

PARENTAL, PERSONALITY, AND PEER CORRELATES OF PSYCHOACTIVE MUSHROOM USE*

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ABSTRACT

Fifty-three college undergraduates reporting use of a hallucinogenic mushroom (*Psilocybe*) were matched on demographic variables to fifty-three nonusers. The subjects were given a detailed questionnaire and were administered four psychological tests. Hallucinogenic mushroom use by men was most associated with peers' mushroom use, whereas mushroom use by women was most associated with parental drug use, especially fathers' marijuana use. Personality measures were secondary in predicting mushroom use. Given these distinctive patterns, researchers examining social and personality influences on drug use should analyze their data separately by sex.

This study was conducted as a continuation of a comprehensive, epidemiological investigation of psychoactive mushroom use (*Psilocybe*). In the 1982 study, a 38-question survey was used to collect data from 1,507 students at the University of California, Los Angeles (UCLA), and California State University, Northridge (CSUN) [1].

The epidemiological study focused specifically on mushroom use because this relatively unknown hallucinogen had apparently become increasingly popular in

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adolescent and young adult populations. Because the study was concerned primarily with mushroom use, those reporting use of only other illicit drugs and those reporting no use of illicit drugs were combined to form a single comparison group (the nonuser sample).

There were three major conclusions of the initial study:

1. Psychoactive mushrooms are now the most widely used hallucinogen for the surveyed population. Of the respondents who reported any hallucinogen use, over 85 percent had used mushrooms and over half had used no drugs other than mushrooms. This preponderance of mushroom use, as opposed to LSD use, suggests the need for more specificity in future epidemiological research on hallucinogens.
2. There is a significantly higher level of overall drug use by mushroom users as opposed to nonusers. This finding led to the hypothesis that users may be more inclined to risk-taking and sensation-seeking behaviors.
3. Psychoactive mushroom use is rapidly growing in popularity among students. For this reason, we felt that the characteristics of those reporting mushroom use should be studied more comprehensively.

The major focus of this article is the detailed exploration of issues related to the second and third conclusions.

Samples of mushroom users and mushroom nonusers were obtained from the undergraduate subject pool in the Department of Psychology at UCLA. Because this study also focused specifically on mushroom use, nonusers of mushrooms who may have used other drugs were included in the comparison nonuser group, as was done in the epidemiological study. The authors used a lengthy questionnaire and obtained information about basic demographics, parental and peer drug use, subjects' other drug use, and subjects' feelings of personal and social integration and well-being. A section was devoted to the mushroom users' perceptions of the experience.

In addition, four personality tests were administered. The four tests were Zuckerman's Sensation-Seeking Scale (SSS), the Socialization subscale of the California Psychological Inventory (CPI), the Eysenck Personality Questionnaire (EPQ), and Zenhausern's Preference test (PRE) [2-5]. The first three of these tests have been used in other drug research studies and are based on the idea of dimensional systems of personality, while the fourth test is based on a model of thinking that distinguishes between verbal and visual cognitive styles [2-14].

Zuckerman's Sensation-Seeking Scale (SSS) was developed in an attempt to assess individual differences in preferred levels of stimulation or arousal [2]. The Sensation-Seeking Scale includes a General Sensation-Seeking scale and four subscales: The Thrill and Adventure Seeking scale, which consists of items that express a desire to engage in outdoor activities involving speed or danger; the Experience Seeking scale, which might be termed the "hippie" factor and whose essence is "experience for its own sake" (this scale is reported as highly

correlated with drug experience); the Disinhibition scale, which might be labeled the "swinger" factor, consists of items expressing loss of inhibition, heavy social drinking, variety in sexual partners, and gambling; and a Boredom Susceptibility scale, which consists of items indicating restlessness in unchanging surroundings and a dislike of repetition of experience, routine work, predictable or dull people [2, 12]. The validity of the Sensation-Seeking Scale is fairly well established. Construct validity and test-retest reliability are high [2, 12]. All the scales (with the exception of boredom susceptibility) have shown internal consistency and test-retest reliability [15].

The second personality test, the Socialization scale, was taken from the California Psychological Inventory (CPI) and was designed to assess belief in culturally-universal folk concepts. The scale places individuals between the extremes of acceptance or deviance from cultural norms (i.e., asocial versus social) [13, 14]. High scorers are more conforming and at the socially acceptable end of the continuum of social behavior, and low scorers are rebellious and given to excess and located at the more deviant end of the continuum [4]. The scale has been found to have good correlational and test-retest reliability [4, 13]. It has also been shown to have good systematic validity in a cross-cultural study [14].

The third test, the Eysenck Personality Questionnaire (EPQ), was also developed to measure a dimensional system of personality as opposed to one of categorical or diagnostic systems [3]. The EPQ contains four subscales: Extroversion, Neuroticism, and Psychoticism scales, which measure hypothesized personality dimensions, and a Lie scale, which detects dissimulation and corrects the other measurement scales for it. Test-retest reliability of the EPQ is generally within the .80 to .90 range. Experimental and correlative studies (some cross-cultural) also indicate strong support for claims of the EPQ's validity [3, 16, 17].

The Zenhausern Preference Test (PRE) was designed to assess thinking style. It was hypothesized that a right cerebral dominance and a deductive mode of reasoning would be associated with a visualizing style, while left cerebral dominance and an inductive mode of reasoning would be associated with a nonvisualizing style. The results gathered with this questionnaire have been inconsistent and its validity is not yet supported [5].

Altogether, the four tests produce twelve personality scale scores:

Zuckerman's Sensation-Seeking Scale (SSS)

1. General
2. Thrill and Adventure Seeking
3. Experience Seeking
4. Disinhibition
5. Boredom Susceptibility

California Psychological Inventory (CPI)

6. Socialization scale

Eysenck Personality Questionnaire (EPQ)

7. Extroversion
8. Neuroticism
9. Psychoticism
10. Lie

Zenhausen's Preference test (PRE)

11. Preference right
12. Preference left

Both this article and the authors' previous paper are intended for drug educators, social policy makers, and professionals who track drug use trends and behaviors in the general population [1]. The goal is to heighten awareness of a relatively new phenomenon among hallucinogenic drug users. Also, because of our experience with the epidemiological study, we felt that the characteristics of mushroom users could be distinguished from users of other illicit drugs and from nonusers of drugs. Thus, to maintain our 1982 design and to test our impressions, we combined the latter two groups into the comparison sample for this study.

METHOD

Subjects

The subjects were UCLA undergraduate students who were fulfilling an introductory psychology course requirement to serve as subjects. The investigators collected data from 144 subjects, although the final sample was reduced to 106 by subject matching. The sample was categorized by sex and use or nonuse of *Psilocybe* mushrooms before the matching, so that thirty-two male users were matched to thirty-two nonusers of mushrooms and twenty-one female users were matched to twenty-one female nonusers of mushrooms.

The matching was done on nine demographic variables: sex, age, class level, ethnicity, religious preference, major field of study, current college grade point average (GPA), high school grade point average (GPA), and parents' occupations. The highest priority in matching was given to sex; second priority to age; third, class level; fourth, ethnicity; fifth, religious preference; sixth, major; seventh, college GPA; eighth, high school GPA; and lowest priority to parents' occupations. The subjects who were dropped from the sample either did not form a matchable pair or had an inadequately coded questionnaire.

The sample was drawn during the 1983 academic school year. Both original ($N = 144$) and matched ($n = 106$) samples were 60 percent men and 40 percent women. The matched sample age range was seventeen years to twenty-four years with a mean of approximately nineteen and one-half years. The subjects were mainly freshmen (62.2%), and sophomores (26.4%), with 8.5 percent

Table 1. Sample Characteristics (Continuous Variables)

<i>Variable</i>	<i>Users'</i> <i>Mean</i> <i>n = 32</i>	<i>Nonusers'</i> <i>Mean</i> <i>n = 32</i>	<i>t</i> ^a
MEN			
Age	19.22	19.19	0.10
High school GPA	3.31	3.52	2.35*
Class level ^b	1.66	1.59	0.28
College GPA	2.97	2.92	0.33
WOMEN			
Age	18.66	18.33	1.02
High school GPA	3.49	3.58	1.45
Class level ^b	1.48	1.24	1.04
College GPA	3.11	3.04	0.53

^a Dependent-samples *t* value.^b 1 = Freshman, 2 = Sophomore, etc.* *p* < .05.

juniors and 2.8 percent seniors. Ethnic backgrounds were: White (76.4%); Asian (13.2%); Black (4.7%); Hispanic (3.8%); other (1.9%). Religious preferences were: Jewish (21.7%); Roman Catholic (21.7%); Protestant (19.8%); fundamentalist Christian (6.6%); none (16.9%); other (13.2%). The major fields of study were: science/math (19.8%); economics/business (15.5%); fine arts/humanities (11.3%); health science (9.4%); history/political science (9.4%); engineering/computer science (7.5%); behavioral science (2.8%); and other (24.5%).

Materials

The subjects filled out: 1) a 38-question survey, designed by the investigators and used in the prior study [1]; 2) a 100-question survey, designed by the investigators, that explored in detail the demographic, social, and subjective aspects of mushroom use, including parental drug use of amphetamines, barbiturates, opiates, and tranquilizers specified as "without doctor's prescription"; and 3) the four personality tests described earlier.

Procedures

The subjects signed up for prearranged experiment times. They were given the survey packages and told that the survey was anonymous. A short explanation of the individual surveys and the coding procedures was given and questions were answered. The packet took approximately forty-five minutes to complete after which an informal debriefing was conducted.

RESULTS

Matching

The characteristics of the matched samples on continuous variables are shown separately on Table 1 for men and women. Except for high school grade point average for the men, the samples did not differ on the continuous variables matched. To assess the possibility that parents of mushroom users were younger

Table 2. Sample Characteristics (Categorical Variables)

<i>Variables</i>	<i>Users n = 53 (Percent)</i>	<i>Nonusers n = 53 (Percent)</i>
Ethnicity^a		
White	81	72
Black	4	6
Hispanic	4	4
Asian	11	15
Other	0	4
Religious background^b		
Jewish	17	26
Catholic	25	19
Other Christian	19	34
None	28	7
Other	11	15
Major department^a		
Math/Science/CS	19	36
Health/Economics/Business	21	28
History/Political Science/Behavioral Science	11	13
Fine Arts/Humanities	13	9
Other ^c	36	13
Fathers' occupation^a		
None/Blue Collar	15	9
Sales/Service	11	6
Executive	32	45
Professional	40	40
Artist/Musician	2	0
Mothers' occupation^a		
None/Blue Collar	26	19
Sales/Service	17	17
Executive	13	21
Professional	26	15
Artist/Musician	6	0
Homemaker/Childcare	11	28

^a χ^2 not significant.

^b χ^2 (4, $N = 106$) = 12.05, $p < .02$.

^c Includes undeclared majors.

than those of nonusers (and thus perhaps more accepting of experimental drug use), mothers' and fathers' ages were compared. No significant differences were found. For all four groups, mean age of fathers was about forty-eight, and that of mothers was about forty-four.

Categorical variables are presented in Table 2 for the entire sample because the sample *N* was too small for valid statistical tests to be conducted separately for men and women. The overall analysis of the categorical variables did not differentiate for sex, but there were some demographic differences in the characteristics of users versus nonusers. First, although not significantly so, users of mushrooms were less often minority (19%) than nonusers (28%). Second, those students who were Jewish or Christian were significantly less often users (36% of users, 60% of nonusers) than were Catholic or nonreligious students (53% of users, 26% of nonusers). Third, users were less likely to be in the "hard" sciences (19% of users, 36% of nonusers) and more likely to have undeclared majors or to have a less common major (36% of users, 13% of nonusers).

User/Nonuser Comparisons

The results of our previous study showed significant differences in the drug use patterns between mushroom users and nonusers [1]. The present analyses include three additional areas that are of major interest in the adolescent drug use literature. These are: 1) parental drug use, 2) personality attributes of drug users, and 3) peers' use of the target drug. Since drug use parameters of men and women differ considerably, wherever possible our analyses have been performed separately for each sex. Also paired comparison analyses between mushroom users and nonusers were run where appropriate because users had been matched to nonusers as previously discussed. Furthermore, our order of analysis parallels the developmental linkage that is reasonable to assume in the acquisition of drug-using behavior: parental behaviors would precede the development of personality attributes related to drug use. The case of peer use is less clear, because peer group affiliations often change after initiation into drug use occurs. Accordingly, peer drug use is not necessarily a precursor to individual use but may be a consequence. For this reason, peer use is introduced last in the analysis sequence and should be considered a correlate of use rather than an antecedent.

Parental Drug Use

Parents' levels of drug use as perceived by the subjects were measured for nine drugs. For each drug, subjects were asked to use the following scale to indicate the level of their parents' drug use: 0 = never, 1 = 1-10 times, 2 = 11-99 times, 3 = 100 or more times. The differences between use or nonuse of mushrooms were tested using parametric dependent-samples *t*-tests separately for each sex.

Table 3 presents dependent-samples *t*-tests between users and nonusers of mushrooms of perceived parental drug use for men only. The three drugs for

Table 3. Parental Drug Use for Men^a

<i>Parents' Drug Use</i>	<i>Mushroom Users' Mean</i>	<i>Mushroom Nonusers' Mean</i>	<i>t^b</i>
Mothers'			
Marijuana	0.44	0.47	0.17
Cocaine	0.06	0.13	0.57
Amphetamine	0.06	0.13	0.57
Fathers'			
Marijuana	0.84	0.50	1.28
Cocaine	0.16	0.19	0.21
Amphetamine	0.06	0.13	0.57
Tranquilizers	0.25	0.16	0.57

^a Scale: 0 = never; 1 = 1-10; 2 = 11-99; 3 = 100+ times.^b Dependent-samples *t*-tests are not significant.Table 4. Parental Drug Use for Women^a

<i>Parents' Drug Use</i>	<i>Mushroom Users' Mean</i>	<i>Mushroom Nonusers' Mean</i>	<i>t^b</i>
Mothers'			
Marijuana	0.90	0.14	2.86**
Cocaine	0.43	0.00	2.63*
Amphetamine	0.43	0.05	2.02 ^c
Fathers'			
Marijuana	1.24	0.10	3.98***
Cocaine	0.67	0.05	2.36*
Amphetamine	0.53	0.05	2.22*
Tranquilizers	0.62	0.14	2.12*

^a Scale: 0 = never; 1 = 1-10; 2 = 11-99; 3 = 100+ times.^b Dependent-samples *t*-tests.^c Borderline significance.* *p* < .05.** *p* < .01.*** *p* < .001.

mothers and four drugs for fathers that are presented do not approach statistical significance. The reason that these drugs in particular were presented is that they are the drugs that were significant for women (see Table 4).

All the perceived parental drug use variables listed in Table 4 significantly differed between female users and nonusers of mushrooms. Fathers' marijuana use is especially striking.

Personality Attributes

Scores on the Psychoticism scale from the Eysenck Personality Questionnaire (EPQ) were significantly different between the male ($\bar{X} = 5.64$) and female ($\bar{X} = 3.62$) respondents of the total sample ($t(104) = 3.735, p < .0003$) but not for users versus nonusers [3]. (We did not use a dependent-samples t -test here because it is a comparison of the total sample by sex.) The finding that men score higher on the EPQ Psychoticism scale is consistent with numerous other studies cited by Eysenck and Eysenck [3, 16]. It is hard to interpret the absolute levels of scores on the Psychoticism scale as the confidence intervals given by Eysenck are so large. Normal male scores are 3.78 ± 3.09 whereas normal female scores are 2.63 ± 2.36 [3]. No other personality test results were significantly different by sex.

Tables 5 (men) and 6 (women) present six of the twelve personality scales and a peer influence variable, number of using friends.

The only personality scale that was significantly different between mushroom users and nonusers for both men and women was the Socialization subscale from the California Psychological Inventory (CPI). The male users were also distinguished

Table 5. Personality and Peer Differences for Men

Variable	Users <i>n</i> = 32	Nonusers' <i>n</i> = 32	<i>t</i> ^a
General Sensation Seeking Scale ^b	24.97	23.66	0.93
Experience Seeking ^b	6.13	4.88	2.40*
Disinhibition Scale ^b	6.94	6.41	0.89
Lie Scale ^c	4.94	7.28	2.82**
Socialization Scale ^d	31.78	35.91	3.56**
Interest and Preference ^e	30.38	25.44	0.46
Number of Using Friends	26.63	8.09	4.68***

^a Dependent-samples t value.

^b From Zuckerman [11].

^c From Eysenck [3].

^d From Gough [4].

^e From Zenhausern [5].

* $p < .05$.

** $p < .01$.

*** $p < .0001$.

Table 6. Peer and Personality Differences for Women

<i>Variable</i>	<i>Users' Mean n = 21</i>	<i>Nonusers' Mean n = 21</i>	<i>t^a</i>
General Sensation Seeking Scale ^b	25.91	22.43	2.69*
Experience Seeking ^b	6.33	5.10	1.63
Disinhibition Scale ^b	6.81	5.38	2.12*
Lie Scale ^c	4.48	5.29	0.93
Socialization Scale ^d	31.14	35.29	2.20*
Interest and Preference ^e	24.81	47.29	1.41
Number of Using Friends	17.48	9.33	1.75

^a Dependent-samples *t* value.^b From Zuckerman [11].^c From Eysenck [3].^d From Gough [4].^e From Zenhausern [5].* $p < .05$.

from the nonusers by the Experience Seeking scale of the Zuckerman's Sensation-Seeking Scale (SSS), whereas the female users and nonusers were differentiated by both the Disinhibition and the General scales of the Zuckerman test. The Lie scale of the Eysenck Personality Questionnaire (EPQ) also seemed to have important differences between the male users and nonusers of mushrooms. The variable that had the greatest difference between male users and nonusers of mushrooms, however, was the number of using friends. This measure of peer influence was consistently the most important variable for the men. Number of using friends did not achieve significance at all in differentiating the female mushroom users from nonusers.

The univariate analyses showed that parental drug use, personality scale scores, and reported peer use were significantly (and, for parental and personality variables presumably antecedently) related to mushroom use. To determine a minimal set of predictors of use, discriminant analysis was applied to the twenty-nine survey variables (see Table 7).

Stepwise discriminant analysis using the Statistical Analysis System (SAS) STEPDISC Procedure was employed to identify variables that contributed most

Table 7. Stepwise Discriminant Analysis Results
Differentiating Male and Female Users from Nonusers

	Men	Women
<i>Parental Drug Use</i>		
Fathers' marijuana use	N/A ^a	$p < .0002$
Average canonical correlation ²	—	.29
Percent correctly classified	—	79%
<i>Personality</i>		
Disinhibition ^b	N/A ^c	$p < .007$
Socialization ^d	$p < .0013$	$p < .0041$
Experience Seeking ^b	$p < .0003$	N/A ^c
Preference Right ^e	N/A ^c	$p < .0015$
Average canonical correlation ²	.23	.33
Percent correctly classified	69%	79%
<i>Combined Parental and Personality</i>		
	N/A ^f	
Fathers' marijuana use	—	$p < .0002$
Disinhibition ^b	—	$p < .0001$
Socialization ^d	—	$p < .0001$
Preference Right ^e	—	$p < .0001$
Average canonical correlation ²	—	.46
Percent correctly classified	—	81%

^a The stepwise procedure did not select any variables for entry.^b From Zuckerman [11].^c Not selected for entry.^d From Gough [4].^e From Zenhausern [5].^f Analysis not conducted for men because no variables selected for parental drug use.

to differentiating between mushroom users and nonusers for each sex separately [18]. The analysis represented in Tables 7 and 8 was designed to explore the predictive capability of parental, personality, and peer data alone and in combination. The average squared canonical correlation is Pillai's trace divided by the number of groups minus 1. (In all cases number of groups equals two.) It is this value that is interpreted as the percent of variance accounted for [18].

The first stepwise discriminant analysis was run on all eighteen parental drug use variables. When the parental drug use variables were entered, none were selected for the men and only the fathers' marijuana use was selected for the women.

Using only the variable of fathers' marijuana use to classify, the percent correctly classified for women was 79 percent. The classificatory discriminant analysis was performed with the SAS DISCRIM Procedure [18]. Even though

only 79 percent of the female subjects were classified correctly, fathers' marijuana use alone accounted for 29 percent of the variance.

The second discriminant analysis was run on the personality variables alone. For the men, the Socialization scale of the California Personality Inventory (CPI) was selected first with an associated probability of 0.0013. When the Experience-Seeking scale of the Zuckerman Interest and Preference test was also selected, the combined probability improved to 0.0003. These were the only two personality tests selected for the men. The percent of variance accounted for with this combination is only 23 percent, and the percent correctly classified is a dismal 69 percent. (In interpreting the percent correctly classified, keep in mind that 50 percent would have been obtained solely by chance and 100 percent is perfect.)

On the personality variables for women, the Disinhibition scale of the Sensation-Seeking Scale (SSS) was selected first and the probability was 0.007. With the addition of the Socialization scale of the California Psychological Inventory (CPI) and the Zenhausen Preference test (PRE), the probability improved to 0.0015. These three personality variables combined accounted for 33 percent of the variance, which is only a 4 percent improvement over that from fathers' marijuana use alone. The percent correctly classified with the three personality tests combined was 79 percent, the same percentage that was obtained with fathers' marijuana use alone.

The combined parental and personality analysis was not conducted for men because no parental drug use variables were selected, so the results would have been the same as for the personality variables by themselves. For the women however, there is a definite improvement in percent of variance accounted for (46%). The probability is highly significant at each step and the percent correctly classified improves slightly to 81 percent.

The next variable assessed in a discriminant analysis (see Table 8) was number of friends who use mushrooms. This variable is considered a measure of peer influence just as perceived parental drug use were measures of parental influence. The number of using friends is highly significant for men with 27 percent of the variance accounted for by this one variable alone and 72 percent correctly classified. For the women, however, although the number of using friends variable was acceptable for inclusion in the discriminant function, the probability was an unimpressive 0.066, with only 8 percent of the variance accounted for and 67 percent correctly classified. Thus, this variable and fathers' marijuana use appear to be sex-linked discriminators in that fathers' marijuana use was highly significant for women and not for men, whereas number of using friends is highly significant for men but only marginally so for women. (Fathers' marijuana use should probably not be interpreted strictly. There are high correlations between fathers' marijuana use and other drug use of both parents and mothers' marijuana use. It seems reasonable to assume a multicollinearity effect, and fathers' marijuana use should probably be thought of as a construct for parental illicit drug use in general.)

Table 8. Stepwise Discriminant Analysis Results
Differentiating Male and Female Users from Nonusers

	Men	Women
<i>Peer Mushroom Users</i>		
Number of using friends	$p < .0000$	$p < .066$
Average canonical correlation ²	.27	.08
Percent correctly classified	72%	67%
<i>Combined Parental, Personality, and Peer</i>		
Fathers' marijuana use	N/A ^a	$p < .0002$
Disinhibition ^b	N/A ^a	$p < .0001$
Number of using friends	$p < .0000$	$p < .0001$
Socialization ^c	$p < .0000$	$p < .0001$
Preference right ^d	N/A ^a	$p < .0001$
Average canonical correlation ²	.33	.50
Percent correctly classified	72%	81%

^a Not selected for entry.

^b From Zuckerman [11].

^c From Gough [4].

^d From Zenhausen [5].

The final discriminant analysis considered the combination of parental, personality, and peer variables. For the men, only two variables were selected, the number of using friends and the Socialization scale from the California Psychological Inventory (CPI). The Zuckerman Interest and Preference Experience Seeking scale was no longer selected for entry. This was because the Experience Seeking score was correlated with number of using friends ($r = .42, p < .0005$). Even though the addition of the Socialization scale increased the percent of variance accounted for (represented as average canonical correlation squared) by 6 percent to 33 percent, the percent correctly classified was still only 72 percent, which was the same as number of using friends by itself.

For the women, the overall combination including number of using friends only raises the percent of variance accounted for by 4 percent from the combination of parental and personality variables without number of using friends. The percent correctly classified stays the same (81%), indicating that number of using friends is not a major contributor for the women.

Reasons for Use

Curiosity was the major reason for use of mushrooms for both male and female users (Table 9). Users of both sexes also wanted to get high or euphoric. Hedonism was the third most important reason for male users, but socialization

Table 9. Reasons for Use. Percent Responding "Yes"

<i>Reasons</i>	<i>Male Users^a</i>	<i>Female Users^b</i>
Curiosity	87.5	85.7
To produce high or euphoria	84.4	76.2
Hedonism	65.6 ^c	38.1 ^c
Increase enjoyment of movies, music, etc.	53.1	33.3
Increase sexual enjoyment	18.8	9.5
Increase enjoyment of food	18.8	9.5
Self Actualization	53.1 ^c	28.6 ^c
To be more creative	34.4	19.1
To "get out of a rut"	21.9	9.5
Achieve a religious or mystical experience	15.6	9.5
Socialization	40.6 ^c	38.1 ^c
To go along with the group	31.3	23.8
Increase sociability	15.6	19.1
Cope with uncomfortable social situations	12.5	14.3
Coping	46.9 ^c	14.3 ^c
Relaxation	40.6	14.3
Relieve stress or tension	31.3	9.5
Relieve depression	21.9	9.5

^a *n* = 32.^b *n* = 21.^c Percent responding "yes" to at least one reason in general category.

was equal in importance to hedonism for the female users. Hedonism, in this case, includes increase in enjoyment of movies, music, sex, and food. Self-actualization followed by coping and socialization finishes the pattern for the men. Self-actualization is also followed by coping for the women. The major difference is the importance women placed on socialization. There is a certain response bias in that a greater percentage of men than women said yes to all reasons, with the exception of increased sociability and coping with uncomfortable social situations.

The actual effects experienced by male users were mainly increases in mood, sense of humor, and introspectiveness and decreases in speech clarity, experience of time (time seems to slow down), and anger (Tables 10 and 11). For the female users the major increases were in sense of humor, introspectiveness, and mood, whereas decreases were reported in sense of balance, experience of time, and reasoning/logic ability. Both sexes seemed to agree on the increases in mood, introspectiveness, and humor, whereas the major decrease both agreed on was in sense of time.

Perhaps the most interesting point to be made from Tables 9, 10, and 11 is that even though the reasons for use were mostly different between the sexes, the actual effects experienced were very similar.

Table 10. Effects Reported by Male Users^a

<i>Effect</i>	<i>Increase</i>	<i>Decrease</i>	Δ^b
<i>Sensory</i>			
Touch sensitivity	53.1	34.4	18.7
Vision	56.3	28.1	28.2
Taste	40.6	28.1	12.5
Body temperature	56.3	15.6	40.7
Balance	18.8	50.0	-31.2
Hearing	40.6	18.8	21.8
<i>Social</i>			
Sense of humor	78.1	15.6	62.5
Talkativeness	53.1	34.4	18.7
Speech clarity	12.5	59.4	-46.9
Introspectiveness	65.5	12.5	53.1
<i>Emotion</i>			
Mood	87.5	6.3	81.2
Anxiety level	28.1	50.0	-21.9
Anger	15.6	46.9	-31.3
<i>Cognition</i>			
Reasoning/Logic	43.8	43.8	0
Concentration	43.8	46.9	-3.1
<i>Activity level</i>			
Restlessness	56.3	28.1	28.2
Drowsiness	28.1	50.0	-21.9
<i>Time</i>			
Experience of time	25.0	59.4	-34.4
Reaction time	37.5	40.6	-3.1

^a $n = 32$.^b $\Delta = \text{Increase} - \text{Decrease}$.

Table 11. Effects Reported by Female Users^a

<i>Effect</i>	<i>Increase</i>	<i>Decrease</i>	Δ^b
<i>Sensory</i>			
Touch sensitivity	71.4	19.1	53.3
Vision	38.1	14.3	23.8
Taste	38.1	28.6	9.5
Body temperature	47.6	9.5	38.1
Balance	4.8	42.9	-38.1
Hearing	38.1	4.8	33.3
<i>Social</i>			
Sense of humor	71.4	4.8	66.6
Talkativeness	57.1	28.6	28.5
Speech clarity	28.6	42.9	-14.3
Introspectiveness	71.4	4.8	66.6
<i>Emotion</i>			
Mood	66.7	14.3	52.4
Anxiety level	47.6	23.8	23.8
Anger	4.8	19.1	-14.3
<i>Cognition</i>			
Reasoning/Logic	28.6	52.4	-23.8
Concentration	52.4	28.6	23.8
<i>Activity level</i>			
Restlessness	52.4	9.5	42.9
Drowsiness	23.8	33.3	-9.5
<i>Time</i>			
Experience of time	28.6	66.7	-38.1
Reaction time	52.4	33.3	19.1

^a $n = 21$.^b $\Delta = \text{Increase} - \text{Decrease}$

Table 12. Other Drugs Used Concurrently with Mushrooms

<i>Drug</i>	<i>Male Users^a</i> (Percent)	<i>Female Users^b</i> (Percent)
Alcohol	84.4	71.4
Marijuana	78.1	38.1
Tobacco	28.1	28.6
Cocaine	28.1	9.5
Hashish	34.4	0.0
Amphetamine (pills)	3.1	9.5
LSD	9.4	0.0
Barbiturates	0.0	4.8
Tranquilizers	0.0	4.8
Peyote/Mescaline	3.1	0.0
Amphetamine (crystal)	0.0	0.0
PCP	0.0	0.0

^a *n* = 32.^b *n* = 21.

Concurrent Drug Use

Table 12 gives the percentages of mushroom users of each sex who used another drug at the same time as mushrooms. Male users combined marijuana/hashish with mushrooms more often, whereas female users combined amphetamines and barbiturates/tranquilizers more often. The finding that is somewhat puzzling is the 9.4 percent of the male users who combined LSD with mushrooms. It also is not clear why no women report hashish use with mushrooms when 34.4 percent of the male users report doing so. This concurrent use of drugs means, of course, that the effects reported in Tables 10 and 11 cannot be attributed solely to mushroom ingestion.

DISCUSSION

The single most important finding in this study is that the variables influencing an adolescent deviant behavior (use of psychoactive mushrooms) are different for men than they are for women. Variables related to adolescent male use were not complex, consisting of only two of the variables measured: peer use (the most important) and a personality trait (Socialization scale) that is expressed by nonconforming behavior. The five variables related to use by women were parental use, three personality traits (parental use alone was as important as the three personality measures combined) and, of much less importance, peer use.

That different etiologies may result in the same behavior (mushroom use) has been suggested by Segal, Huba, and Singer [19, p. 3] and has a significant

implication in the study of determinants of adolescent drug use, a topic currently of great interest in the United States. Few studies in the literature have examined drug use correlates separately for men and women. Our results indicate this failure may lead to the erroneous conclusion that drug use behavior is less complex than it is.

An approach taken by Bank et al. in examining the social determinants of adolescent drinking is promising in that they propose a causal model relating determinants to behavior [20]. Parental and peer social influence, measured both as normative values and actual behavior, are included as determinants of adolescent drinking patterns. Unfortunately, while they conduct analyses separately by nation and can show strong differences in etiologies across cultures, they do not perform the analyses separately for sex. Generalizing from our results, we would predict different causal schema for men and for women. If one reflects on the different socialization patterns of men and women, it is not surprising that the determinants of many behaviors, including drug use, should be, in part, a characteristic of gender.

Our own findings show that use of mushrooms is related to 1) perceived parental drug use, 2) certain personality dimensions as measured by Zuckerman's Sensation Seeking Scale (SSS), the Eysenck Personality Questionnaire (EPQ), and the Socialization scale of the California Psychological Inventory (CPI), and 3) reported peer use. The parental drug use data are of considerable interest, because the literature reports contradictory findings [21, 22]. We found an especially strong relationship between women's mushroom use and fathers' reported drug use. Marijuana in particular seems to be the drug used by parents that had the most influence. This is corroborated by the combined stepwise discriminant analysis for women, in which fathers' marijuana use was selected first. Parental drug use patterns thus do seem to have some influence on our subjects' use or nonuse of mushrooms. Determining how this influence is transmitted, however, requires further study. The process may involve role modeling or parental acceptance of experimental drug use. It may also involve the way parents who use drugs educate, or expose, their offspring to drug use. It would be useful to employ the model proposed by Bank et al. to study this relationship further [20]. Research might also explore the drug use patterns of individuals given "drug education" in school and individuals who report a high prevalence of parental drug use.

In the paired comparisons and the discriminant analysis, certain personality scales show a more "reliable" predictive strength than has been reported in the literature [6, 7, 12, 17, 23]. Seven of the eleven scales were shown to be significant for either men or women on both the univariate analysis and the discriminant analysis. One of the scales, the Socialization scale of the California Psychological Inventory, had the highest discriminatory power (between users and nonusers) for both sexes of any other variables.

This suggests that those who use mushrooms are less socially conforming individuals than other respondents. Although all the personality scales that were

used in this study are capable of indicating psychopathology, there were no indications of any psychopathology in our mushroom-using group. Segal, Huba, and Singer agree that for college student drug users only a "small segment of the substance users ingest drugs either to escape from pressing problems or to 'drop out'" [19, p. 201]. This group may be more akin to what Shaffer and Zinberg described as "second generation users" [24]. They may have become involved (at a low incidence level) because mushrooms have now assumed some of the symbolic role that McGlothlin claimed for marijuana use during its rapid increase in popular usage in the 1960s [1, 25]. In fact, many of the findings reported here do not differ greatly from those reported as characteristics of the avante garde marijuana user of the 1960s [25]. More research into the parallels between earlier marijuana users and present mushroom users may be helpful in evaluating present users, their use of mushrooms, and the implications for future developments.

The relationship of peer to own use of mushrooms is not surprising, for this has been reported consistently in the literature. The sex difference in the degree of this relationship is certainly more interesting and has clear implications in the development of prevention programs. If one perceives of men's drug use as a "pack" behavior, then intervention must take a social systems approach. On the other hand, women's drug use seems to be more a result of parental modeling or incorporation of parental norms and is also more clearly related to personality. Thus, interventions for women may need to emphasize counseling and personal behavior change.

We wish to emphasize that our data suggest that mushroom use is not characteristic of a deviant or pathologic subpopulation. But, as Shaffer and Zinberg observed [24, p. 52]: "As deviant drug use patterns become more prevalent and popular, as marijuana use did in the mid-1960's, knowledge about the drug and its effects increase. [sic] Slowly misconceptions are corrected." Considering this, mushroom use (or psychedelic drug use in general), which a decade ago was considered extremely deviant, has now filtered into a "second generation" of users who are willing to flaunt certain social norms, particularly when influenced by familial role modeling, in an effort to gain a supposed unique experience. In other words, this present trend doesn't seem to indicate a public health problem now or in the future, because use seems to be primarily experimental and short-term [1] with few reported negative effects. Yet mushrooms, and the experience they produce, may have important personal effects and symbolic roles for individuals who may consider themselves the second generation of the new seekers.

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