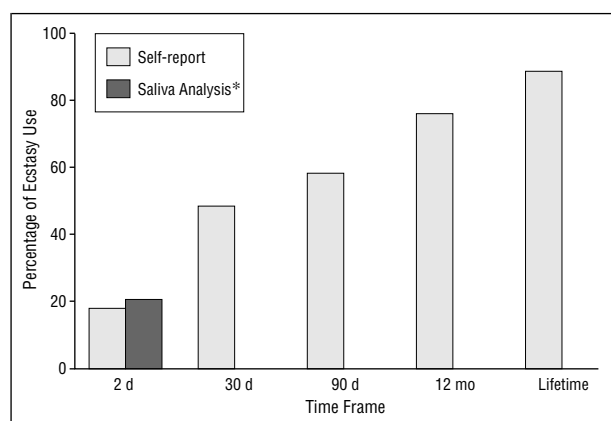


Ecstasy Use Among Club Rave Attendees

The “rave” phenomenon—loud music, flashing lights, and frenzied all-night dancing—has been a major element in the resurgence of psychedelic drug use in Western society.¹ Purportedly central to raves is the use of “club drugs,” including 3,4-methylenedioxymethamphetamine, also called MDMA or ecstasy.¹ The use of ecstasy seems to be increasing worldwide, with rave attendees being a high-risk population. Because these drugs have potentially serious physical and psychological consequences, such as anxiety, memory loss, paranoia, depression, cognitive impairment, cardiac complications, and kidney failure,²⁻³ the rave phenomenon has sparked the attention of health officials and policy makers. However, to our knowledge, no studies have collected self-report or objective drug use information from rave attendees in the United States.

Our study estimated the prevalence of ecstasy use among a sample of rave attendees. Self-reported drug use



Ecstasy use according to self-report and saliva analysis among club rave attendees (N=96). Asterisk indicates that saliva analysis is useful for the detection of ecstasy only within 48 hours of use.

information and saliva specimens were collected from attendees of raves at 5 nightclubs in the Baltimore-Washington corridor between 1 AM and 4 AM during the fall of 2000. A total of 148 club rave attendees were approached for interviewing. The interviewer's introduction described the purpose and sponsorship of the study and included informed consent provisions. Seventy-seven percent of persons leaving raves agreed to and completed the interview. Ninety percent of those who completed the interview provided a saliva specimen that was subsequently analyzed by a laboratory (PharmChem Laboratories, Menlo Park, Calif) for the presence of MDMA. Results are based on the 96 individuals who completed the interview and provided a saliva specimen. Of the original 102 respondents who completed interviews, 6 reported being younger than 18 years and were excluded from further analysis.

Most of the sample (65%) was male and between the ages of 18 and 21 years (76%). Ninety-four percent were white, 84% were employed at least part-time, and 88% had completed the 12th grade. Eighty-nine percent reported lifetime ecstasy use, 48% reported 30-day ecstasy use, and 18% reported using ecstasy within the 2 days preceding the interview (**Figure**). Twenty percent tested positive for ecstasy by saliva analysis.

The **Table** describes the drug use of the entire sample and compares ecstasy users with nonusers. Current ecstasy users were more likely than nonusers and past users to have used marijuana in the past 12 months (81% vs 36% and 33%; $P \leq .001$) and more likely than nonusers to have used powder cocaine in the prior 12 months (51% vs 0%; $P \leq .01$) (Table).

Estimates of lifetime ecstasy use obtained from this sample (89%) far exceeded those from our earlier study of juvenile offenders in Maryland (18%)⁴ and those from a study of a group of college students of comparable age (8.4%).^{5,6} Our findings, therefore, corroborate previous studies outside the United States⁷ that found rave attendees to be at high risk for ecstasy use. Our study also revealed that current ecstasy users were more likely than nonusers and past users to have used marijuana and pow

Alcohol and Other Drug Use During the Past Year for Total Sample and by Level of Ecstasy Use*

Substance Used in Past 12 Months	Total Sample (N = 96)	Self-reported Ecstasy Use		
		Nonusers (n = 11)	Past Users (n = 12)	Current Users (n = 73)
Alcohol	95	100	92	95
Marijuana	70	36†	33†	81†
Powder cocaine	42	0‡	25	51‡
Crack cocaine	4	0	0	6
Methamphetamine	21	0	17	25
Heroin	7	0	0	10
Phencyclidine (PCP)	10	0	8	12

*Data are given as percentage of sample.

†The comparison between current users and the other 2 groups was significantly different ($P \leq .001$).

‡The comparison was significantly different ($P \leq .01$); all other differences were nonsignificant ($P > .05$).

der cocaine within the past 12 months. These findings suggest that ecstasy users are likely to be polydrug users who might need preventive and treatment interventions. Given that recent data indicate that ecstasy use is increasing among youth, more research is needed to learn about the risk factors, one of which could be the rave setting, associated with initiation of ecstasy use. In addition, since this study has demonstrated that rave attendees constitute a high-risk sample, more comprehensive data collection efforts should be undertaken at raves held at nightclubs and at other locations across the United States to better understand the psychosocial and behavioral consequences of ecstasy use. Specifically, longitudinal studies are necessary to define the temporal patterning of ecstasy use within drug use in general, as well as to delineate the onset and duration of consequences associated with ecstasy use.

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Some Pitfalls of Computer Modeling

The article recently published in the ARCHIVES titled "Computer Simulation of Stair Falls to Investigate Scenarios in Child Abuse"¹ is a troubling example of irresponsible "computer simulation" without scientific foundation and experimental basis. The intention of the study was to demonstrate that computational tools may be used to aid clinicians, scientists, and engineers in determining injury mechanism—a noble and important goal in objectively evaluating injury potential and formulating prevention, therapeutic intervention, and rehabilitation strategies. However, the authors demonstrate a naive approach to computer modeling and draw tenuous conclusions about femur fracture potential during stair fall events. The authors also take the additional, unsubstantiated step of postulating that their computer model will eventually differentiate between "accidental" and "nonaccidental" trauma, the latter imply-

ing intent typically on the part of a parent or caregiver. The published results of the authors' study demonstrate that the model achieves none of these results with any scientific basis or biomechanical rigor.

Although the authors mention the age-old caveat that their model is yet to be validated scientifically, the mere mention of the lack of objective support is only one of several shortcomings of the study and does not absolve the authors of drawing unsubstantiated conclusions about injury mechanism and intent. None of the model's results are explained by theory or demonstrated with experimental evidence or discussion of case study. No comparisons are made between the model's "outcome measures" and biomechanical tolerance data for various modes of femur failure. None of the plots demonstrating the model's output are given a statistical indication of error and no sensitivity analysis of initial conditions and parametric variation is presented to indicate the true statistical significance of each parameter tested. None of these critical points are addressed in the study, and many of the readers unfamiliar with modeling may not even be aware that they are critical points.

While the authors' formulation of a model using existing and powerful technology to aid in the determination of injury mechanism is well intentioned, the execution of such a study and the publication of its results are not substantiated simply by the use of a computer. The computer is only solving kinematic equations based on the laws of physics, and without the proper input and the crucial scientific and experimental validation of the output, the model is naive at best and misleading and potentially dangerous at worst. No computer model can "detect" intent.

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In reply

In response to Dr Thibault's letter regarding our article, we would like to offer the following.

Dr Thibault states, "the intention of the study was to demonstrate that computational tools may be used to aid . . . in determining injury mechanism. . . ." and that our conclusions about injury mechanisms and intent are unsubstantiated. Our study objective, as stated in the article, was to demonstrate the usefulness of computer simulation techniques for investigating the influence of stair characteristics on injury biomechanics. We concluded that stair characteristics play an important role in the likelihood of injury, highlighting the need for documenting details of the environment in which a fall occurs. The goal of our work was not to determine injury mechanism, but rather to better understand specific contributors to injury risk. We drew no conclusion about injury mechanism or intent.