are characteristic effects. Common effects include *contours seeming sharper, seeing new shades of color, having visual imagery automatically accompany thoughts and reading, being able to see a third dimension in pictures, and experiencing a*

sensual quality to vision.

Hearing

For hearing, *hearing more subtle qualities of sound* is one of the most characteristic effects found, as well as *understanding the words of songs better* and *finding a greater spatial separation between sound sources*. Common effects include *auditory images being more vivid*, *finding that space becomes organized according to sound characteristics rather than visual characteristics*, and *synesthesia*, or sounds producing visual images in the user's mind.

Touch, Taste, Smell

The sense of *touch taking on new qualities* and *becoming more sensual* are characteristic, and experiencing *vivid tactual imagery* is common.

New qualities to taste and *enjoying eating very much* are characteristic effects. Again, *taste imagery is markedly enhanced* is a common effect, as well as *craving for sweet things*. It is also common for the *sense of smell to become enhanced and richer*.

The Senses in General

In looking at the sensory changes, we should remember that sensory perception is not, as we commonly assume, a passive process of "seeing what's there," but an active process of constructing percepts from the physical stimuli that come in. The level of this constructive or pattern-making process is generally optimal in terms of providing a good signal-to-noise ratio; i.e., we make few mistakes about what is there. I suspect what marijuana is doing is increasing the level of functioning of this patterning activity, making it work in a more active way. This may result in a genuine increase in the ability to pick signals out of noisy backgrounds, but it probably also increases the number of mistakes; i.e., it organizes things that are not actually related in the real world into a coherent percept.

The Space/Time Matrix

Perceptions of the external environment are not isolated percepts; they occur in the context of the space/time matrix. This space/time matrix is normally background for perceptions—we take it for granted. Marijuana intoxication can cause some radical changes in the way the space/time matrix is

perceived. For example, *greater separation between sound sources* as, say, a pair of stereo speakers, has already been mentioned as a characteristic effect, and the *distance experienced in walking some place being radically changed* is also characteristic. Common effects on space are for *distances per se to seem greater or shorter*, and for *near things to seem even nearer and for far things to seem even farther*, a depth-magnification effect. Infrequently, *air or space may take on a "solid" quality*, or the user may *completely lose track of his physical body and seem to float in limitless space*.

Changes in time perception are striking. Characteristically, *time seems to pass more slowly*, and the user feels *much more in the here-and-now*, totally immersed in the present situation without thinking about its relation to the past or its possible future developments. Commonly, *events seem to flow more smoothly in time*, although *they may flow rather jerkily* at higher levels. *Deja vu*, the feeling that one has done this before, may be experienced, and *time may seem to stop*, i.e., it's not just that things take longer but certain experiences are simply timeless; they seem to occur "outside" of time. At high levels of intoxication, particularly, the users' experiences are less and less structured by the ordinary physical space/time matrix. Events and experiences become more and more difficult to communicate as their relationship to the usual space/time matrix is lost.

Paranormal Perception

Another mode of perceiving the environment is by experiences of ostensible extrasensory perception, phenomena such as telepathy, clairvoyance, and precognition. The users believed that they had experienced a great many ostensible paranormal phenomena. Seventy-six percent of them believed in the reality of extrasensory perception. *Feeling so aware of what other people were thinking that the users thought it was telepathy* was a fairly frequent effect, with only 30 percent of the users saying they had never experienced this. *Precognition*, foretelling the future by more than a logical inference, was a rare effect, but not absent.

An even more exotic ostensible paranormal phenomenon was *out-of-the-body experiences*, which 44 percent of the users indicated they had experienced at least once, although not always in conjunction with marijuana. This incidence of out-of-the-body experiences is much higher than has ever been reported for any other population sample, so marijuana use is probably instrumental in promoting this experience.

INTERPERSONAL RELATIONS

Marijuana intoxication is seldom a solitary activity, where the user just sits around perceiving the external world and his own body. Users feel it is a social drug *par excellence*. What does it do to social interaction?

Social Interaction

Characteristic effects on social interaction are *being less noisy at parties than when either straight or drunk on alcohol, finding ordinary social games hard to play, picking up on and saying much more subtly humorous things, and having feelings of great insights into others*. Other common effects are *feeling more sociable at low levels of intoxication, less sociable at higher levels, talking more at low levels and talking less at higher levels, having more feeling of group solidarity, playing either very childish or very elaborate and involved games with others, saying things that seem more profound and appropriate, and having a great deal of empathy with others*. *Giggling a lot* is also a common effect.

It seems as if marijuana acts as a potentiator of social interaction from Low to Moderate levels of intoxication. At high levels, marijuana may have two quite different effects on social interaction because of the great intensification of inner experiences. The user may become less social and withdraw from group interaction in order to fully appreciate his inner experiences. If, on the other hand, he continues to interact with others, he may feel this interaction to be particularly profound, occasionally including such things as feelings of *merging with the other person* or feeling so aware of them that he believes it to be a kind of *telepathic interaction*.

Sexuality

One of the most intimate kinds of interaction possible with another person is sexual love. The majority of the users indicated that marijuana greatly enhances sexual pleasure. Relevant characteristic effects were: *new qualities to touch and taste* (with *new smell qualities* being common)—what one might consider the intimate senses—and *new, pleasurable qualities to orgasm*. It was common for the user to *feel more need and desire for sex*, and, particularly, to *feel more sexual desire if the situation was appropriate*. That is, marijuana is not an aphrodisiac in the sense of *forcing* sexual drive, but rather it makes sex more desirable if there is already an initial attraction. It was common for the users to feel that they were *better lovers when intoxicated*, to have *much closer contact with their partner in making love*, it being much more a union of souls rather than just of bodies, and to be much more responsive to the sexual partner. Some users described making love at high levels of marijuana intoxication as so ecstatic as to be beyond words in many respects, a blending and fusing of essence and energy that took them beyond the bounds of space and time, and into one another.

It should be noted, however, that one quarter of the users thought they were *worse lovers* when intoxicated than when straight, for, they reported, they became so immersed in their own intensified and pleasurable sensations that they paid little attention to their lovers.

INTERNAL MENTAL PROCESSES

Memory

A characteristic effect of marijuana intoxication on memory is to *forget the start of a conversation*; that is, there is a decrement in memory for things occurring over the last few minutes. Nevertheless, it is a common effect for users to feel that they *can converse intelligently despite this shortening of their memory span*. It is also common to have a *good memory for events in general occurring during the period of intoxication*, but *poor memory for this period* is also just as common, depending on unknown psychological factors. *Long-forgotten events commonly pop into memory*. At high levels of intoxication it is common to *forget even the start of one sentence*, and *thoughts may slip away before being fully grasped*. Users often make special efforts, apparently successfully, to continue to function well in spite of this large loss of memory.

State-specific memory occurs; intoxication experiences apparently forgotten can be recalled the next time the user is intoxicated.

Thought

There are many effects of marijuana on thought processes. Characteristic effects are: *accepting contradictions more readily*, not getting upset just because things do not make immediate sense, and having *spontaneous insights into one's own personal functioning*, as well as *being more here-and-now*. It is also characteristic to find it *harder to read*, and to *appreciate more subtle humor*, as mentioned earlier. It is common to feel that *one has ideas that are much more original than usual*, to feel *thinking is more intuitive*, to find *thought automatically accompanied by visual images*, to *see new significance in things that ordinarily seem dull or commonplace*, to *skip intermediate steps in problem-solving*, and to *get so absorbed in thought that one's attention must be forcibly gotten*. At Low levels of intoxication, it is common for the user to feel his *mind is working more efficiently on problem-solving activities*, but at higher levels it is common to feel that *the mind begins to work less efficiently*.

Emotion

The only characteristic effect of marijuana on emotional mood is to *almost invariably feel good*, which is what we would expect in a group of experienced marijuana users. It is common to *feel emotions more strongly*, to be *more aware of bodily components of emotion* (muscle tensions, heartbeat, etc.), and to *have one's mood just before becoming intoxicated considerably amplified*. For these experienced users, there is a generally good emotional tone to being intoxicated that can override mildly negative emotions just before becoming intoxicated. If they are in a very negative mood, however, there is a chance of this emotion being greatly amplified and producing a very bad trip. Most of the users had never had a *severe negative emotional crisis* while intoxicated. Of those users who had experienced such a crisis, most indicated it had subsided by itself or that they had been talked down by friends, with only

one user needing professional help. In retrospect, some of the users felt their emotional crises had been a good thing in making them aware of aspects of themselves they had not wanted to face.

Control

To what extent can experienced users control the effects of marijuana intoxication sufficiently well to generally avoid negative experiences? It is characteristic that *users feel less need to be in control of things*, and that *they can come down at will*, i.e., suppress most of the effects of intoxication when necessary. Experienced users have a wide variety of psychological techniques for increasing their level of intoxication at will. Experienced users feel that most of the instances of strong negative effects of marijuana are due to rigid, over-controlled, or unstable people trying it and not being able to tolerate the change in their experiences.

THE PERCEIVER

Experiences do not just happen; they happen to and are caused by a unique individual with likes and dislikes, a past and hopes. How might a user's feeling of who he is change during marijuana intoxication?

The Body

One of the most important sources of sensory input that provides a frame of reference for our identity is our own body. Although there are many effects here, only two were characteristic: the user gets *very physically relaxed and is disinclined to move about*, and if he does move about, his *movements seem exceptionally smooth and coordinated*. The direction of attention is important in how the body is perceived, a common effect being *"if I am paying attention to some particular part of my body the rest of my body fades away a lot..."* Getting *so absorbed in thinking or fantasies that all perception of the body is lost* is also common. With respect to pain, it is common for *pain to be easier to tolerate if attention is turned elsewhere* and for *pain to be more intense if concentrated on*. It is also common for the *body to feel particularly light*.

A number of common effects deal with becoming aware of internal processes in the body to a greatly enhanced extent, such as feeling a *pleasant warmth in the body*, *being very aware of the beating of one's heart*, and being *hyper-aware of breathing*. Another common experience that does not seem to be simply an enhancement of ordinary sensations is getting *feelings in the body that are described as energy or force of some sort flowing*.

Sense of Identity

Marijuana intoxication has a number of effects on a person's feeling of identity per se. For example, a characteristic effect is for the user *to feel more childlike, more open to experience*, more filled with wonder and awe at the nature of things than he is ordinarily. Common effects on identity include *feeling particularly powerful, capable, and intelligent, feeling a lack of separation between oneself and the world*, an at-one-ness with the world, and *feeling that one's actions and events become archetypal*. That is, instead of John Smith doing a particular thing with Mary Jones at a certain time, it becomes Man interacting with Woman in the Way Man has always interacted with Woman.

Spiritual Experiences

This shift in identity to archetypal levels takes us to a number of experiences, which may be considered spiritual, that is, dealing with the ultimate nature and destiny of man. Some of the users have had important spiritual experiences take place while they were intoxicated, others have had experiences occurring later but considered a result of their marijuana use. Some of these were spontaneous, others were deliberately sought through meditation techniques practiced while intoxicated. Thus 22 percent of the users felt that *using marijuana had acquired a religious significance* for them. Particular experiences included visions, ostensible paranormal experiences, the infrequent experience of *feeling directly in touch with a Higher Power*, and some other experiences already discussed but given a spiritual connotation, such as sexual love seeming a union of souls, being more childlike and open to the universe, and the space/time matrix radically changing.

LEVELS OF INTOXICATION

Practically all the potential effects of marijuana intoxication seem to fit the model (Chapter 2) of the minimal level of intoxication; i.e., after a certain threshold of intoxication has been reached for a given effect, it is potentially available at all levels above that. One consequence of this is that more and more variability as to which effects are experienced at a given time occurs with higher levels of intoxication. Most of the characteristic effects, for example, have common minimal thresholds in the Fair to Strong range (See Chapter 24).

Categories of potential effects available as we go from Fair up toward Maximal levels of intoxication may be described as follows (these are graphed in [Figure 24-3](#)).

Beginning at fair levels of intoxication, there may be a number of phenomena, which depict a sort of *restlessness*. This is one of the few categories of phenomena which does not seem to meet the minimal level model noted earlier; these phenomena generally seem to disappear once the user gets more strongly

intoxicated rather than staying potentially available at all levels above the minimal one.

Going somewhat higher, the user may experience a variety of effects that we might call *relaxing, quieting, or opening*. These involve a general calming down and being receptive to things. *Sensory enhancement* in the various senses may begin at this level, as well as feelings of *greater sensitivity to others* and *subtlety in interpersonal relationships*. At these Low-to-Moderate levels, we may also have the beginnings of *feelings of efficiency*, being able to focus well on things, being centered in oneself, and being able to work well. This last category is the one other type of effect that also does not seem to meet the minimal level model, but rather to exist only at these Moderate levels and to be later replaced by feelings of inefficiency. *Insights into oneself, realization of changes in cognitive processes, and aftereffects*, such as finding it somewhat hard to get organized the next day, may begin at this Moderate to Strong intoxication level.

As the user smokes enough to get up to the Strong levels of intoxication, *alterations in his perception of the space/time matrix* of existence may begin to occur. *Imagery* in all sensory modalities may be greatly intensified, fantasy may become extremely real, and it may be possible to experience fantasies so real as to almost be hallucinations. At the Strong level and above we may also begin to get *feelings of drifting, losing control* of the situation, and, if problem-solving activity is pressed upon a user, feelings that the mind works inefficiently. Greatly *enhanced awareness of internal body processes* that normally cannot be sensed may start to come in at this level also.

As the user becomes even more intoxicated, he may begin to experience *alterations in memory functions*, such as forgetting what he started to talk about, remembering things other than what he is trying to recall, or state-specific memory. Loss of contact with the environment becomes possible, and the user may become absorbed in internal experiences. *Identity may change* in the ways discussed above, and the infrequent *mystical and paranormal experiences* may occur at this level.

Jumping up to the Maximal level, *nausea* may occur, albeit very rarely. Note again that practically all lower-level phenomena are potentially available at higher levels as well.

IMPLICATIONS FOR FUTURE RESEARCH

What are some major questions for future research?

First, how can we get an even better understanding of the nature of marijuana intoxication? Replication and extension of the present study is called for. With such a design, we could devise better questions to ask, better in terms of having more specific meaning to both users and investigators and better in terms of psychometric properties that would allow more sophisticated statistical analyses. Similar studies could be carried out with different populations and tell us valuable things about how cultural factors shape experience; I doubt that the young black in the ghetto has the same spectrum of effects with marijuana as the white college student or professional.

Still within the systematic questioning format, we could investigate the interrelationships of intoxication phenomena within a single individual, trying to do justice to the uniqueness of individual experience. From such case studies one could then compare individuals and possibly find similar types of users, i.e., there might be very little overlap between the experiences of some users, even though all their experiences fall within the total spectrum of potential effects of marijuana intoxication. The reasons

for these individual differences could tell us a good deal about the functioning of the mind.

The results of the present study and replications of it can also be used to guide laboratory research and perhaps avoid many of the pitfalls that have plagued previous laboratory studies. Many questions can be studied in the laboratory that are not very suitable for the field study approach. For example, how well do users' ratings of their level of intoxication correlate with actual amount of marijuana or THC consumed? Which is more useful for predicting other aspects of intoxication, experience or behavior, self-report of level or knowledge of amount of chemical consumed? Undoubtedly, some users will not be able to rate the amount of THC well, whereas others will do so very well. What makes for good raters and poor raters? Does the ability to "come down at will" or have a "contact high" make knowledge of THC levels meaningless? How does a new user "learn" to become intoxicated? How do experienced users "learn" new effects? Could completely new effects be produced under the special conditions possible in a laboratory setting? Could a "disciplined" use of drugs be taught, say in conjunction with bio-feedback techniques, making entirely new intoxication effects available?

A second important direction for future research is understanding other states of consciousness in general and eventually, consciousness itself. The type of overall look presented in this book for the phenomenology of marijuana intoxication has not been carried out for the other states of consciousness, yet many people make facile assertions such as, "Meditation is just a form of self-hypnosis," based only on surface knowledge of different states of consciousness.

This lack of data on other states of consciousness makes it impossible to answer some important questions about marijuana intoxication, e.g., what effects of marijuana intoxication can be identically experienced in other states of consciousness? Might we learn to experience some of the desirable effects of being stoned in our ordinary state?

A third important direction for future research is on the practical uses and benefits of marijuana intoxication. Obviously, pleasure is the main benefit of marijuana for most users most of the time. But does it really aid creative thinking? Might it have specific applications in personal growth or psychotherapy through its many effects on thought, emotions, memory, identity? Might there be useful medical applications in selected cases, such as a tranquilizer or sedative in low doses?

Finally, a good deal of research is needed on what the *real* costs or dangers of occasional or chronic marijuana use might be. So much propaganda has been put out, officially and unofficially, on this question that the waters are very muddied. I think it unlikely that we ever get something for nothing, but let's find out the actual physiological or psychological costs of marijuana use so we can weigh them against the benefits and make an intelligent decision about whether the benefits are worth the cost.

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On Being Stoned

Charles T. Tart, Ph. D.

APPENDIX A. Effects of More Powerful Psychedelic Drugs

For each possible effect description, users were asked to circle "LSD" if they had also experienced that effect at least once while intoxicated with one of the more powerful psychedelic drugs (LSD, mescaline, psilocybin, STP, MDA, harmaline, etc.).

The table below presents, for every question, two items of information: (1) the percentage of all users of the more powerful psychedelics who circled "LSD" on this question; and (2) the percentage of heavy users of the more powerful psychedelics who circled the "LSD" response. Heavy users were defined as those who had had a more powerful psychedelic drug six or more times.

[a] For "Total Users" note that these are percentages of the 108 respondents who had used psychedelic drugs, not of the total 150 marijuana users.
N.A., not applicable, indicates that information about LSD was not asked for on this question.

% PSYCHEDELIC USERS WHO CIRCLED LSD			% PSYCHEDELIC USERS WHO CIRCLED LSD			% PSYCHEDELIC USERS WHO CIRCLED LSD		
QUESTION NUMBER	HEAVY USERS	TOTAL USERS[a]	QUESTION NUMBER	HEAVY USERS	TOTAL USERS[a]	QUESTION NUMBER	HEAVY USERS	TOTAL USERS[a]
1	27	32	74	23	30	149	13	20
2	5	9	75	18	30	150	15	22
3	16	17	76	11	20	151	9	17
4	26	26	77	7	11	152	5	9
5	10	11	78	15	20	153	11	17
6	36	41	79	13	19	154	15	22
7	29	39	80	7	11	155	8	9
8	18	22	81	9	17	156	10	15
9	12	20	82	25	37	157	7	15
10	15	17	83	11	19	158	7	7
11	11	17	84	9	15	159	7	15
12	15	20	85	17	26	160	8	11
13	24	32	86	12	20	161	13	19
14	13	13	87	1	2	162	5	9
15	20	30	88	11	13	163	7	11
16	38	52	89	7	9	164	6	11
17	47	56	90	4	4	165	9	15
18	13	22	91	7	7	166	3	4
19	3	2	92	9	15	167	N.A.	N.A.
20	3	4	93	35	46	167B	N.A.	N.A.
21	3	6	94	29	35	168	N.A.	N.A.
22	7	7	95	10	13	169A	N.A.	N.A.
23	39	48	96	10	13	169B	12	N.A.
24	16	20	97	4	6	170	12	20
25	8	15	98	19	24	171	22	26
26	10	13	99	11	17	172	6	9
27	8	15	100	8	11	173	12	20
28	19	28	101	8	13	174	10	17
29	10	17	102	7	11	175	11	20
30	16	22	103	16	19	176	5	6
31	19	28	104	N.A.	N.A.	177	17	46
32	14	20	105	8	11	178	7	11
33	13	20						

34	12	17	106	17	20	179	3	4
35	6	6	107	10	15	180	8	11
36	7	11	108	12	13	181	11	11
37	10	13	109	5	7	182	9	15
38	12	19	110	3	4	183	23	33
39	17	24	111	7	13	184	36	37
40	8	13	112	8	11	185	18	22
41	6	9	113	13	20	186	26	37
42	6	9	114	12	19	187	5	9
43	2	4	115	8	15	188	9	13
44	7	9	116	14	20	189	37	50
45	2	2	117	8	13	190	11	19
46	2	4	118	11	19	191	30	43
47	9	15	119	5	7	192	26	37
48	8	13	120	2	4	193	7	7
49	5	9	121	3	4	194	42	48
50	4	6	122	7	11	195	33	43
51	19	22	123	9	15	196	29	41
52	14	22	124	8	13	197	3	6
53	11	15	125	12	19	198	2	4
54	7	13	126	7	9	199	2	4
55	29	37	127	6	11	200	13	24
56	15	20	128	17	30	201	5	7
57	10	17	129	13	22	202	3	6
58	20	26	130	7	9	203	N.A.	N.A.
59	10	13	131	10	15	204-1	30	N.A.
60	37	50	132	10	20	204-2	37	41
61	13	24	133	8	15	205	41	43
62	9	13	134	19	28	206	32	41
63	13	13	135	15	22	207	20	26
64	N.A.	N.A.	136	19	24	208	24	32
65	19	24	137	11	19	209	18	17
66	7	11	138	17	26	210	12	15
67A	N.A.	63	139	19	28	211	29	39
67B	N.A.	N.A.	140	15	20	212	18	24
67C	24	33	141	13	24	213	N.A.	N.A.
68	3	4	142	11	20	214	9	15
69	24	30	143	6	7	215	7	13

70	15	22	144	4	6	216	26	35
71	13	20	145	15	22	217	6	7
72	8	13	146	7	13	218	22	30
73	12	19	147	5	7	219	4	7
			148	10	15	220	N.A.	N.A.

Appendix B

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On Being Stoned

Charles T. Tart, Ph. D.

APPENDIX B. Questionnaire Used in This Study*

*This is a reproduction of the questionnaire used for collecting the data of the present study. The instructions for filling out the questionnaire and the covering letter that went out with it are reproduced in Chapter 3.

NO NAMES!

Age _____ Occupation _____ (if a student, what do you plan?)

Sex _____ Marital Status _____

Education: degree or highest grade completed _____

Do you have any children? _____
_____ Political affiliation _____

Religious affiliation _____

Ever been arrested? _____ For what? _____

Were you convicted? _____

Do you regularly practice any sort of meditation or other non-drug discipline for spiritual or personal growth? _____

If so, what? _____

How long have you been smoking pot or hash? _____

In *all* this time, what has been your average frequency of use? (ignore this question if you've been turning on less than 6 months)

- Almost every day or more
- Once/week or more
- Once/month or more
- Occasionally

During the last *six months*, what has been your frequency of use?

- Almost every day or more
- Once/week or more
- Once/month or more
- Occasionally

How often have you used any of the following major psychedelics: LSD, mescaline, peyote, psilocybin, DMT, or DET?

Before you started smoking pot?

- More than 6 (how many?)
- One to five times
- Never

After you started smoking pot?

- More than 6 (how many?)
- One to five times
- Never

Within the last six months?

- More than 6 (how many?)
- One to five times
- Never

Please make the same ratings (before, after, last 6 months) by putting three numbers (N-N-N) after each of the drugs below you have tried:

- Amphetamine or methedrine (by mouth)
- Amphetamine or methedrine (by injection)
- STP
- PEACE
- MDA
- Others (what?)

Do you think your experiences (if any) with any of these other psychedelic drugs have affected or changed the quality of your experiences with pot? If yes, how?

How long have you been drinking alcoholic beverages in sufficient quantity to change your consciousness (i.e., drinking to get "tipsy" or drunk, rather than just having a little wine or beer with meals for the taste)?

In *all* this time, what has been your average frequency of use?

During the last six months, what has been your average frequency of use?

If pot were as available legally as alcohol. about what percentage of the time would you choose alcohol

to alter your state of consciousness rather than pot?

[HTML editor's note: To save space and transmission time, the following change has been made: With a few exceptions, all the following questions should have the same list of choices following them as question number 1. The exceptions are followed by the choices as contained in the original publication.]

VISION SENSE:

1. I can see new colors or more subtle shades of color than when I'm straight.

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Very Strongly	Maximum	LSD

2. Colors get duller, not as vivid.

3. There is a sensual quality to vision, as if I were somehow "touching" the objects or people I am looking at.

4. When I look at *pictures* they may acquire an element of visual depth, a third dimensional aspect that they don't have when straight.

5. The world looks flat; it lacks the third dimension of depth.

6. I see fringes of colored light around *people* (not objects), what people have called the "aura."

7. I see fringes of colored light around *objects* (not people), what people have called the "aura."

8. If I try to visualize something, form a visual image, I see it in my mind's eye more intensely, more sharply than when straight.

9. Things outside the center of my visual field, things in the periphery of my vision look different when I'm not looking directly at them than when I look directly at them. E.g., I might see a door as open when I'm not looking directly at it but when I look directly at it, it is closed.

10. Things seen are seen more sharply in that their edges, contours stand out more sharply against the background.

11. My vision tends to be somewhat blurry, if I try to examine something visually, I can't focus quite as sharply as when straight.

12. My visual perception of the space around me is changed so that what I'm looking at is very real and clear, but everything else I'm not focusing on visually seems further away or otherwise less real or clear.
13. I can see patterns, forms, figures, meaningful designs in visual material that does not have any particular form when I'm straight, that is just a meaningless series of lines or shapes when I'm straight.
14. Visual depth perception changes, so that near objects seem much nearer and far objects seem much further away.
15. Objects or people may seem to get visually nearer or further *as I look at them* without their actually moving at all.
16. The face of another person will change even as I watch it, so he keeps changing from one different person to another.
17. Everything I look at seems to vibrate or pulse, as if it had a life of its own.
18. I find it difficult to read while stoned.
19. It is easier to read than usual while stoned.
20. If I read while stoned, I remember *more* of what I've read hours later than if I had been straight.
21. If I read while stoned, I remember *less* of what I've read hours later than if I had been straight.
22. I have more imagery than usual while reading; images of the scenes I'm reading about just pop up vividly.
23. With my eyes open, I can see things that aren't there, i.e., for which there is no real visual basis. For example, if you look at stains on a wall and see a design, that's an illusion; you are altering something there. This question deals with seeing something when there's *nothing* there, such as seeing a pattern or object on a perfectly blank wall.

HEARING SENSE:

24. I can hear more subtle changes in sounds; e.g., the notes of music are purer and more distinct, the rhythm stands out more.
25. I can understand the words of songs which are not clear when straight.
26. I have difficulty hearing things clearly: sounds are blurry and indistinct.

27. If I try to have an auditory image, hear something in my mind, remember a sound, it is more vivid than when straight.
28. The sound quality of my own voice changes, so that I sound different to myself when I talk.
29. When listening to stereo music or live music, the spatial separation between the various instruments sounds greater, as if they were physically further apart.
30. With my eyes closed and just listening to sounds, the space around me becomes an *auditory* space, a place where things are arranged according to their sound characteristics instead of visual geometrical characteristics.

TOUCH SENSE:

31. Touch sensations take on new qualities that they don't have when straight.
32. My sense of touch is more exciting, more sensual, when stoned.
33. Some surfaces feel much smoother, silkier than when straight.
34. Some surfaces feel much rougher, more irregular, than when straight; the
35. Objects seem heavier, more massive, when I lift them when stoned.
36. Objects seem lighter, less massive, when I lift them.
37. I can experience vivid tactual imagery, imagine what things feel like and feel their texture very vividly in my mind.
38. The *temperature* of things, their warmth or coldness, takes on new qualities.
39. Taste sensations take on new qualities that they don't have when straight.
40. Tastes become divided into several components. instead of an overall taste. E g., a bite of bread may taste salty on one part of your tongue and sour on another part at the same time.
41. There is an exceptionally long time delay between starting to chew food and the time the taste actually reaches my consciousness.
42. I salivate quite a lot when stoned.

43. If I belch, I retaste the food in my stomach. and it tastes very good.

44. I enjoy eating very much and eat a lot.

45. If I try to imagine what something tastes like, I can do so very vividly.

46. I crave *sweet* things to eat, things like chocolate, more than other foods.

SMELL SENSE:

47. Smell sensations take on new qualities that they don't have when straight.

48. Smells become much richer and more unique when stoned.

49. When I smell something, different components of the smell seem to register at different physical locations in my nose.

50. If I try to imagine what something smells like, I can do so much more vividly than when straight.

51. When I walk someplace my experience of the distance covered is quite changed (e.g., not being aware of the space between. just seeming to suddenly be there or, conversely, feeling that it takes an immense number of steps to cover the distance).

52. Distances between me and things or me and other people seem to get greater: they are further away.

53. Distances between me and other things or people seem to get shorter; they are closer.

54. Objects seem to tilt toward the left.

55. I get so lost in fantasy or similar trips in my head that I completely forget where I am, and it takes a while to reorient after I come back and open my eyes.

56. The space or air around me takes on a solid quality; it is no longer "empty" space.

57. The force of gravity seems to alternate between pushing me up and pushing me down.

58. Time passes very slowly; things go on for the longest (e.g., one side of a record seems to play for hours).

59. Time passes very rapidly; things finish almost before they seem to have gotten started.

60. Time seems to stop; it's not just that things take longer, but certain experiences seem outside of time, are timeless.
61. Events and thoughts flow more smoothly; the succession of events in time is smoother than usual.
62. Events and thoughts follow each other jerkily; there are sudden changes from one thing to another.
63. *While* something is happening, I get the funny feeling that this sequence has happened before. in exactly the same way. Even though I logically know it couldn't have happened before, it feels strange, as if it's repeating exactly (this is called a *deja vu* experience and should not be confused with a false memory).

EXTRASENSORY PERCEPTION:

64. I believe in the existence of extrasensory perception (ESP), i.e., that people can sometimes acquire knowledge about things happening at a distance in space or time, or about other people's thoughts, when there is no possibility of this knowledge having been acquired through the known senses (sight, hearing, etc.).

- _____ Believe strongly
_____ Believe somewhat
_____ Haven't made up my mind
_____ Disbelieve somewhat
_____ Disbelieve strongly

65. I feel so aware of what people are thinking that it must be telepathy, mind reading, rather than just being more sensitive to the subtle cues in their behavior. Frequency?

66. I can foretell the future by some kind of precognition, more than just predicting logically from present events.

67. Have you ever had the experience of feeling "located" outside your physical body, i.e. of *you* being at a different location in space than the one you knew your body was at? Dreams aren't included here, or situations where you just lose consciousness of your body. This is where you consciously feel located at a different place and know *at the time* that you are conscious but at a different location. Has this happened to you:

- At all _____ (if so please describe on rear)
While stoned? _____ happened before/after started smoking grass.

68. I can perform magical operations that will affect objects or people while stoned. (Please describe on rear)

PERCEPTION OF THE BODY:

69. My perception of how my body is shaped gets strange; the "felt" shape or form doesn't correspond to its actual form (e.g., you may feel lopsided, or parts of your body feel heavy while others feel light).

70. I lose awareness of most of my body unless I specifically focus my attention there, or some particularly strong stimulus demands my attention there.

71. If I am paying attention to some particular part of my body, the rest of my body fades away a lot so the part I'm attending to stands out more sharply.

72. When there is any trembling in my body, the upper half of my body trembles much more than the lower half.

73. I become very aware of my breathing and can feel the breath flowing in and out of my throat as well as filling my lungs.

74. I get dizzy or nauseated, so much so that I wonder if I will get sick.

75. I become aware of parts of my body that I am normally unaware of! can't become aware of when straight, such as internal organs.

76. My body gets very numb, without feeling.

77. The location of my consciousness, the physical locale of the part of *me* that seems most me, has moved to different parts of my physical body from those it occupies while straight.

78. When defecating or urinating, I become aware of the internal organ processes involved that I can't be aware of when straight.

79. With my eyes closed, my body may feel very light or even feel as if I float up into the air when stoned.

80. My body feels abnormally heavy, as if it weighed much much more.

81. I feel a lot of pleasant warmth inside my body.

82. I get feelings in my body that are best described as energy, force, power of some sort flowing.

83. I become very aware of my spine and feel energy flowing through it.

84. I become aware of *chakra* centers along my spine and feel changes in my state of consciousness as energy flows through the *chakras*.
85. I feel a vibration or tingling sensation in some or all of my body that I can tell is *not* an actual muscle tremor by looking at my body.
86. My muscles develop actual physical tremors (large enough to see visually).
87. My scalp itches a lot if I have smoked too much grass.
88. Pain is easy to tolerate if I keep my attention elsewhere.
89. Pain is more intense if I concentrate on it.
90. My body feels larger than usual.
91. My body feels smaller than usual.
92. I am much more aware of the beating of my heart.
93. I have lost all consciousness of my body and the external world, and just found myself floating in limitless space (not necessarily physical space).
94. I have lost all consciousness of my body during fantasy trips, i.e., gotten so absorbed in what was going on in my head that my body might as well not have existed for a while.

MOVEMENT:

95. I *feel* much stronger when stoned (regardless of whether actually physically stronger or weaker).
96. I *feel* much weaker when stoned (regardless of whether actually physically stronger or weaker).
97. My non-dominant hand (left if you're right-handed and vice-versa) becomes partially paralyzed, unusable.
98. I get physically restless so that I want to move around a lot.
99. I get physically relaxed and don't want to get up or move around.
100. When I move about or dance, my motions seem exceptionally smooth and well coordinated.

101. When I move about or dance, my motions seem awkward and uncoordinated.

102. I tremble a lot in my hands for a while after having been stoned.

103. My sense of balance gets very erratic, making it seem difficult to walk or even maintain a sitting position.

104. Smoking grass makes me cough hard while inhaling and holding my breath.

RELATIONS WITH OTHER PEOPLE:

105. When stoned with others, I play "childish" games; i.e., we interact with each other in ways which are very enjoyable but which people would ordinarily consider childish.

106. I find it very hard to play *ordinary* social games when stoned.

107. I feel isolated from things around me, as if there were some kind of barrier or glass wall between me and the world, muting everything coming in and partially isolating me.

108. I get somewhat paranoid about the people with me; I am suspicious about what they're doing.

109. I am less noisy and boisterous at parties than when straight.

110. I am less noisy and boisterous at parties than when drunk or tipsy on alcohol.

111. I feel the things I say in conversation when stoned are more profound, more appropriate to the conversation, more interesting.

112. When stoned with a group of people, the group takes on a much greater sense of unity, of real social relationship, than when straight; i.e., I feel much more part of a *group* instead of one person simply in the presence of other people.

113. I have feelings of deep insights into other people, how they tick, what their games are, when stoned (regardless of whether they check out later).

114. I empathize tremendously with others; I feel what they feel; I have a tremendous intuitive understanding of what they're feeling.

115. I become more sociable; I want to be with and interact with people more.

116. I become less sociable; I want to be by myself.

117. I talk a lot more than when straight.

118. I talk a lot less than when straight.

119. Other people seem dead, lifeless, as if they were robots when I'm stoned.

120. I am very strongly influenced by the social situation set up by my companions, so I will do whatever they are doing even if it is something I don't want to do or wouldn't do normally.

121. Being with people who are much higher than I am (as from their being on acid or much more stoned on grass) gets me higher even though I don't smoke any more grass.

SEXUAL ACTIVITY:

122. My sexual drive goes up when stoned; I have more *need* for sex.

123. I have much less sexual drive when stoned; it's difficult to arouse me even in a situation which would normally arouse me.

124. I have no increase in sexual feelings unless it's a situation that I would normally be sexually aroused in, and then the sexual feelings are much stronger and more enjoyable.

125. When making love, I feel I'm in much closer mental contact with my partner; it is much more a union of souls as well as bodies.

126. When making love, I feel rather isolated from my partner; I'm wrapped up in my intensified sensations and not really very aware of my partner's reactions and feelings.

127. I feel as if I'm a better person to make love with when stoned. Why? (Please answer on back.)

128. Sexual orgasm has new qualities, pleasurable qualities, when stoned.

THOUGHT PROCESSES:

129. I can get so wound up in thoughts or fantasies that I won't notice what's going on around me or won't hear someone talking to me unless they attract my attention forcibly.

130. I can get so wound up in thoughts or fantasies while doing some physical task or job that I lose awareness of doing it, yet suddenly find that I have finished the physical task even though I lost track of it mentally.

131. I do things with much less thought to possible consequences of my actions than when straight, i.e., I go ahead and do things without thinking first about "What will people think? How will this effect me?" etc.

132. My mind goes completely blank for long periods (15 minutes or more); even though I'm not asleep, I have no thoughts or images or anything going on in my mind.

133. In thinking about a problem of the sort that normally requires a series of steps to solve, I can get the answer without going through some of the usual intermediate steps; i.e., I start to think about the problem and then just arrive at what is clearly the answer, without being aware of the steps in the thought process I would normally be aware of.

134. I can't think clearly; thoughts keep slipping away before I can quite grasp them.

135. Commonplace sayings or conversations seem to have new meanings, more significance.

136. I give little or no thought to the future; I'm completely in the here-and-now.

137. I am more willing to accept contradictions between two ideas or two views of the situation than when straight. I don't get up tight because the two things don't make immediate sense.

138. I learn a great deal about psychological processes, what makes people tick, i.e., general knowledge about how the mind works (as opposed to specific insights about yourself).

139. *Spontaneously*, insights about myself, my personality, the games I play come to mind when stoned, and seem very meaningful.

140. If I *deliberately* work on it I can have important insights about myself, my personality, the games I play.

141. If I try to solve a problem, it *feels* as if my mind is working much more efficiently than usual (regardless of how you evaluate your solution later).

142. If I try to solve a problem it *feels* as if my mind is much less efficient than usual (regardless of how you evaluate the solution later).

143. If I work on some problem while stoned, I work *more* accurately than straight, as judged by *later* real-world evaluation.

144. If I work on some problem while stoned, I work less accurately than straight, as judged by later real-world evaluation.

145. The ideas that come to my mind when stoned are much more original than usual.

146. I appreciate very subtle humor in what my companions say, and say quite subtly funny things myself.

147. I can play elaborate games and get very involved in the games.

148. When thinking about things while stoned, there are visual images that just automatically go along with the thinking; i.e., I think much more in images instead of just abstract thoughts.

149. I think about things in ways that seem intuitively correct, but which do not follow the rules of logic.

MEMORY FUNCTIONING:

150. I *spontaneously* remember things I hadn't thought of in years, more so than straight (does not apply to consciously *trying* to remember things.)

151. My memory for otherwise forgotten events is much better than straight when I consciously *try* to remember.

152. My memory for otherwise forgotten events is much worse than when straight when I *try* to remember.

153. My memory span for conversations is somewhat shortened, so that I may forget what the conversation is about even before it has ended (even though I may be able to recall it if I make a *special* effort).

154. My memory span for conversations is very shortened so that I may forget what the start of a sentence was about even before the sentence is finished (although I may be able to recall it if I make a *special* effort).

155. I can continue to carry on an intelligent conversation even when my memory span is so short that I forget the beginnings of what I started to say; e.g., I may logically complete a sentence even as I realize I've forgotten how it started.

156. I think I've said something when actually I've only *thought* about saying it, more so than when straight.

157. I think something is a memory when it turns out to be a fantasy, something I just made up, but fooled myself into thinking was a memory at the time. (not the same as *deja vu*.)

158. My memory of what went on while I was stoned is good afterwards, better than if I had been straight all the time.

159. My memory of what went on while I was stoned is poor afterwards compared to what I would have remembered had I been straight.

EMOTIONS:

160. Whatever mood I was in before turning on becomes greatly amplified, so if I felt down I really feel bad and if I felt good I really feel very good.

161. I feel emotions much more strongly when stoned, so they affect me more.

162. I feel emotions much more weakly when stoned, so they have little effect on me.

163. I am *more* aware of the body tensions and feelings that are part of emotions when stoned.

164. I am *less* aware of the body tensions and feelings that are part of emotions when stoned.

165. I almost invariably feel good when I turn on, regardless of whether I felt bad before turning on.

166. I almost invariably feel bad when I turn on, regardless of how I felt before I turned on.

167. How many people have you seen "freak out" on grass, i.e., have such a catastrophic emotional upset that they needed help of some sort? (Not counting yourself.) _____ No. of People
What percentage is this compared to all the times you've seen people get stoned?

168. What sort of help did they get? How effective was it?

169. Have you ever freaked out in this way? _____ Yes _____ No

How many times? _____

What sort of help did you get, and how effective was it?

SELF-CONTROL:

170. I find it easy to accept whatever happens; I don't need to control it or feel in control of it.

171. I *worry* about losing control, such that I might do something I wouldn't want to do (regardless of whether you *actually* lose control).

172. I lose control of my actions and do *antisocial* things (actions that harm other people) that I wouldn't

normally do.

173. My inhibitions are lowered so that I do things I'm normally too inhibited to do (Note: this does not apply to *antisocial* acts but to acts that are generally acceptable, but that you can't normally do through shyness or the like).

174. I giggle a lot when stoned; I am silly, even though the situation is not that funny.

175. I often forget to finish some task I've started, or get sidetracked more frequently than when straight.

176. I get a rather *compulsive* desire to get even higher after a certain stage; I will smoke much more if I can

177. I have little or no control over my fantasies; i.e., they flow along spontaneously and even if I try I can't change what I'm fantasizing about.

178. I have excellent control over my fantasies; I can make them go in whatever direction I want.

179. I can work at a necessary task with extra energy, absorption, and efficiency.

180. I have lost control and been "taken over" by an outside force or will, which is hostile or evil in intent, for a while.

181. I have lost control and been "taken over" by an outside force or will, which is good or divine, for a while.

182. Parts of my body have moved on their own volition, have done something which I did not will.

183. I feel as if I lose control over my thoughts; they just go on regardless of what I want (without reference to whether you *like* this or not).

184. I can "come down" at will if I need to be straight for a minute to deal with some complicated reality problem (circle the point of highness above which you can't do this).

IDENTITY:

185. My personality changes a lot temporarily while I'm stoned, so that in many important ways I am a different person for that time.

186. I have been so absorbed in looking at or contemplating an object or person that I felt as if I were that object or person, i.e.. temporarily the split between it-and-me or they-and-me was transcended.

187. When stoned I lose most of my sense of ego identity and usually take on 3; the identity of my like-sexed parent (father for males, mother for females).

188. I feel completely unique; there is no one like me; I feel as if I am much better than ordinary people when stoned.

189. I lose all sense of self, of being a separate ego, and feel at one with the world.

190. I feel very powerful, capable, and intelligent when stoned.

191. Some events become archetypal, part of the basic way Man has always done things. That is, instead of me (John Doe, ego) doing something, it is just Man Doing What Man Has Always Done. That is, my actions become part of the pattern that man has always been part of, instead of me, a particular individual, carrying out a particular act at a particular moment in space/time.

SPIRITUAL EXPERIENCES:

192. I feel in touch with a Higher Power or a Divine Being to some extent when stoned, I feel more in contact with the "spiritual" side of things.

193. I am able to meditate more effectively than when straight (if yes, please describe what sort of meditation you do on the back of this page).

194. I have spiritual experiences, discrete experiences which have had a powerful, long-term religious effect on me while stoned. (If so, please describe on rear.) ____Yes ____No

195. Getting stoned has acquired a religious significance for me. ____Yes ____No (If yes, in what way? Explain on back.)

SLEEP:

196. I find it very difficult to get to sleep if I'm stoned, even if it's my usual bedtime.

197. I find it very easy to go to sleep at my usual bedtime when stoned.

198. I get very drowsy even though it's *not* late or otherwise close to my usual bedtime.

199. My sleep is particularly refreshing if I go to bed stoned.

200. My sleep is restless and poor if I go to bed stoned.

201. My dreams are more vivid if I go to bed stoned.

202. My dreams are less vivid or forgotten if I go to bed stoned.

SPECIAL TECHNIQUES:

203. Since taking LSD (or mescaline, peyote, psilocybin, or another major psychedelic drug), I am able to get much higher on grass than I was before.

_____Yes

_____No

_____Not applicable-haven't had LSD

204. I have special ways of getting higher besides smoking more grass with:

1. Other drugs + grass _____Yes _____No

2. Special mental techniques _____Yes _____No

(Please explain any yes answer on rear)

205. There is a certain degree of being stoned from above which I cannot come down quickly if I *must* come down to deal adequately with reality. (circle level)

206. I have special technique(s) for coming down rapidly if I need to be straight quickly.

_____Yes _____No (If yes, please describe on rear)

MISCELLANEOUS:

207. I feel more childlike, more open to experience of all kinds, more filled with wonder and awe at the nature of things.

208. Some of my inner trips, eyes-closed fantasies have been so vivid and real that, even though I know logically they couldn't be real, they feel real; they are as real as ordinary waking-life experience.

209. I find it very hard to get organized or accomplish anything I want to the day after smoking grass (Circle lowest level at which this occurs.)

210. I have gotten very nauseous and vomited.

211. Others (who were straight at the time) have told me that I act very differently when I'm stoned.

(Circle highest level at which this has happened.)

212. Others (who were straight at the time) have not noticed that I've been stoned (applies to other people who were your friends and would have told you if they'd noticed). (Circle highest level at which this has happened.)

213. Could you compare the effects of alcohol and marijuana on yourself on the back of this page? When do you prefer to use the one, when the other?

214. I feel that the world is all right. that everything is pretty much the way it should be when stoned (except for the marijuana laws)

215. I feel the world is in pretty bad shape, that all sorts of changes need to be made in the social order to make it a decent place to live in (for things besides the marijuana laws).

216. Sounds have visual images or colors associated with them, synchronized with them.

217. I get much more involved in ordinary tasks than when I'm straight: they're completely absorbing.

218. With my eyes closed, my inner visions and fantasies become extremely real, as real as nighttime dreams.

219. I suddenly realize that nothing has been happening for a long time; my mind has been blank and nothing was going on.

220. I move up to higher levels of consciousness in jumps, sudden increases, rather than smoothly.

What important or characteristic things happen to you when you're stoned that haven't been described above? Could you describe each one and rate it in the same way below? Use the back of this sheet if needed.

221. ...

Frequency?	Never	Rarely	Sometimes	Very Often	Usually	
How Stoned?	Just	Fairly	Strongly	Very Strongly	Maximum	LSD

222... 223...

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On Being Stoned

Charles T. Tart, Ph. D.

References

THE FOLLOWING reference list is not intended to be a comprehensive bibliography on marijuana. For reasons discussed in Chapter 2, much of the voluminous older literature on marijuana is of little value to most readers and so has not been included here. The occasional reader interested in a comprehensive guide to the literature on marijuana may see Gamage and Zerken, 1969.

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Marijuana use Patterns

LLOYD HAINES* and WARREN GREEN*

I. THE SAMPLE

This survey is compiled from a total of 131 questionnaires. Subjects were not selected with the goal of obtaining a representative cross-section of the community. Rather, emphasis is on the use patterns of moderate to heavy marijuana smokers. Of the 131 people interviewed, only 8 (6 per cent) smoked less often than once a week.

Although many subjects were from the Berkeley area, effort was made to analyze people from other areas as well. Questionnaires were returned from New York, Illinois and Michigan, in addition to other cities in California.

Of the 131 respondents, 75 were male and 56 female. 74 were students, 43 worked full-time, and 14 were unemployed. The student group broke down as follows: 32 were in or had completed some high school, 27 had some college education and left before graduation, 43 were currently in college, and 29 were doing or had completed some graduate work.

As noted above, the sample consisted mainly of moderate and heavy smokers. Broken down, the results were as follows:

Every day:	32	24.4%
Every other day:	29	22.1%
At least twice a week:	30	22.8%
Once a week:	32	24.4%
Less frequently:	8	6%

Throughout this paper, reference will be made back to the figures given in this section.

Questionnaires were administered orally avoiding the risk of blank answers. Subjects were questioned about their answers, permitting the interviewer to find out why a particular answer was given. Occasionally, questions were asked twice, at different times during the interview session, in order to establish the validity of a response. On the average, each questionnaire took 50-70 min to administer. Subjects were questioned in private, eliminating any possibility of their inhibitions affecting an answer.

Use patterns may differ in areas where laws regulating marijuana are different. Thus in Berkeley, where little enforcement of the marijuana laws is attempted, people will smoke while walking in the streets. In Chicago, for example, where strict enforcement is practiced, and jail sentences are imposed, use is almost exclusively restricted to residences.

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Another aspect of use that differs in various communities is size of a marijuana cigarette. In California, where marijuana is relatively inexpensive, large "joints" are used and grass is freely given to friends. In contrast, New York smokers roll very thin "joints," and are more covetous of their dope supply. Price differentials in these two areas may be as high as 150 per cent.

II. TURNING ON THE FIRST TIME

Approximately three of every four subjects first smoked with a close friend or relative. Only 2 stated that their first drug experience was with a stranger. This clear pattern is undoubtedly a product of the illegality of marijuana use and the resulting "subculture." Also, for novices, drug use is a relatively important event. The initiate is most at ease around close friends.

The survey suggested, although a precise empirical finding was not possible, more experienced smokers were more willing to smoke with strangers. Those who recently have begun using marijuana do most of their smoking with close friends.

It is commonly thought most people do not get high the first time they smoke. Surprisingly, this survey revealed that better than two of every three subjects (91 v. 40) did get high the first time they tried. There is some evidence that the older the novice, the less likely he was to get high on his first attempt; this, however, is not a clear finding.

Subjects were asked to recall how much marijuana they smoked to get high the first time, and how long they had to smoke. Few, however, could even venture a guess, although most were sure they smoked more than they must now smoke to get stoned.

III. METHOD OF USE

Respondents were asked how they usually use grass. Not at all surprisingly, smoking was the predominant method. Only 20 people replied they smoked less than 90 per cent of the time. Most people had tried cooking grass into brownies or cookies at least once. Only a few had boiled it to tea.

The main reasons given for the popularity of smoking as opposed to ingesting were: relative ease of preparation and predictability of dosage. Most who had eaten cooked marijuana said there was no accurate way to gauge a likely reaction to a given amount of ingested grass.

Other than the factor of ease and predictability, few subjects told of a qualitative preference for smoking or ingesting. Yet most noted varying degrees of qualitative difference in the two experiences. Ingested grass was said to take much longer to "come on," perhaps upwards of two hours. The experience was likely to be of longer duration and greater intensity, although this may be related to the amount taken, which is usually greater when ingested. A small number of respondents (6) who had also taken LSD or mescaline, likened the ingesting experience (if the dosage proved adequate) to "dropping" a psychedelic drug.

When the subjects smoked marijuana, by far the most popular method was the "joint." The breakdown between joint and pipe was as follows:

Joint		
100%	of the time	38
95%	" " "	17
90%	" " "	21
80%	" " "	14
70%	" " "	19
50%	" " "	15
40%	" " "	4
20%	" " "	3

This result is not surprising, since joints are the most uniform method of gauging dosage, and require minimal investment or preparation. Many subjects volunteered the fact, however, that the likelihood of a pipe being used increased when the number of smokers increased.

Respondents were asked the approximate number of joints they must presently smoke to get high. Answers ranged from a low of $\frac{1}{4}$ to a vague "1 to 4." The vast majority of responses were between $\frac{1}{2}$ and one joint, and the group average was 0.91 joint.

This finding, however, is of extremely limited value, for an overwhelming number of subjects said that this depends on the quality of the grass smoked (124 vs. 7). Those answering affirmatively were asked if these qualitative differences were "major," "moderate," or "slight." The results:

major	=	84
moderate	=	35
slight	=	5

Perhaps consistently with these results, a vast majority of those questioned believed there are different "types" of grass, e.g., "Acapulco Gold," "Panama Red," "michoacan," etc. 98 replied affirmatively, and only 15 negatively. 18 declined to answer.

Asked to rate these "types" in order of potency, the test group came up with no consistent finding. They did state that Acapulco Gold and Panama Red were clearly distinguishable by their color, that michoacan was the flowered tops only, with no stems, and that all three varieties were far stronger than "average" grass.

Eleven respondents said they had smoked grass cured in psilocybin, a mixture which is apparently highly potent. A few of these people said that such grass had a faintly bitter smell, and if taken in moderately heavy doses could produce hallucinations.

Four of the subjects believed they had smoked grass cured or soaked in belladonna. Their opinion of this blend was unfavorable. The mix was highly potent, but alien to a grass high. The consensus was that the belladonna had been added to make otherwise low-quality grass saleable.

Many reported having seen or smoked marijuana cut with sugar; probably this was not designed to enhance quality but to increase weight.

Most smokers continue to smoke even after they are high. Of 125 people answering this question, only 30 replied negatively. Of these 30, 21 had been

smoking for less than a year. This finding seems consistent with the over-all developmental trend the interviewers perceived: novices treat turning on as a "big thing," while the more experienced smokers develop increasingly casual attitudes.

IV. SETTING OF USE

Subjects were asked where they turned on, and how regularly in each setting. Obviously, most cited "private residence." More interesting, however, were the responses to other settings; car, outdoors, and entertainment activity. Fully half of the test group stated that they had turned on in cars. These 66 people turned on an average of 14 per cent of the time in cars. 83 people turned on outdoors, for an average of 12 per cent of the time. And 51 said they smoked at entertainment activities (e.g., Fillmore, movies, etc.) for an average of 10 per cent of the time.

Those subjects who turned on in one non-residence setting, were likely to do so in the other settings as well. Apparently, once the initial fear of arrest subsides, the smoker is likely to turn on most everywhere. Predictably, novices (especially females) were least likely to smoke outside of a private residence.

V. OWNERSHIP PATTERNS

Three of every four respondents own their own grass. Here it is appropriate to reiterate that the sample consists of relatively heavy users, and is not a representative cross-section of the community. Of those who do not own their own (32), 20 were girls, and of these 20, 14 had husbands or boy friends who do own their own grass.

By far, the amount most commonly owned was the lid. 74 usually owned about a lid; 9 usually owned about 2 lids; 7 usually owned less than a lid; and 9 usually owned about one pound.

Most of these subjects usually buy their grass by the lid. 17 subjects purchase by the kilogram, on an average of 56 per cent of the time. All of these 17 admitted to doing some selling of grass.

Small-time selling was fairly widespread among the sample. 51 replied that they had sold, and 61 had never done so. The most likely sellers were experienced male smokers. There was no clear evidence linking selling to more "hard core" drug users. Although sellers turned on more often than the rest of the sample, they by no means monopolized use of other drugs. One who sells marijuana is not necessarily a hard-core drug user.

105 people said they had at least one particular "source." Those having one, two, or three such sources were divided fairly evenly, and constituted 80 per cent of the subjects. Very few knew more than three sources.

The subjects are generally well acquainted with their sources. Subjects were asked if they knew their sources closely, fairly well, slightly, or hardly at all:

Closely:	67
Fairly well:	35
Slightly:	3
Hardly at all:	0

Most of the sample was confident of their ability to obtain grass whenever they wanted it. Asked how probable were their chances of success at a given time, they replied as follows:

Certain:	54
Highly probable:	62
Fair chance:	15
Improbable:	0

These results are probably influenced by the high degree of usage of the test group. Ease of access would seem to increase as does one's involvement in the drug's "subculture".

VI. ACTIVITY PATTERNS

Subjects were asked if they usually get high with a purpose in mind. They were also given several activities, and asked what percentage of the time they turned on for the purpose of performing that activity. The results of the first general question, i.e., do subjects usually get high with a purpose in mind, were inconclusive. 72 said yes and 53 no. Affirmative answers were particularly prevalent among those who had been turning on for a relatively short period of time; conversely, experienced smokers turned on more often with no purpose in mind.

The following, listed by purpose/activity, tells how many people turn on for that purpose, and, on the average, what percentage of the time they turn on for the purpose.

Purpose	No. of people saying yes	Average % of time
To relax	81	35%
Entertainment activity	68	36%
Sexual activity	47	14%
To pass the time	44	22%
To go to sleep	29	10%
Go to class	12	13%
Work (non-school)	11	40%
Study	8	4%

Subjects were asked if they usually became more quiet or talkative when high. The results here were inconclusive. 47 said they became more quiet, 25 became more talkative, 33 said that both may happen, depending on their mood, 26 did not know.

One fairly clear finding was most people become more passive when stoned. 19 said they became more alive or agitated, and 76 said they became more passive.

40 subjects have worked while high. This is not a regular occurrence. 8 subjects work on a regular or semi-regular basis while high. These eight subjects work a good part of the day. They turn on during lunch and coffee breaks. The jobs do not require great mental acuity. Four of the subjects work in gas stations and the others perform various other manual labor tasks. These eight subjects claim to work as effectively or more effectively in comparison to being "straight." One subject, a gas station attendant, feels he can communicate better with his customers and can give them outstanding service when high. It should be noted that these eight subjects are high *every day, whether at work or not.*

Of the 32 remaining subjects who answered yes, 23 have worked infrequently when high. They are fairly heavy users at home, but do not like to smoke or be high on their jobs. 16 feel their ability is impaired, and 7 do not feel comfortable in business surroundings while high.

Many subjects are students who hold part-time jobs. These jobs tend to require little concentration, which may contribute to the reason(s) why the subjects are willing to be high. 8 subjects work fairly regularly when high and find they can perform adequately. This group will read for pleasure when high. They claim to read just as effectively on comparison to being "straight." These subjects are generally long-time users, having used the drug for an average of two years. They also use marijuana at least every two days. It is possible to conclude that because marijuana has been integrated into most of their activities, they can perform "as normal" at work.

Study

33 subjects study when high. (60 per cent of the test group are students; thus 40 per cent of the students study when high.) 28 of the subjects study infrequently. 16 of the 28 feel their potential to study is inhibited, and attempt to stay "straight" when required to study. In contrast, 12 feel they function just as effectively in comparison to being "straight." 8 of the 12 feel their reading speed is decreased, but retention is increased. 25 of the 28 prefer to study when "straight" and study when high only if the situation arises.

Five subjects claim to study exclusively when high. They also claim their effectiveness is improved by using marijuana. These five subjects feel they are more productive when high. They will drive, read and work when high. They have integrated marijuana into all aspects of their lives. One law student has finished three years at Hastings in a continued high state. He has taken finals when high, and just recently graduated.

40 per cent of the students have attended class when high. 23 per cent of the students find their classwork ineffective, and 17 per cent can perform adequately. All but 5 attend class infrequently when high. These 5 are discussed above. They study, attend class, and do many things when high.

Read

84 subjects read for pleasure when high. 47 do not. Every subject who studies when high also reads for pleasure while high. 40 people read infrequently while high. 36 read frequently, and 8 read most of the time, while high. Of all the subjects who read while high, those subjects who read most often are generally the most effective readers. This is not an exclusive rule, however. Many claim their reading speed is slowed considerably. This problem seems to be offset by increased retention or heightened enjoyment from reading the material. 18 feel they read more effectively, 36 just as effectively; and 30 less effectively.

Drive

81 licensed drivers answered that they have driven while high. Of the 50 who said no, 30 were female, who permitted their escorts to do the driving. The other

20 were licensed drivers who either drove infrequently, or found marijuana to impair their driving abilities.

An interesting fact about this group (those who can drive but don't), is that they have not been turning on very long, i.e., they averaged only $11\frac{1}{4}$ months. This might mean that they have not had enough experience with marijuana to function properly. It should also be noted that this group also cannot read or study when high. Marijuana appears to impair their whole behavioral pattern.

Of the 81 who drive while high, 63 drive frequently. They do not let marijuana interfere with their plans. They use highways and city streets. As earlier indicated, many use the car to turn on, while others turn on in the car when traveling to a particular destination.

67 of the 81 mentioned above, feel they drive as well as, or better than driving while "straight." 59 of the 67 expressed confidence in their ability to drive. 14 feel they drive less effectively. 18 expressed some doubts in their ability.

None of the subjects has ever incurred physical harm or has been involved in an auto accident when stoned. This finding is fairly important, because many of the subjects have been driving for some time when stoned. This fact dispels many theories that marijuana aids in causing traffic accidents. 25 of the people who drive on a regular basis claim their ability to control the car is improved by use of marijuana. They feel their concentration is improved and find fewer distractions compared to being "straight." 15 subjects feel motion is slowed and therefore their reactions seem improved.

Subjects were questioned if they were concerned about others who drive when high. Unanimous concern was expressed if the "high" in question was a product of speed, LSD or liquor. The subjects felt little concern about drivers using marijuana. One subject stated: "Smoking in automobiles is a way of life." This feeling was fairly pervasive among the subjects. Subjects in a fast-moving city, such as New York, showed concern about scurrying automobile traffic. It is obviously more difficult to drive in this setting than in Berkeley. One subject, who lives in New York and attends a school in Berkeley, drives constantly while high in Berkeley. When in New York, he prefers to stay "straight" if driving is required.

Eat

All the subjects responded affirmatively to this question. 91 per cent of the subjects eat every time they smoke.

85 per cent of the people interviewed ate greater quantities when high. The interviewers tried to elicit the reason for this phenomenon and were unsuccessful in finding any one answer. 30 per cent said they were hungrier; 27 per cent felt they liked the tastes of food and the textures; 37 per cent said they liked the chewing and swallowing sensation; and 6 per cent did not know.

One may attempt to explain the phenomenon simply by stating people are usually in the house and have easy access to food consumption. This is too simplistic, because many subjects stated they went out to exotic restaurants when high and ate "hot" foods. When high, people have many reasons for eating. Hunger is only one. Many subjects (67 per cent) confessed they continued to eat voraciously even when their hunger is gone. 27 per cent continued to eat when bloated. They

attribute this to the enjoyment received from tastes and textures. 17 per cent consider eating an enjoyable, sensual activity.

Sex

84 per cent of the subjects engage in sexual activity when high. Of the 16 per cent who don't, approximately half do not engage in sex at any time (many high school students were interviewed, thus many of the subjects were young). Of the 109 people who engage in sex, approximately 45 do so more frequently than when "straight." 60 engage in sex at the same frequency. Only 4 subjects have sex less frequently. 53 subjects claim the sexual act is longer. 80 subjects feel the experience is more enjoyable compared to being "straight." The explanation for these findings is that marijuana enhances physical sensations.

It is apparent from an analysis of the answers elicited on eating food and on sexual activity, that marijuana has a sensual effect on the subjects. They were more aware of their bodily functions and sensual pleasures. This is true of male and female, long- and short-term users, both moderate and heavy smokers. This is not to say that when one smokes marijuana, he or she immediately engages in sexual activity. The responses show that most subjects have regular sexual partners, whether it be a spouse or lover. The incidences occur when they are together and have the opportunity.

Only one unattached subject in the test group claimed to go out and "hustle" or try to "pick up" a partner. All the other unattached subjects found their ability to "hustle" impaired after smoking marijuana. They had little ambition to get up, get dressed, and attempt to meet people. The subjects dispelled notions that marijuana smokers roam the streets in search of sexual prey. In fact, quite the opposite occurs; the subjects stay at home and engage in sex only if a partner is available and willing.

Movies

Subjects were questioned about movies. Four-fifths of the subjects attend movies when high. They were split in their answers as to frequency. 43 go frequently; 51 infrequently; and 10 go most of the time. Compared to being "straight," 38 attend movies more often; 32 go just as often; and 34 go less frequently.

The subjects have a tendency to get high, intending to go to the movies. They claim to appreciate colors, characterizations, and good films much more when high. They become more selective about the movies they attend. The subjects will not see poor movies. The subject's tolerance for poor acting and trite plots decreases when high. 23 subjects have walked out of movies after a few minutes for precisely this reason. However, 62 per cent have gone to see cartoons or children's films when high. Subjects also stated certain films are "head" films. Some feel that such pictures are especially produced to be seen when high: "Yellow Submarine" was the most commonly given example, with "2001" also mentioned often.

TV and Music

When high, $\frac{2}{3}$ of the subjects watch TV. The responses to the questions on TV were similar to those on movies. The subjects had little tolerance for poor TV shows.

Watching TV, along with listening to music and talking, constitute most of the average "head's" time. The explanation for this is quite simple. The TV is easily accessible in one's house; thus TV, music and talking become the major activities. 55 people listen to music most of the time when high. 68 subjects listen frequently. 43 per cent of the subjects listen to music at a louder volume when high. 57 per cent have a tendency to listen to "hard rock" music when high.

SUBJECTIVE VIEWS

Subjects were questioned if marijuana is part of their "life style." Subjects were occasionally hesitant in responding to these questions, but, after repetition of the question, all subjects were cooperative.

Do you consider grass part of your life style? $\frac{3}{4}$ (95) responded Yes: 32 said No. Subjects were questioned about what "part" or "role" marijuana plays in their lives. Those who felt marijuana was not part of their life style checked "no particular role," exclusively. Those who checked "major role—fairly important role," were the heaviest users. This was not a mutually exclusive category, however. 6 subjects who smoke every day checked "no particular role," and said they could stop at any time. They said marijuana served as a pleasurable "thing," but could be eliminated from their lives without any trouble. Few of the light smokers (once a week) felt marijuana played more than a minor role. There is not a direct correlation between the amount one smokes and his view on what role it plays, as the following chart demonstrates.

	Every day	Every other day	Twice week	Once week	Longer	(how often smoke)
Major role	16		3			
Significant role		12	4	6		
Fairly important	3	2	6	7		
Minor role	5	9	16	14		
No particular role	6	4	3	3	12	

32 subjects said grass was not part of their life style, even though some of these used marijuana every two days. These subjects explained that marijuana was just a pastime, like drinking liquor or playing cards, and it meant little in the spectrum of their lives.

Subjects were questioned about their feelings when marijuana was unavailable, 6 considered this question not applicable. They have always been able to get marijuana. Of the remaining subjects, 81 said they *did* miss grass when unavailable; and 42 replied in the negative. Subjects rated their feelings:

- 5 — lost without it
- 2 — intensely aware of its absence
- 33 — significantly miss it
- 39 — only slightly miss it
- 42 — don't miss it

When do you begin to miss grass?

immediately	—	13
after one day	—	8
after a few days	—	36
after a week	—	13
longer	—	14
do not miss it	—	39

The findings are fairly clear. However, the difference between "significantly miss it" and "slightly miss it" did not depend on frequency of use. Both heavy and moderate users checked each category. The following chart shows the correlation between frequency of use and feelings when grass is unavailable.

	Every day	Every other day	Twice week	Once week	Longer
Lost without it		4	2		
Intensely aware of absence	4				
Significantly miss it	17	6	7	3	
Slightly miss it	9	6	11	9	3
Do not miss it	3	4	11	19	5

Heaviness of use will not necessarily determine when a subject will miss marijuana.

	Every day	Every other day	Twice week	Once week	Longer
Immediately	5	4		3	
After one day	8			3	
After a few days	11	15	5	4	
After a week			6	6	
Longer	7	2		3	3

(note—39 subjects never miss grass)

The majority of heavy users, 24, feel the loss within a few days. 3 subjects who smoke once-twice weekly do not miss marijuana.

A surprising finding is $\frac{1}{3}$ of the subjects, who have been without grass, feel a change of mood. These 34 subjects feel tension, experience irritability, and increased nervous energy. Most of the 34 are heavy users (at least every other day). Subjects were conscious that marijuana acts as a quasi-tranquilizer. One student said, "Before I began using grass on a regular basis," at least every other day, "I was nervous and irritable. I required tranquilizers. Since I have been using grass, I find no need for tranquilizers and am perfectly satisfied with my new-found tranquility."

Half of the subjects have substitute activities in the absence of marijuana. The substances most commonly used are liquor and hashish. Mescaline and LSD are used less frequently. 41 of the 56 who use substitutes during the summer, a period when marijuana is often scarce, relied on hash to "get through." They feel hash is the closest substitute for marijuana, and is readily available in times of grass shortage. Wine and beer were listed frequently. Little hard liquor was consumed.

Two-thirds (86) of all subjects claim that after long periods of being stoned, i.e., 10 hours or more, they feel physical differences. People complain of headaches,

grogginess and haziness. Subjects did not seem overtly concerned with this physical state. Some said they just took aspirin for the headache. Others would stop using marijuana for a while. Generally, the subjects accepted as fact that those who maintained a continual high would not operate at maximum efficiency.

Communication

When high, do you deal with people who have never turned on?

(yes-97) (no-34)

How effectively?	more effectively	14
	less effectively	63
	just as effectively	54

Are you inhibited or nervous at such times?

(yes-63) (no-68)

When high, do you deal with people who have turned on but who are not stoned?

How effectively?	more effectively	12
	less effectively	26
	just as effectively	93

Are you inhibited or nervous at such times?

(yes-23) (no-108)

When high, do you deal with people who are also high?

(yes-131) (no-0)

How effectively?	more effectively	52
	less effectively	18
	just as effectively	61

Are you inhibited or nervous at such times?

(yes-5) (no-126)

The charts show responses to questions: how well do you deal and communicate with people when they are high? Subjects were also questioned about their nervousness and inhibitions. Most subjects deal with all three types of people. Almost half the subjects feel they deal less effectively with people who have never turned on. Half the subjects feel they deal more effectively with those who are also high. Explanations were "heads understand each other," or "straight people don't understand." These responses can be tied in with findings that $\frac{2}{3}$ (109) subjects felt that high people have a sixth sense and can understand unspoken feelings and thoughts. Subjects had difficulty in explaining this phenomenon, but were emphatic in their assertion that it does exist.

Subjects reinforce their beliefs by staying with stoned people after smoking. They will generally avoid straight people unless it is necessary for shopping or doing chores. An artificial barrier is placed between straight and stoned people. Subjects

deal with straight people infrequently, but deal with stoned people most of the time. Two separate communities are created, but this does not happen continually. When subjects are straight, their dealings with other straight people increase. However, good friends of smokers are usually "heads." Few straight people are in their peer group.

Subjects feel better understood by fellow smokers.

Nervous

63 subjects were inhibited or nervous when dealing with straight people. In comparison, only 5 subjects felt this way when dealing with people who were high.

The explanation for their feelings is two-fold. First, the subjects feel a bit paranoid when dealing with straight people. 23 subjects responded this way and showed some special concern about the police. The remaining 39 cannot express themselves well, and feel foolish at such times. 113 subjects feel they can communicate with people who are high in an effective manner (only 69 can do this with straight people).

80 subjects can perceive if someone else is high. 40 cannot. Subjects can usually tell by a person's eyes, actions, and speech patterns whether or not a person is stoned. This makes for easy group identification. This fact reinforces segregation of smokers from non-smokers.

Subjects were asked to analyze qualitatively the effects of marijuana. They were questioned about grass being a stimulant or depressant. The results are:

Stimulant	—	36
Depressant	—	45
Neither	—	7
Depends on mood	—	5
Both	—	18

Both stimulant and depressant 50 per cent of time—19.

Subjects were fairly well divided when asked if they tired more or less easily after smoking. 48 said they tired more; 63 said less; and 9 tired just as easily. Subjects explained, classifying marijuana as a stimulant or depressant often depends on the type of marijuana. Several subjects thought "Panama Red" has a stimulating effect. After smoking "red," several subjects found themselves doing chores around the house.

Marijuana affects people differently. Some become stimulated and others lethargic. When one becomes stimulated, it is in areas that do not require strenuous physical activity. Those who claim grass is a depressant usually sit around, talk, watch TV and listen to music. Rarely do they engage in activities outside their homes. Only 4 subjects engage in strenuous activity when high. They ride motor-cycles, run and swim.

Subjects were questioned about their performance of planned activities after smoking. The responses were almost unanimous. 98 subjects complete the activity as planned. Even those who reported grass as a depressant complete planned activities after they smoke. It seems that marijuana only depresses spontaneous action, and has little effect on scheduled plans.

VII. GRASS-SMOKERS AND THE LAW

Subjects were asked if the fact they were breaking the law in any way disturbed them. Almost half (57 v. 69) of those answering said No. Those saying Yes were asked to explain how it disturbed them. All cited the fear of arrest, while none expressed any moral qualms whatever.

Whilst most smokers are aware of the possibility of arrest, relatively few show great concern. Asked how worried they were about the prospects of arrest, the subjects responded as follows:

Extremely worried	—	15
Concerned	—	29
Little concern	—	61
No concern	—	18

Of the test group, only 4 had ever been arrested (1 for codeine possession) and none had been sent to jail.

The test group was asked if they perceived a difference in their fear of being arrested when they are and are not high. The results were almost perfectly even: 60 said Yes and 63 No. Of those saying Yes, 7 were less concerned when stoned, and 2 could go either way.

Predictably, an overwhelming majority view the marijuana laws as being unrealistic. Asked if they should be changed, all but two answered affirmatively. These two did not express approval of the present laws, but stated that they simply didn't know what was right. The others uniformly advocated milder laws.

VIII. SUBJECTIVE VIEWS

In the next section of the survey, subjects were asked to give their opinions on various drugs, rating each on the basis of its physical, psychological and moral harm. For each category, a rating of "5" was "most harmful," and "1" was "least harmful." This section was intended to provide some insight as to the way confirmed marijuana smokers view the over-all drug context.

The first category was that of physical harm. The results are set out below:

	1	2	3	4	5
Cigarette smoking	9	11	28	50	33
Marijuana	91	15	7	0	0
Alcohol	0	20	33	41	24
Tranquilizers	9	29	31	0	36
Stimulants	7	9	22	36	44
LSD	11	19	20	30	37

What is most significant in these results is that most of the sample, although moderately heavy users, continued to recognize a sharp delineation between grass and other "heavier" drugs. The results were contradictory to the notion that experienced, heavy smokers lose their sense of perspective and become psychologically attuned to all drugs.

Using 3 to 5 ratings as expressing opinions of physical harm, this finding is quickly perceived. While only 7 ratings of 3 were given to marijuana, there were 87 ratings of 3 to 5 for LSD; 67 for tranquilizers; and 102 for stimulants.

Also significant is the fact that this perceived delineation between grass and other drugs was not restricted to those who only use grass. Even those subjects who had experimented extensively with other drugs did not lump them together in the same category with grass.

The next category was *psychological* harm.

	1	2	3	4	5
Cigarette smoking	47	16	30	11	20
Marijuana	55	47	10	0	2
Alcohol	15	26	26	25	31
Tranquilizers	8	22	41	25	14
Stimulants	9	9	20	44	31
LSD	3	10	23	22	49

These results are consistent with the above-mentioned delineation between grass and other drugs. While only 12 people give grass a psychological harm rating of 3 to 5, 94 feel LSD is harmful; 80 find tranquilizers harmful; and 95 think stimulants are psychologically harmful. Here again, there is no perceivable trend among frequent users to stop discriminating between drugs.

Asked to rate drugs on the basis of *moral* wrong, a slightly different result was noticeable. A large number of subjects (38) refused to make any moral judgments whatsoever on the taking of any drugs. This attitude seemed linked to the length of time the subject had been turning on. The results:

	1	2	3	4	5
Cigarette smoking	80	7	3	3	7
Marijuana	93	6	5	0	0
Alcohol	81	26	0	0	0
Hashish	88	13	3	2	0
Tranquilizers	68	6	19	10	3
LSD	70	9	7	10	13
Barbiturates	38	7	8	9	17
Stimulants	59	8	6	6	20
Opiates	56	0	13	7	28

As can be seen from the above, more than 20 subjects refused to answer the question at all; in addition, 31 marked a uniform "1" for all topics. There is thus a strong tendency among frequent smokers to avoid moral judgments on the taking of any drugs. Among those who did make judgments, however, the same delineation that was evident in the first two ratings was present. There were only 5 ratings of 3 to 5 for both marijuana and hashish, while there were 48 for opiates; 32 for stimulants; 30 for LSD; and 32 for tranquilizers.

PERSONAL PERCEPTIONS

86 subjects have less confidence in their ability to perform tasks when high; 31 have greater; and 14 have equal confidence. The subjects explained that motor functions are occasionally impaired and sometimes mental acuity is lessened. 92 perceived a differing ability to perform. A vast majority of subjects prefer to stay straight if required to function in demanding situations.

However, 113 subjects have deeper thought and insights when high; 115 become more introspective; and 109 become more analytic. It is indeed odd that subjects report this type of ability, and still feel mental acuity is impaired. Apparently, there is a distinction between functional, utilitarian thought—directed to a given purpose—and spontaneous, unrestricted thought. The former seems more difficult when stoned, while grass seems to facilitate the latter.

AFTER-EFFECT

Subjects were asked approximately how long, on the average, they stayed high without smoking more. The results broke down as follows:

Less than 1 hr	2
1-2 hr	16
2-3 hr	46
3-4 hr	42
More than 4 hr	11

Thus, of those answering, 75 per cent usually stayed high from 2 to 4 hr.

The sample was also asked for how long a period they felt they were “coming down” from a grass high. The results:

Less than 1 hr	17
1-2 hr	43
2-3 hr	21
3-4 hr	3
More than 4 hr	5

Thus, the vast majority of people felt they came down on the average of less than 3 hours. Consistent with this is the finding that only 22 felt they usually had to sleep it off before being “completely normal”; 90 disagreed.

Respondents were asked if their next-day performance was in any way impaired by having been high. 38 said Yes, stating they felt a slight lethargy or fuzziness, especially in the morning; 91 said their next day performance was in no way impaired. Of those who noted some impairment, all but one said that such impairment did not continue throughout the entire next day.

CONCLUSION

This study has focused its attention on various aspects of Marijuana use. The study was begun with the intention of finding if some pattern of marijuana use exists. The information gathered has in fact proved that frequently marijuana smokers think and act alike.

Some concern may be expressed over faulty methodology, i.e., not choosing a random sample. Of course it is difficult to choose a random sample in a study such as this, but it can be done.

Interestingly enough, the authors feel the test group represents a cross-section of heavy marijuana smokers. After data was compiled and conclusion drawn, new questionnaires were administered to randomly selected subjects. A few people were approached on the streets of Berkeley and asked to cooperate in a survey. In addition,

people unknown by the authors were approached at a New Jersey party. They too were requested to complete questionnaires. The responses to the questions were remarkably similar to the majority of answers elicited from the original test group. Although not conclusive, these facts lead the authors to believe the selected test group is representative of heavy marijuana users.

Some selected findings deserve mention. These findings dispel often held misconceptions about marijuana use. First, although one makes marijuana part of his life style, he can and will function in society. A heavy user still can drive, read, work and attend school. Secondly, one can be a heavy user and still refrain from using other "hard core" drugs.

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