

Increasing Use of "Ecstasy" (MDMA) and Other Hallucinogens on a College Campus

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Abstract. We conducted a random survey of illicit drug use by undergraduate students at a private southern university in 1990 and compared the results with results from a similar 1986 survey of that college's student population. During the 4 years since the first study, the prevalence of cocaine use declined from 39% to 21%, and use of traditional amphetamines declined from 22% to 12%. No significant differences were found in the use of marijuana—68% in 1986, 64% in 1990—or in use of LSD (lysergic acid diethylamide)—14% in 1986, 17% in 1990. The use of mescaline/psilocybin increased from 8% to 24% and the use of MDMA, known as "Ecstasy" (3,4-methylenedioxyamphetamine), increased from 16% to 24%. Mescaline/psilocybin and Ecstasy were more likely than the other drugs to have been used first during the students' college years, according to the 1990 study.

Key Words: drug use, LSD, marijuana, MDMA, mescaline, psilocybin

This study examined the prevalence of illicit drug use by undergraduates on a southern university campus in 1990 and compared the findings with data from a similar study conducted in 1986.¹ We studied the use of the following drugs: "Ecstasy" (3,4-methylenedioxyamphetamine, or MDMA); LSD (lysergic acid diethylamide); mescaline (3,4,5-trimethoxyphenethylamine) and psilocybin (4-phosphoryloxy-N, N-dimethyltryptamine), which were grouped together on the questionnaire; marijuana; cocaine; and amphetamines.

Ecstasy (MDMA, sometimes called XTC or Adam) is an oral amphetamine derivative used briefly as a psycho-

active agent by some psychiatrists a decade ago, generally as an adjunct to insight-oriented psychotherapy.²⁻⁴ Its use has been associated with a number of deaths,⁵⁻⁹ but even small amounts of the drug have produced severe toxicity.¹⁰ Fatal cases have exhibited a wide clinical spectrum, including cardiac arrhythmias, convulsions, disseminated intravascular coagulation, hyperthermia, rhabdomyolysis, and acute renal failure. Nonfatal cases have also been associated with hepatotoxicity.⁵ Persons with Wolff-Parkinson-White syndrome seem to be particularly at risk for sudden cardiac death following the use of Ecstasy.⁸ The drug's hallucinogenic properties are similar to those of mescaline but with fewer visual, auditory, and tactile hallucinations. Because it is alleged to produce emotional closeness to others, serenity, and relaxation, street users have termed it the "love drug." It was first patented in Germany in 1914; currently, there is no medical use for Ecstasy.

LSD is synthesized from the alkaloid found in the rye fungus, ergot (*Claviceps purpurea*). It is the most powerful of the known hallucinogens. LSD, which was synthesized in 1938, is taken orally and can produce significant changes in perception, mood, and thought. The changes include visual hallucinations and distortions. Cases of suicide during or following LSD intoxication have occurred occasionally, as have accidental (sometimes bizarre) fatalities, homicides, and self-mutilations.¹¹ LSD had been used medically almost exclusively as an investigational drug in psychotherapy and in the treatment of alcoholism.

Mescaline is derived from the Mexican peyote cactus (*Lophophora williamsii*) and the San Pedro cactus (*Trichocereus pachanoi*), which are found in Peru and Ecuador. Mescaline can also be produced by chemical synthesis in the laboratory. In its pure form, mescaline sulfate is a white crystalline material. Synthetic mescaline often appears as a white or colored powder. Mescaline produces a spectrum of effects similar to those of both LSD and psil-

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ocybin, including visual, auditory, and tactile hallucinations and distortions. Effects usually occur within the first hour of administration and can include tension and anxiety, numbness, muscle twitches and muscle weakness, dizziness, motor incoordination, rapid reflexes, tremulousness, and pupillary dilatation. Those who ingest mescaline may also experience such reactions as tachycardia, increased blood pressure, nausea, vomiting, and hyperthermia. Psychological reactions may frequently include time, space, and body-image distortions. Mescaline is usually administered orally in powder, tablet, capsule, or liquid form. The peyote cactus was used by Mexican Indian tribes during religious ceremonies and its use spread north during the mid-19th century. Several decades ago, researchers used mescaline to facilitate psychotherapy, but the drug has no medical use at the present time.

Psilocybin ("magic mushroom") is a chemical compound that occurs naturally in many mushrooms found throughout the world. The drug can also be chemically synthesized, but only with great difficulty and expense. Common reactions following oral ingestion include muscular relaxation, coldness of the limbs and abdomen, and dilation of the pupils. As the effects become stronger, LSD-like mood changes may also occur. If the dose is large enough, the effects will include vivid visual and auditory distortions and hallucinations. Although there is no current medical use for psilocybin, it has been used ritually in Mexico and Central America for centuries to produce altered states of consciousness. Adverse reactions associated with psilocybin mushrooms are thought to occur as a result of drug synergism—that is, mixing intoxicants such as alcohol, marijuana, and psilocybin.¹²

METHOD

In spring 1990, we undertook a two-sample cross-sectional prevalence survey of the undergraduate population at Tulane University. First, we mailed anonymous questionnaires concerning drug and alcohol use and self-addressed return envelopes to a random sample of 1,400 students, representing 25.2% of the undergraduate population. Reminder postcards were sent 2 weeks later, after which the response rate in this first group was 54.2% ($n = 759$). For the second sample, we selected classes from among all the undergraduate courses offered by each of the colleges. The two primary selection criteria were class enrollment greater than 15 and that the class met between 11 AM and 2 PM on a Tuesday, Wednesday, or Thursday. The sample of classes we surveyed was proportionately representative of the fields of study throughout the entire university. After we had selected the classes using these criteria, 20 of 40 instructors agreed to participate and to distribute the questionnaire during their class periods. Those students who had not completed the mailed questionnaire were asked to participate; those who had already completed the questionnaire were directed not to respond in class. The in-class sample size was 505 (repre-

senting 99.6% of the 507 students attending these classes).

We compared results from the mailed sample and the in-class sample for response differences on all of the variables. Because we found no significant differences that might indicate a response bias in either group, we combined the two samples, yielding a 63.3% response rate for the remainder of the analyses ($n = 1,264$).

We obtained permission from the university Institutional Review Board before commencing both the mail-out and in-class studies, and the students' returned questionnaires were presumed to be evidence of their consent to participate.

A previously reported 1986 study at this university surveyed a stratified random sample of 2,000 undergraduates from a total population of slightly more than 6,000 students. The 1986 sample was equally divided by sex and class level (first-year, sophomore, junior, senior); representative percentages of students from the university's colleges were also selected. Survey materials were designed to provide anonymity. At that time, a follow-up postcard was mailed to encourage students to return the questionnaire. The final response total was 742 (38%).

We compared these two sets of data. Although the data-collecting instruments were not completely identical, both survey instruments included the same demographic variables—each student's sex, age, school of enrollment, year, place of residence (while attending school), employment status, and religion. Both instruments also contained a table indicating lifetime usage (the number of times during their life when they had used a drug) patterns for alcohol, Ecstasy, LSD, "other" psychedelics (mescaline and psilocybin), amphetamines, inhalants, barbiturates, cocaine, and marijuana/hashish. The respondents were instructed to complete the table, indicating the school grade they were in when they tried a specific drug for the first time.

In addition, because both study groups contained approximately the same percentage of students in each of the university years, the two groups were considered comparable.

Analysis

For statistical analysis of the data, we used the EpiInfo Version 5.01a (March 1991) Public Domain Software for Epidemiology and Disease Surveillance from the Centers for Disease Control (CDC), Epidemiology Program Office, Atlanta, Georgia, and the World Health Organization (WHO) Global Programme on AIDS, Geneva, Switzerland. We performed chi-square tests to determine whether significant differences existed between the 1986 and 1990 data. The significance level we used was $p < .05$.

RESULTS

Although the total questionnaires returned in 1990 was a relatively high 63% compared with the 38% of the 1986 mailout study, the samples did appear to be comparable

TABLE 1
Comparative Use of Selected Drugs Tried at Least Once

Drug	Respondents		Difference
	1986 (n = 742) (%)	1990 (n = 1,264) (%)	
Ecstasy	15.5	24.3	+ 8.8*
LSD	14.2	17.5	+ 3.3‡
Mescaline and/or psilocybin†	8.0	23.9	+ 15.9*
Marijuana	67.8	63.8	- 4.0‡
Cocaine	39.2	21.0	- 18.2*
Amphetamines	22.2	12.3	- 9.9*

†Mescaline and psilocybin were grouped together on the questionnaires. ‡No significance of difference ($p > .05$).

*Significance of difference between 1986 and 1990: $p < .0001$.

response groups representative of the university's undergraduate population. The gender distributions for respondents in 1986 and in 1990 were not significantly different (53% men v 47% women in 1990, compared with 49% men v 51% women in 1986), although the 1986 sample population significantly underrepresented men, $\chi^2(1, 742) = 19.10, p < .001$.

The distribution by class level was significantly different for the 1986 and 1990 samples, $\chi^2(3, 2,008) = 36.67, p < .001$. This sample accounted for about 14% of the variability in distribution across class levels. Actual proportions for the two samples were first-year students, 24% v 25%; sophomores, 27% v 27%; juniors, 30% v 22%; and seniors, 19% v 26% in 1990 and 1986, respectively. In the university undergraduate population, the distribution level was first-year, 31% v 27%; sophomores, 25% v 25%; juniors, 23% v 23%; and seniors, 21% v 25% in 1990 and 1986, respectively.

Frequency of Lifetime Drug Use

The reported prevalence of use of each of the hallucinogenic drugs increased from 1986 to 1990, with increases found for Ecstasy and for mescaline/psilocybin that were statistically significant (Table 1). Marijuana, cocaine, and amphetamine use, on the other hand, showed a decline in the percentage of respondents who indicated use during that period. This decline was significant for cocaine and amphetamines, but not for marijuana.

Use Before and While Attending College

A noteworthy finding is that initial uses of Ecstasy and mescaline/psilocybin most often occurred while respondents were attending college. The 1990 data show that four out of every five students who had ever taken Ecstasy and three out of every five students who had ever used mescaline/psilocybin did so *for the first time* during college, whereas marijuana, cocaine, and amphetamines were generally first used before the student entered college (Table 2).

TABLE 2
Selected Drugs First Tried During College

Drug	1990 % of users of each drug
Ecstasy	79.7
LSD	49.5
Mescaline and/or psilocybin†	62.0
Marijuana	19.0
Cocaine	39.5
Amphetamines	19.0

†Mescaline and psilocybin were grouped together on the questionnaires.

DISCUSSION

Our findings suggest an increase on this campus in the use of the hallucinogenic drugs Ecstasy and mescaline/psilocybin from 1986 to 1990, and an apparent decrease in cocaine and the traditional amphetamines. Because nearly two thirds of the undergraduate students on this campus come from out of state, our findings may also reflect drug use among college students outside the state of Louisiana. These results are somewhat dissimilar to those reported in a larger national study of adolescents and young adults by Johnston et al.¹³ They reported that the trend in lifetime hallucinogen use in their sample of college students remained virtually unchanged during the same period that we studied—1986 to 1990. Their report that the prevalence of cocaine and amphetamine use had decreased, however, was similar to our findings. Unfortunately, Ecstasy was not included in Johnston and colleagues' 1986 questionnaire, so changes in use of Ecstasy between 1986 and 1990 could not be compared. Similarly, in a study reported in 1987 that randomly and anony-

mously polled undergraduate students at Stanford University, 39% reported taking Ecstasy at least once,¹⁴ a finding that further documents the extensive use of this hallucinogenic drug.

Because of the vagaries of college students' return of questionnaires, the comparison of the 1990 sample population with the undergraduate population was significantly different, $\chi^2(3, 1,266) = 50.80, p < .001$. First-year students were significantly underrepresented and juniors significantly overrepresented in our study. It is conceivable, although not likely, that some of the differences we observed in drug use may have been partially influenced by this variation in the samples.

If our findings that initial use of hallucinogens occurs while students are attending college and is increasing in prevalence are confirmed by others, then those educators or administrators who are developing drug education, prevention, or intervention programs for college youth should incorporate this information into their drug abuse program strategies.

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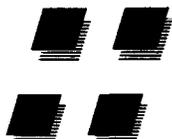
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