6. THE PUBLIC HEALTH IMPLICATIONS OF MDMA USE

JEROME BECK

1. INTRODUCTION

MDMA has been thrust upon the public awareness as a largely unknown drug which to some is a medical miracle and to others a social devil. . . . There have been the born-again protagonists who say that once you have tried it you will see the light and will defend it against any attack, and there have been the staunch antagonists who say this is nothing but LSD revisited and it will certainly destroy our youth [1].

The above appraisal by psychopharmacologist Alexander Shulgin aptly illustrates the public health controversy surrounding the emergence of this unique substance in American society. Frequently referred to as "Ecstasy," "XTC" or "Adam," MDMA suddenly became the object of extensive media coverage in 1985, highlighting what appeared to be dramatic increases in both therapeutic and recreational use. A controversy ensued providing widely divergent perspectives on the substance. Representing one faction were various psychiatrists and researchers who viewed MDMA as a valuable therapeutic adjunct and saw minimal harm associated with carefully monitored use [2–6]. The other side was largely composed of drug enforcement officials, who viewed MDMA as a dangerous "designer drug," possessing potentially harmful actions, with increasing abuse occurring outside of the therapeutic community [7–9].

The uniqueness of MDMA (3,4-methylenedioxymethamphetamine) is exemplified by the terminological confusion in adequately describing its actions.

Peroutka S.J. (ed), Ecstasy.

As an N-methyl analogue of MDA, it is related to both the amphetamines and mescaline. Although MDMA has been most commonly labeled a psychedelic drug, it possesses stimulant properties as well. Moreover, it is rarely hallucinogenic and seldom produces the sensory phenomena or mental confusion associated with other psychedelics [10–12].

A public health appraisal should examine what is known about a particular substance and its users in assessing the potential benefits and harms associated with the drug. Much of the current research examining MDMA's therapeutic as well as toxic potential is amply explored elsewhere in this volume. In attempting to construct a comprehensive public health appraisal of MDMA, this chapter combines a brief overview of research findings with a review of epidemiological data and governmental policy. Complicating such an evaluation is the fact that our current knowledge about MDMA is almost entirely derived from anecdotal data and preliminary research. As a consequence, the most immediate public health implication concerning MDMA is how little we actually know about both the drug and its users.

An adequate public health appraisal should also assess the strengths and weaknesses of current governmental policies regarding a substance and suggest changes thought to maximize benefits and minimize dangers. As such, this chapter not only addresses ways to remedy gaps in knowledge but also examines current policies that possess significant public health implications. This task is best accomplished through separate examinations of the therapeutic and recreational use of MDMA. An assessment of the significant impact that illegality has had on both forms of use is included within each of these analyses.

2. THE SCHEDULING CONTROVERSY

The Drug Enforcement Administration (DEA) first encountered MDMA in 1972 through a street sample bought in the Chicago area [12]. However, such reports were infrequent and it was not until a decade later that the Drug Control Section of the DEA began soliciting information regarding MDMA. In 1982, an early article on MDMA quotes a DEA spokesman as stating, "If we can get enough evidence to be sure there's potential for abuse, we'll ban it" [13].

Satisfied that they had accumulated enough evidence regarding abuse potential, the DEA administrator recommended the placement of MDMA into Schedule I on July 27, 1984 [14]. In support of this action, a DEA chemist concluded that "MDMA has a high potential for abuse based on its chemical and pharmacological similarity to MDA, its self-administration without medical supervision, its clandestine synthesis, and its distribution in the illicit drug traffic" [8].

What appeared to be a routine scheduling process of a little-known substance was quickly challenged by a rather well-organized group of psychiatrists and researchers who strongly believed in MDMA's therapeutic potential

[2–6]. Citing LSD as a case example, therapists argued that a schedule I status would severely hinder any research into the drug's therapeutic potential. The government's surprise at the therapists' reaction was evidenced by a DEA pharmacologist's statement that they "had no idea psychiatrists were using it" [15].

In actuality, a number of psychiatrists and other therapists had been using MDMA since the late 1970s as an adjunct for various purposes, particularly in facilitating communication, acceptance, and fear reduction [10, 16–17]. Despite their belief in MDMA's efficacy, therapists were reluctant to publicize their preliminary findings for fear that any publicity would inevitably result in its illegality and removal from therapeutic research and use [18].

In response to MDMA proponents' challenges, federal administrative law hearings were held in three cities (Los Angeles, Kansas City, and Washington, D.C.) to determine the final scheduling of MDMA. The DEA (together with the FDA) clearly believed that MDMA belonged in Schedule I. Their attorneys set out to prove that MDMA fit all three criteria necessary for such a placement: a high potential for abuse, no currently accepted medical use, and a lack of safety for use under medical supervision [19].

Shortly before the first hearing, the DEA Administrator unexpectedly invoked the emergency scheduling powers granted by the Comprehensive Crime Control Act of 1984 [20]. As a result, MDMA was temporarily placed in Schedule I on July 1, 1985. The primary rationale behind this new federal law was an attempt at counteracting the sudden advent of so-called designer drugs (primarily synthetic opiate analogues) in the early 1980s [21]. This amendment provides the Attorney General authority to place any substance posing "an imminent hazard to public safety" into Schedule I for a period of one year (plus an additional six months, if necessary), while the final scheduling process is underway [20].

A number of rationales were provided for the necessity of this action. The primary justification centered on an as yet unpublished study associating high dosage, intravenous use of MDA in rats with suspected serotonergic neurotoxicity of unknown significance [22].

Perhaps an even more significant reason behind the emergency scheduling was the active promotion of "XTC" as a legally available euphoriant by a Texas-based operation. Beginning in the early 1980s, this mass-production and marketing scheme stood in sharp contrast to the typically smaller-scale, more clandestine distribution networks found in other parts of the country. [21, 23]. The blatantly open sales of MDMA in numerous bars and nightclubs in the Dallas area presented a very public and problematic drug use pattern to authorities [7, 8].

Although virtually everyone at the hearings argued that there should be at least some controls placed on MDMA (thus outlawing non-medical use), therapists and other proponents proposed that it remain available for clinical use and research. Their lawyer attempted to refute the DEA's contentions

by arguing that MDMA has only a low to moderate abuse potential, is safe under medical supervision, and possesses significant therapeutic value. As a consequence, they argued that MDMA be placed into a lower schedule that would allow for the continuation of human research and therapy [2–6, 18].

Many researchers and therapists feared that a Schedule I status would make it almost impossible to continue using MDMA, even experimentally. Therapists argued that their quiescence in publicizing preliminary findings was justified in light of historical examples involving other psychedelics. Numerous LSD studies involving over 40,000 subjects were conducted throughout the 1950s and early 1960s. Major reviews of these studies concluded that, in general, LSD research had compiled a remarkable safety record with arguable efficacy in at least some studies [24–27]. Nevertheless, strict controls established in the late 1960s resulted in the almost total discontinuance of LSD research. Once-flourishing explorations into the therapeutic potential of other psychedelic substances (including MDA) also came to a virtual standstill upon their placement into Schedule I of the 1970 Controlled Substances Act [27].

These actions were not supported by much of the therapeutic community. According to Grinspoon and Bakalar, "Almost everyone who has worked with psychedelic drugs, and many who have not, think that their research potential is great; and many who have worked with them also think they have therapeutic potential" [27]. They reinforced their contentions by citing survey findings of LSD researchers as well as randomly selected American Medical Association members [27].

The DEA attorneys countered therapist concerns by arguing that a Schedule I status does not preclude appropriately conducted research into MDMA's therapeutic potential. Various government witnesses were called upon to testify that such substances could still be studied if the correct protocol was followed [28–30]. However, citing historical examples, MDMA proponents argued that stringent Schedule I requirements significantly discouraged research and claimed that no substance had ever been removed from Schedule I. An FDA official refuted this latter point by noting that sufentanil had been rescheduled from Schedule I to II in 1984 [31]. This appears to be one of only two exceptions to the rule, however, with almost all changes in scheduling having occurred in the direction of increased control [32].

Several psychiatrists and other researchers testified on behalf of MDMA's therapeutic potential at the administrative law hearings [2–6]. In general, they argued that a major advantage of MDMA over traditional psychedelics is that it produces far less distortion of sensory perception and fewer unpleasant emotional reactions. The MDMA experience is generally seen as both personal and familiar and seems to differ only in its degree of intensity from that of everyday experience. This stands in sharp contrast to the effects of most other psychedelics, where the experience is often perceived as unfamiliar and transpersonal [10]. As Grinspoon argued, "MDMA appears to have some

of the advantages of LSD-like drugs without most of the corresponding disadvantages" [3].

In countering the optimism expressed by MDMA advocates, DEA attorneys called upon various research experts to critique the largely anecdotal nature of the therapist's testimony [29, 31, 33–34]. These government witnesses also gave little credence to the two preliminary studies conducted by proponents [17, 35]. In general, their critique could be summed up in Kleinman's conclusion that "although these reports make interesting reading, their lack of scientific design, methodology, and controls makes them scientifically unsound" [28].

The anecdotal evidence and preliminary research offered by MDMA advocates fell far short of meeting the FDA's exacting specifications regarding safety and accepted medical use. Nevertheless, proponents' testimony at the hearings provided strong arguments for MDMA's therapeutic promise as well as safety (considering the small number of doses that would be given to any one patient). After criticizing Greer's study on methodological grounds, one government witness, John Docherty, went on to urge that formal, well-controlled studies be conducted to assess what he viewed as a potentially valuable compound for psychotherapy [36]. Acknowledging the necessity of such research, Greer confidently stated that "because every therapist I know who has given MDMA to a patient has found it to be of significant value, I am convinced that it can be shown scientifically to be efficacious" [2].

The persuasiveness of proponents' arguments was evidenced by the DEA Administrative Law Judge's findings and recommendations, which largely concurred with their contentions [37]. Citing MDMA's therapeutic potential and safety and noting the lack of significant abuse, the judge recommended a Schedule III placement. This would have substantially eased research requirements and allowed the continued therapeutic use of MDMA by physicians.

The DEA attorneys took sharp exception to the judge's ruling, once again emphasizing the absence of well-controlled, double-blind studies, necessary in meeting the "currently accepted medical use" criteria required of drugs in Schedules II–V. In addition, they argued that the unresolved neurotoxicity question demonstrated a significant lack of "safety for use under medical supervision" — the other major criteria for Schedules II–V [38]. Relying on these arguments, the DEA Administrator subsequently rejected the judge's recommendation and attempted to permanently place MDMA in Schedule I on November 13, 1986 [39].

Four recent appellate court decisions challenged the validity of the DEA's attempts to temporarily and permanently schedule MDMA in 1985 and 1986. The major consequence of these rulings was the apparent invalidation of these placements on technical grounds [40].

Three of the appellate court decisions concerned the validity of prosecutions and convictions resulting from MDMA's temporary placement in Schedule I

on July 1, 1985 [41–43]. Although differing somewhat as to the challenges and resulting decisions, all three rulings were in basic agreement that the emergency scheduling was invalid. As a consequence, the convictions were overturned on the basis of technicalities associated with faulty implementation of the emergency scheduling law [18, 40].

Grinspoon, M.D. vs. Drug Enforcement Administration differed from the other three cases in not challenging a previous conviction [44]. Instead, this appeal to the First Circuit Court in late 1986 was a continuation of the therapist's battle to get MDMA out of Schedule I. In September of 1987, the Court overturned the DEA Administrator's final scheduling and remanded the DEA to reanalyze its scheduling of MDMA. In so doing, the Court ruled that the DEA had erred in narrowly defining the criteria for "currently accepted medical use" as equivalent to an FDA New Drug Application (NDA) or Investigational New Drug (IND) protocol approval. The Court also found the DEA to have erred in equating "lack of accepted safety for use of the drug or other substance under medical supervision" with lack of FDA approval. To address these definitional problems, the Court directed the DEA to better define these two scheduling criteria and demonstrate how they apply to MDMA [44].

The First Circuit Court did concur, however, with the DEA's contention that MDMA possesses a "high potential for abuse." Although the Court agreed with proponents in noting the lack of sufficient evidence demonstrating significant abuse of MDMA, it nevertheless ruled that the DEA had succeeded in establishing the *potential* for such abuse. The Court acknowledged that a Schedule I placement might impede MDMA research, but concluded that this reason was not sufficient to require moving MDMA out of Schedule I [44].

Addressing the First Circuit Court's directives, the DEA Administrator concluded that MDMA fell far short of meeting the DEA's revised definitions of what constituted acceptable medical use. Although acknowledging that, "many witnesses in this proceeding, including those presented by the agency, indicated that MDMA may have a potential therapeutic use, such a potential use is not sufficient to establish accepted medical use" [45]. As a consequence, he once again ordered the placement of MDMA into Schedule I on March 23, 1988.

An unforeseen legal complication resulted from the First Circuit Court's decision. Although temporarily dismissing MDMA's placement in Schedule I, the Court's ruling appeared to have little effect on MDMA's legality, since it was generally assumed that it would continue to be illegal under the Controlled Substance Analogue Enforcement Act passed in late 1986. The Analogue or "Designer Drug" law makes illegal any substance that is similar in structure or psychological effect to any substance already scheduled, providing it is manufactured, posssessed, or sold with the intention that it will be consumed by humans [46].

It now appears, however, that anyone arrested for MDMA offenses prior

to the second rescheduling cannot be prosecuted under the Analogue Act, as a result of an unusual technicality. Since MDMA had already been made a controlled substance it could no longer be considered an analogue of a controlled substance [40].

In summary, a major consequence of the various appellate court rulings is the likelihood that most, if not all, convictions for MDMA offenses before March 23, 1988, will ultimately be reversed if appealed. As a US Department of Justice lawyer recently concluded, "it appears that all federal prosecutions based upon MDMA's previous status as a Schedule I controlled substance will be subject to challenge and that such challenges are likely to be sustained" [40]. It should be noted, however, that although these rulings fault the DEA's actions in attempting to schedule MDMA, they lend little or no support to proponents' contentions. Barring unforeseen circumstances, it appears that Schedule I will remain MDMA's home for many years to come.

3. THERAPEUTIC IMPLICATIONS

It is important to examine the various obstacles that may impede or prevent an adequate assessment of the therapeutic potential of substances such as MDMA in our society. More to the point, let us assume for a moment that MDMA does indeed possess both significant therapeutic value and relative safety at prescribed doses. What would it take and how long would it take to convince the government of its efficacy and safety?

A number of formidable obstacles confront any attempt to generate the substantial funding necessary to finance research into MDMA's therapeutic potential. Aside from the neurotoxicity question, the most significant obstacle currently facing MDMA is its "orphan drug" status. Since MDMA was patented in 1914, it is now in the public domain, which means that any company could produce and market it for approved conditions. Little incentive exists for a pharmaceutical company to invest the millions of dollars on research necessary to possibly obtain FDA approval, only to have other firms market the same product with minimal investment [10, 47].

An additional problem inhibiting pharmaceutical interest concerns the probable lack of profit associated with the marketing of MDMA or similar substances employed as adjuncts to psychotherapy. Profits accruing from the few doses given a typical patient would be minimal compared with those garnered from currently prescribed psychotropic medications (e.g. tranquilizers or antidepressants) that are often intended for daily use.

Finally, the placement of MDMA into Schedule I probably completes the task of discouraging pharmaceutical interest in the substance. As the Second Triennial Report to Congress from the Secretary of Health and Human Services states, "it is unlikely that pharmaceutical companies will develop a drug, no matter how promising it is, that is in Schedule I of the Controlled Substances Act" [48].

Despite the above obstacles, efforts are still being made to generate the

interest and funding necessary to investigate MDMA's therapeutic potential. A major goal in this regard is convincing the FDA to certify MDMA as an "orphan drug." This action would greatly increase MDMA's chances of being researched and marketed as a therapeutic adjunct. However, the possibility of an orphan drug designation is largely dependent on a successful resolution of the neurotoxicity question and subsequent FDA approval for human research [47].

Pharmaceutical disinterest is not the only obstacle facing MDMA or other substances utilized for their potential insight-enhancing properties. As Seymour, Wesson, and Smith point out: "No other medication is currently recognized by the Food and Drug Administration as an adjunct to psychotherapy, and even psychotherapy in its many variants is not accepted by mainstream medical practitioners as bona fide medical treatment" [49].

The above skepticism can be attributed in part to the empirical difficulties that plague any attempt at conducting well-controlled double-blind research with insight-oriented therapeutic techniques. As Sidney Cohen succinctly pointed out with regard to LSD research, "no method of using LSD therapeutically has as yet met rigid scientific requirements, . . . but, in truth, no other type of psychotherapy has been fully tested by these exacting methods either" [50]. Although psychotherapy research has improved since that observation was made over two decades ago, the methodological problems involved in conducting such studies remain daunting at best.

Given the obstacles, it is not surprising that Grinspoon and Bakalar conclude from their comprehensive review of psychedelic research that the therapeutic use of these substances "obviously has potentialities that are not being allowed to reveal themselves" [27]. Citing historical examples to reinforce his argument, Nichols argues that "as a result of this government-induced stagnation in the field of drug-assisted psychotherapy research, psychiatry has not been offered various types of novel psychoactive drugs for assessing their value to medicine" [51]. He goes on to declare that,

> the very nature of the organization of the FDA precludes it from taking any kind of risk — theoretical or actual. Yet risk is an essential part of drug discovery. The paternalistic idea has developed that consumers must be protected from any risk, of any kind, from the cradle to the grave [51].

The limits of the current psychiatric system are exemplified by the drugs commonly utilized in treating the gamut of mental problems. Practically all of these psychotropic medications are pharmacological depressants prescribed primarily for symptomatic relief. Nichols decries this lack of pharmaceutical options, declaring that, "It is a harsh reality indeed that tells patients with emotional pain to suffer quietly, that they will not be helped except with drugs that dull the mind" [51].

Frustrated by the intractability of the current system, a number of re-

searchers have argued that revisions are necessary to adequately deal with substances such as MDMA. Nichols, Grinspoon, Bakalar, and others advocate the creation of adequately conducted informed consent procedures, allowing adults to voluntarily participate in research involving drugs with significant therapeutic promise [27, 51]. According to Smith and Seymour: "There is some movement currently to create a new category for experimental psychoactive drugs with low abuse potential, no established medical uses, but high therapeutic potential, so that these drugs may possibly be used in treatment-center research" [52].

Even assuming the creation of such a category, the neurotoxicity question remains the most formidable obstacle blocking the human research necessary to assess MDMA's therapeutic value. The majority of animal studies have found varied degrees of suspected serotonin nerve terminal degeneration in certain areas of the brain [53–56].

The significance of this alleged neurotoxicity, however, remains unknown. Also unknown is whether it occurs (and at what dosage levels) in humans and, if so, whether it is permanent or transient in nature. Finally, MDMA proponents point out that there have been no documented cases of MDMA-related neurological impairment among any of the hundreds of thousands of MDMA users [57].

Government officials and other researchers respond to these arguments by warning that disorders or problems associated with other neurotoxic substances (e.g., MPTP) were not always immediately apparent in users [53]. As Charles Schuster, Director of the National Institute on Drug Abuse (NIDA) and co-author of the original MDA neurotoxicity study, cautions, "What we don't know is whether twenty or thirty years from now, at the age of 45, they [MDMA users] may begin to be showing central nervous system degenerative signs that ordinarily would not be seen until they get to be 70 or 80 [58].

Proponents have countered this commonly expressed fear by noting that a number of other sympathomimetic drugs suspected of neurotoxicity continue to be medically prescribed, often for daily use [57, 59]. The most notable of these is fenfluramine (Pondamin®), which produces serotonergic changes similar to those of MDMA, at dosage levels scarcely above the effective therapeutic dose [60]. In summarizing the research of Schuster and colleagues at the University of Chicago, Johanson concludes that fenfluramine produces, "a long lasting depletion of serotonin in the striatum, hippocampus, and rest of brain at a dose only 1.25 times the ED50 dose for anorexia" [61].

Proponents also argue that any risk associated with the therapeutic use of MDMA would be minimal, considering the small number of doses given to any one patient. Nevertheless, the FDA has rejected all Investigational New Drug (IND) applications to date, in each case citing the neurotoxicity issue as its major rationale — even in proposals involving therapeutic research with terminally ill patients [47].

The government's well-publicized stand on MDMA stands in sharp contrast to its seeming lack of concern regarding fenfluramine. As the Adminstrative Law Judge concluded, the "FDA has approved the daily use of fenfluramine in humans on a chronic basis. Fenfluramine is a controlled substance, but this proven neurotoxic substance is only in Schedule IV [37]. An examination of the 1988 Physician's Desk Reference reveals that fenfluramine remains in Schedule IV, with no mention informing physicians or other readers of the neurotoxicity research [62].

Numerous problems complicate an adequate determination regarding the appropriate place in modern society for potentially valuable therapeutic adjuncts like MDMA. Nevertheless, the inadequacy of current efforts lead Grinspoon and Bakalar to conclude that "our legal and political institutions, like our natural science and psychiatry, are failing to supply the complex responses these complex drugs demand. We should show more confidence in our capacity to tolerate and make use of them" [27].

4. RECREATIONAL IMPLICATIONS

Although MDMA first appeared on the street in the early 1970s, use remained limited until the end of the decade. Recreational use increased at a somewhat faster pace during the early 1980s, with information about the drug disseminated largely through word of mouth and anonymously written "flight" guides providing detailed instructions regarding proper use [10, 63].

This relatively quiet popularization suddenly changed with the proposed scheduling and ensuing reaction by therapists, which brought MDMA to national attention in mid-1985. Within a few months, the print and electronic media had discovered "Ecstasy." Almost every major newspaper and magazine printed stories about MDMA, often sensationalizing its reputed euphoric, sensual, and therapeutic qualities [15, 23, 64–65].

The rise in publicity was accompanied by what appeared to be an exponential increase in street demand. During the administrative law hearings, UCLA's Ronald Siegel testified "that street use had escalated from an estimated 10,000 doses distributed in all of 1978 to 30,000 doses distributed per month in 1985" [66].

The DEA found evidence of increased use throughout much of the country, particularly in the Dallas area, where it was estimated that "30,000 dosage units of MDMA are distributed each month" [7]. As mentioned earlier, this mass-production and marketing scheme included blatantly open sales of MDMA in certain bars and nightclubs. The DEA also noted the promotion of MDMA as a legal euphoriant by means of fliers, circulars, and promotional parties [7].

Although the media blitz resulted in a dramatic increase in interest throughout the country, it appears that MDMA was already popular in certain areas. Shulgin estimated that two million doses had been consumed prior to the DEA's proposed scheduling [37]. Doblin's interviews with major dealers leads

him to believe in even higher estimates of use. One group of distributors told him that they had dispensed approximately 500,000 doses over a seven year period up to 1984. Another group (the Texas operation) claimed to have already distributed two to three million doses by 1984. Nevertheless, the impact of media coverage is evidenced in the same group's claim to have sold two million doses in the month prior to the emergency scheduling [67].

The above estimates clearly attested to MDMA's increasing popularity, as well as the power of free publicity. Nevertheless, all of these figures were highly speculative and limited in what they told us about MDMA users.

Having first encountered MDMA as a drug educator at the University of Oregon in 1976, I found myself on the ground floor in researching the recreational use of this substance. Through my capacity as a drug educator, counselor, and researcher in Oregon and the San Francisco Bay Area, I was able to use informal ethnographic and qualitative interview strategies in sketching a profile of MDMA use in two areas where it enjoyed early and significant popularity. This observational analysis, combined with anecdotal accounts provided by various groups (e.g., media and therapists) and official statistical indicators (DEA and Drug Abuse Warning Network [DAWN] data), culminated in the publication of three articles [10, 21, 68].

In June of 1987, the National Institute on Drug Abuse (NIDA) approved a grant by Marsha Rosenbaum, Patricia Morgan, and myself to conduct a sociological exploration of MDMA users. MDMA's recent emergence, unique actions, and increasing popularity provide a rare opportunity to examine gradually evolving patterns of use among various groups. Unfortunately, our findings are still preliminary as of this writing allowing for only general observations to be reported here. This analysis is supplemented by my earlier research and by the only other known studies of recreational MDMA users: Siegel's exploratory study in Los Angeles [69] and Peroutka's informal survey of undergraduates [70, 71].

MDMA appears to be most popular in particular urban areas possessing established distribution networks for the drug. Its use has been associated most commonly with college students, gays, yuppies, and "New Age" seekers of psychological and/or spiritual growth. A typical dose ranges from 100 to 150 milligrams and costs between 10 and 25 dollars [10, 12].

Although many respondents in our study consider MDMA to be a "drug of choice," they offer radically different points of view regarding its perceived value. On the one hand are those who see "Adam" as a valuable therapeutic and spiritual tool. Many of these individuals pursue "New Age" spiritual directions and, with the exception of other psychedelic experiences, often report little use of other substances. On the other extreme are those who seek the acclaimed euphoria and sensuousness associated with "Ecstasy." These individuals tend to have substantial experience with a wide array of psychoactive drugs and find that MDMA provides many of the qualities previously sought in other substances (e.g., cocaine). Although extremists on either side

often have great difficulty understanding the other, the vast majority of users fall somewhere in between, sensing and often pursuing both "therapeutic" and "recreational" benefits in their experiences.

Oral ingestion is by far the most common route of administration among current users, although inhalation is occasionally reported and, in rare cases, injection. Taking the drug orally is preferred because it produces the longest, smoothest high with the least amount of stimulant side effects. Briefly summarized, effects generally appear within 20 to 60 minutes, with the user often experiencing a brief "rush" of energy, most often described as mild but euphoric. After this rush, the high levels off to a comfortable plateau, which usually lasts two to three hours and is followed by a gradual "coming down" sensation, culminating in a feeling of fatigue.

MDMA, although milder and shorter-lasting than MDA, still exerts amphetamine-like effects on the body, including dilated pupils, dry mouth and throat, tension in the lower jaw, occasional grinding of the teeth, and overall stimulation. Nausea and dizziness are occasionally reported, most often during the initial onset of the high. Individuals become dehydrated and should be drinking water or juice throughout the experience. Unfortunately, some choose to drink alcoholic beverages, which increase dehydration and negative aftereffects. In general, the presence and/or severity of various side effects is greatly affected by the individual's frequency of use, the size of dose, and overall mental and physical health. As a consequence of its sympathomimetic actions, MDMA use would likely be contraindicated for individuals with the following medical conditions: diabetes, diminished liver function, epilepsy, glaucoma, heart disease, hypertension, hypoglycemia, hyperthyroidism, and pregnancy [10, 12, 17].

During the hearings, proponents presented the results of a later published research project evaluating the effects of a single MDMA exposure on 21 healthy individuals [35]. All of the subjects had used MDMA on previous occasions. Using blood chemistry, physiological measures, and neurological examinations, the researchers concluded that,

> This experimental situation produced no observed or reported psychological or physiological damage, either during the twenty-four hour study period, or during the three month follow-up period. From the information presented here, one can say only that MDMA, at the doses tested, has remarkably consistent and predictable psychological effects that are transient and free of clinically apparent major toxicity [35].

The research design of this experiment was heavily criticized by an FDA pharmacologist at the administrative law hearings [31]. He essentially agreed with the study's conclusion that "there is insufficient evidence to judge accurately either harm or benefit" [35].

A unique attraction that differentiates MDMA from other stimulants is its capacity to induce a strong paradoxical sense of relaxation. This effect often

leads users to be almost totally oblivious to many of the stimulant side effects [10]. As with therapeutic accounts, most recreational users cite a dramatic drop in defense mechanisms or fear responses, while also feeling an increased empathy for others. Combined with the stimulant effects, this often produces an increase in intimate communication.

Users tend to be predominantly positive when describing their initial MDMA experiences. Nevertheless, many of the users in our study have significantly cut down or discontinued use as their perception of costs begin to outweigh benefits. Although positive effects are often described as continuing well beyond the experience (e.g., carryover of insight, lessened fear), it is the negative aftereffects that often lead to discontinuance or sharp reductions in use. Necessary allowances for next day recovery underlie the infrequent use reported by many of the respondents in our study (particularly professionals), who state that job, school, and family demands rarely allow for what they consider to be a "two-day experience" [72].

There is wide variability as to the perceived severity of aftereffects. Some individuals report frequent use with minimal problems, whereas others quickly discontinue use. As with other stimulants, individuals under the influence of MDMA are often capable of ingesting large quantities of alcohol with few immediately discernible effects. As a consequence, overuse of alcohol plays a significant role in many of the next day hangovers. What could be a potentially toxic interaction between MDMA and alcohol merits further investigation.

Factoring in a number of common culprits (e.g., taking too much too often, overindulging in alcohol or other drugs) offers a significant, yet incomplete, explanation for differences in perceived severity of negative aftereffects. Users are often aware of and attempt to control for a number of readily identifiable factors that contribute to the next day's hangover. Nevertheless, some users still complain of varying degrees of problematic aftereffects (fatigue, malaise, headaches) that often persist for a day or two (and in rare cases longer) after taking MDMA [10, 12, 70].

In earlier articles, I speculated from my observations of users that MDMA may have an adverse action on the immunological response of some individuals [10, 12]. This effect was most often (but not always) associated with repeated high dosage use, particularly in long-term users. Such individuals frequently complained of increasingly uncomfortable and prolonged "burnout" periods and reported an increased susceptibility to various ailments, particularly sore throats, colds, flus, herpes outbreaks, and bladder infections. Such reactions were rare among novice users and individuals in good physical and mental health. Since these problems have been noted by only a small number of respondents in our current study, the significance of such findings remains in question. Such problems are probably comparable to what might be expected from the overuse of other sympathomimetic substances (e.g., the

amphetamines). Further study would be useful in addressing this concern.

In addition to valid concerns regarding potential neurotoxicity or negative aftereffects, we have seen the emergence of user mythologies, spawned by erroneous media reports and hard-to-trace rumors of the drug's toxic potential. A primary problem has been the frequent confusion of MDMA with various synthetic opiate analogues, commonly referred to as "designer drugs." This label has been applied to the intentional process of chemically engineering existing controlled substances to create legal substitutes that possess similar psychoactive properties [73]. Although MDMA is often referred to as a designer drug, such a designation is debatable, since it was first synthesized in 1912, before the passage of any national drug legislation. The primary designer drugs are synthetic opiate analogues employed as substitutes for heroin. The use of these substances has resulted in significant problems: MPTP has been associated with Parkinson's disease, while the extremely potent fentanyl analogues have been responsible for a large number of fatal overdoses. Unfortunately, MDMA has often been confused with these drugs, both in the media and on the street, resulting in a number of erroneous beliefs [21].

Another surprisingly common belief (particularly among college students on the West Coast) is that MDMA somehow "drains the spinal fluid" or "fuses the spinal cord." Neck and backaches that occasionally follow MDMA use probably contributed to the formation of this user mythology [12, 21].

Psychological problems associated with MDMA use appear to be rare but are potentially troublesome when they do occur. Although MDMA enjoys a reputation for producing an "easy-to-handle" experience, infrequent panic reactions and/or hyperventilation during the initial onset of the high (the "rush" phase) have been noted. I have found this to occur most often with novice users who become overwhelmed by the sudden power of the initial rush. Fearing that this is simply a portent of worse to come, they then succumb to a generalized panic reaction. Reassurance that this "peak" phase is transitory generally lessens the problem [10, 12, 66].

Very little data exists regarding prevalence and types of psychological problems associated with MDMA use. What little information is available regarding the treatment of MDMA-related psychological problems comes from the Haight–Ashbury Free Medical Clinic. In 1985, they reported that three to four individuals a month sought treatment for problems related to MDA, MDMA, or related drugs [12]. This number represented less than 1% of their entire case load and has significantly decreased since that time. Unfortunately, it is impossible to discern whether this decline can be attributed to lessened use or changing patterns of use associated with a more informed user subculture. Many of the clients appearing at the clinic present acute symptoms that include anxiety, rapid pulse, and in advanced cases, paranoia. Unlike abusers of other substances, these clients rarely returned for further treatment, leading to speculation that they were novice users who had learned their lesson [74]. According to Seymour:

With MDMA and the methoxylated amphetamines, as is the case with most stimulants and psychedelics, the acute toxicity symptoms that are usually seen in treatment are similar and result from taking too much of the drug. These dose-related symptoms usually dissipate as the drug wears off, and the patient can be discharged within a few hours [12].

More chronic psychological problems have recently been noted by the Haight–Ashbury Free Medical Clinic. A "delayed anxiety disorder" has been observed in a few individuals following an MDMA experience. The problem typically occurs among novice users of MDMA, with manifestations ranging from mild anxiety or depression to more full-blown symptomatology [12]. Although rare, these initial findings underscore a potential danger underlying unsuccessful attempts at "self-therapy" by individuals who run the risk of exacerbating emotional problems with unsupervised use.

During the administrative law hearings, the DEA attorneys attempted to establish that MDMA possesses the "high potential for abuse" criteria necessary for a Schedule I placement. In support of their contention, they cited two animal studies which found that most primates will self-administer MDMA at regular intervals (although less frequently than cocaine) [75–76].

The attractive qualities frequently ascribed to the "Ecstasy" experience certainly suggest a high abuse potential. Although Seymour [12] and others have stated that MDMA doesn't seem to pack a "euphoric punch" or "rush" comparable to other drugs, just the opposite appears to be true. Among individuals in our study who have tried both MDMA and cocaine, many express a clear preference for the longer, smoother euphoria provided by MDMA. One could assume that a significant number of MDMA users would eventually experience major problems from overuse.

Nevertheless, in sharp contrast to cocaine, this does not appear to be the case with MDMA, at least among current user groups. In testimony submitted on the DEA's behalf, Siegel noted from his exploratory study that the most common patterns of MDMA use were "experimental" (ten times or less in a lifetime) or "social-recreational" (one to four times per month). He went on to state that "compulsive patterns marked by escalating dose and frequency of use have not been reported with MDMA users" [66].

Our preliminary findings generally support Siegel's observations on use patterns. The most frequent use of MDMA tends to occur during the months following the initial experience. After first exposure, a small minority of individuals attempt to continually re-experience the positive aspects of the drug. This abusive cycle tends to be brief, however. Within a short period of time, the frequent use of MDMA almost invariably produces a strong dysphoric reaction that is only exacerbated with continued use. The increasing number of unpleasant side effects, coupled with an almost total loss of desired effects, appear to occur with greater rapidity and intensity than they do with other more commonly abused substances.

In agreement with Siegel's findings, respondents in our study who continue to use MDMA almost invariably do so in a controlled, infrequent manner. Nevertheless, a very small minority of our respondents describe "binging" with MDMA upon occasion, in a manner similar to their use of cocaine — sometimes individually going through a half gram or more of MDMA in an evening. In addition, approximately 10% of our respondents have reportedly taken MDMA over 100 times, usually over a time period of five or more years. This stands in contrast to Peroutka's sample of 100 undergraduates where 38 was the maximum number of experiences and the vast majority had taken it less than 10 times [70]. The major reason for this disparity in number of experiences was our intentional oversampling of frequent and long-term users, who tend to be much older than the undergraduate sample.

In attempting to establish MDMA's abuse potential, the DEA attorneys cited commonly accepted drug problem indicators (e.g., seizures, drug treatment, and emergency room admissions) to support their contention. However, proponents reversed this argument by nothing the remarkable dearth of reported problems considering the DEA's own estimates of MDMA use [10, 12]. Their contention was later supported by Newmeyer's epidemiological review of drug problem indicators, which concluded that MDMA "has given hardly any indication that it is a problem for Americans, either in terms of adverse reactions, treatment admissions, or police involvement" [77].

It appears that chronic binging or other problematic use patterns are rare among current MDMA users. However, since the popularity of MDMA is fairly recent, more time is needed to see how long-term patterns develop among current user groups. In addition, continued research is necessary to adequately assess MDMA's abuse potential for new user groups introduced to the drug. It could prove to be a self-limiting phenomenon among certain user groups, while others encounter significant problems related to overuse and/or more potent routes of administration (e.g., I.V. use). As Newmeyer cautions:

> It may well be that MDMA currently enjoys controlled, careful use by a number of cogniscenti, somewhat as LSD did around 1960. Perhaps in future years, a much larger number of less sophisticated individuals will be drawn into MDMA usage and will find ways to evince adverse reactions, police involvement, and other unpleasant consequences from use of the drug [77].

Finally, one must consider the public health implications surrounding the scheduling of MDMA. For a short time, the outlawing of MDMA led to increased interest in the development and sale of other, still legal, methoxylated amphetamines [21]. However, users generally found these substances to be lacking in comparison to MDMA. A small number of our respondents reported having tried the most popular of these — MDE ("Eve"). They gave it mixed reviews, with all preferring MDMA. Nevertheless, following

MDMA's scheduling, "Eve" quickly replaced "Adam" in some Dallas bars [23]. However, the "designer drug" legislation that passed in 1986 put a damper on this maneuver by outlawing the sale of controlled substance analogues [46].

The demise of street drug analysis in recent years adds to the difficulty of ascertaining what effect (if any) MDMA's newly controlled status has had on street quality and availability. Although analysis results have generally shown high levels of purity for MDMA samples submitted before scheduling, not enough information is available since scheduling [63]. Nevertheless, one can anticipate an increase in problems resulting from bathtub chemistry and increased adulteration, which are commonly associated with other illicit drugs. Considering MDMA's narrow dose range, these factors could present significant problems to users.

5. CONCLUSIONS AND RECOMMENDATIONS

The scheduling of any substance has obvious public health implications. As previously discussed, the placement of MDMA into Schedule I has significant ramifications regarding both therapeutic research and recreational use. As Smith, Wesson, and Buffum pessimistically conclude:

> Moving a drug to Schedule I does not stop illicit availability. The whole notion of controlled drugs is a misnomer. Nothing is so out of control as those drugs the DEA and FDA have appropriated to Schedule I. Moving a drug to Schedule I does, however, have consequences. Price generally increases, the quality control of licit manufacture is destroyed, and responsible research becomes almost impossible. MDMA, a drug with low abuse potential and possible therapeutic use, is the latest victim of our misguided drug control policies [78].

The MDMA controversy did succeed in challenging many of the basic precepts underlying the Controlled Substances Act. The Administrative Law Judge was not alone in his frustration regarding the limitations of the five available schedules and the vagaries of the criteria utilized in determining proper placement into them [79]. In describing the dilemma facing him, the judge noted that four of the five schedules are reserved exclusively for substances possessing demonstrated medical value and safety. These drugs are placed in differing schedules depending on their potential for abuse (II is the highest and V the lowest). Attempts to control substances of unproven medical value and safety have only one available option — Schedule I. However, the criteria necessary for inclusion in this schedule specifically state that the substance must possess a *high abuse potential*. Recognizing this gap in the Controlled Substances Act, the judge concluded that:

> The Acting Administrator should decide that a substance that has a potential for abuse less than a *high* potential, and no currently accepted medical use in treatment in the United States, cannot lawfully be placed in any of the five schedules established by

the Controlled Substances Act of 1970. The terms of the Act do not permit it. No amount of poring over legislative history empowers us to close the obvious gap left in the statutory scheme [79].

Since MDMA proponents fell far short of meeting the FDA's exacting specifications regarding safety and accepted medical use, the third criterion pertaining to abuse potential became even more significant. Of interest here is the process that determines whether a substances possesses the "high potential for abuse" necessary for inclusion into Schedule I. This was a key concern for both camps, as a result of the above-mentioned gaps in the Controlled Substances Act.

A number of ill-defined problems arise in any attempt to assess the abuse potential of various substances. Should any non-medical use of a psychoactive drug automatically be considered abuse? Even utilizing more exacting definitions of abuse (e.g., problematic use characterized by dysfunction or other negative consequences) still encounters problems regarding where to draw the line between low, moderate, or high abuse potential, since practically any psychoactive substance (licit or illicit) will be abused by at least some individuals.

The DEA's interpretation of abuse potential was repeatedly challenged by proponents, as well as by the Administrative Law Judge [2, 5, 37, 78, 80]. It appears that the DEA arbitrarily defines any recreational use of certain kinds of substances as evidence of abuse [19, 81–82]. However, what criteria are actually employed to differentiate drugs with low, medium, and high potentials of abuse?

It appears that three different standards are currently employed by the DEA in assessing abuse potential: one for such highly abused drugs as alcohol and tobacco, which are intentionally exempted from the scheduling process; another for medically accepted drugs found in Schedules II–V; and a final one reserved for those substances placed in Schedule I. An examination of Schedules II–V provides a fairly good ordering of drugs regarding their respective abuse potentials. Looking at opiates, for example, one can understand why morphine is in Schedule II (high abuse potential) while codeine cough syrups are in Schedule V (low abuse potential).

Comparison of abuse potential becomes increasingly problematic when examining those substances that have been placed in Schedule I. Although the inclusion of drugs such as PCP certainly makes sense, the rationale for other substances is less convincing. This is particularly true of the numerous psychedelic drugs found in Schedule I. How could an obscure drug such as ibogaine be determined to possess a high potential for abuse necessary for a Schedule I placement? This substance is used ritualistically among certain African cultures and remains virtually unknown in the United States [27].

Although LSD and psilocybin have certainly been abused by some individuals, one might question whether their abuse potential is substantially

greater than that of diazepam (Valium®). Diazepam is a popular street drug possessing significant addiction potential and frequently cited in emergency room admissions [83–84]. Nevertheless, it is listed in Schedule IV, which is reserved for those substances possessing only a low potential for abuse. Assume for a moment that diazepam had no authorized medical uses. If that were the case, would it then be placed into Schedule I as a result of its street reputation and abuse potential? If so, Schedule I can then be seen as a catch-all for certain kinds of drugs lacking FDA approval regarding accepted and safe medical use, regardless of their actual abuse potential relative to other substances. Ultimately, as Seymour contends:

"What is being called into question is not just the control of one drug that may or may not have a high abuse potential. The core issue is one of scientific inquiry and medical progress and how these are to be balanced against public safety and integrity" [12].

In concluding that MDMA did not meet any of the three criteria necessary for a Schedule I placement (high abuse potential, no currently accepted medical use, and lack of safety of use under medical supervision), the Administrative Law Judge presented a significant challenge to his agency's interpretation of the scheduling process [37]. Although his findings were later rejected by the DEA Administrator [39] and largely overruled by the First Circuit Court [44], they nonetheless highlighted the troublesome dilemmas associated with attempting to apply the DEA's and FDA's understanding of these criteria to MDMA and other psychedelic substances.

The administrative law hearings also revealed an obvious lack of research in assessing both the potential benefits and harms of MDMA. The overall epidemiology of use was clearly a mystery as well. Consequently, both sides were limited to offering testimony based largely on anecdotal data or extrapolations from preliminary animal studies. The most significant point of agreement between the two camps was in recognizing the obvious need for more research to better determine the potential benefits and risks of a substance that was becoming a "drug of choice" for increasing numbers of Americans.

Since the hearings, MDMA research has primarily centered on various animal studies conducted to assess the neurotoxicity question. The importance of this research emphasis is highlighted by the fact that its eventual resolution will largely determine if and when needed human studies of MDMA's therapeutic potential are allowed to resume.

An additional research priority should focus on studying individuals who have taken or were prescribed various suspected neurotoxins, particularly fenfluramine. For obvious reasons, the invasiveness required of many physiological techniques necessitates extrapolations from animal data. Nevertheless, researchers have already begun to conduct spinal taps and other physiological and psychological measures on MDMA users [85]. Unfortunately, a number

of methodological problems present significant challenges to the validity and reliability of these studies. There are always problems with attempts at collecting retrospective data from recreational users regarding total number of uses, dosage amounts, and purity of product, as well as frequently extensive use of other drugs. Even more importantly, most MDMA users have short use histories, frustrating attempts at addressing the long-term implications of MDMA use.

One option that would overcome many of the problems described above entails a study of individuals who were given MDA in research or therapeutic settings back in the 1960s and early 1970s [86–89]. Locating an adequate sample from this relatively small group would overcome many of the problems regarding dosage and purity, while also addressing the long-term implications of a substance suspected of being more neurotoxic than MDMA.

An even better alternative calls for studying users of fenfluramine, a substance that produces serotonergic changes similar to MDMA in roughly the same equivalent dose range. In contrast to MDMA users, it can be anticipated that individuals prescribed fenfluramine will have better recall of total doses (assisted by prescription records) and assurance of product purity. In addition, as a result of fenfluramine being prescribed for daily use (often for lengthy periods of time), users will frequently have longer exposure to greater amounts of a suspected neurotoxin than their MDMA counterparts. Perhaps most significantly, the fact that fenfluramine has been prescribed for over two decades will address the long-term significance of current findings. As such, it may shed some light on the MDMA controversy, while assessing a potential public health problem that remains almost totally unknown among users and prescribers of fenfluramine.

Unfortunately, the paucity of epidemiological research continues to frustrate an adequate assessment of overall extent, patterns, and changes in MDMA use over time. Almost all we have to rely on are the extremely rough estimates of use provided at the administrative law hearings in 1985. These reports cited almost exponential increases in MDMA use up to that time. What has happened since then?

A wide divergence of opinion currently exists as to whether the overall use of MDMA has increased, decreased, or stayed the same since its scheduling in 1985. With but one exception, there have been no additional published estimates of use. This exception was Peroutka's 1987 survey of 369 undergraduates, which found that an astonishing 39% had reportedly tried MDMA [70–71]. The survey provided valuable data regarding student use patterns and perceived effects. Unfortunately, the fact that it was a convenience sample seriously challenges its validity in accurately estimating the extent of MDMA use.

With the exception of a small number of deaths associated with MDMA use (examined elsewhere in this volume), the usual problem indicators remain silent, with only infrequent reports of hospitalizations, arrests, or treatment

admissions. Lacking any valid estimates of use, this quiescence can be interpreted in many ways. One could alternately attribute this low reportage of MDMA-related problems to minimal levels of use and/or abuse; its illicit status, which inhibits people from seeking treatment; responsible and informed user groups; and/or low toxicity of the drug.

The current lack of valid epidemiological data seriously undermines an accurate public health appraisal of MDMA use. Even if MDMA was found to cause a particular physiological or psychological problem, the overall significance and societal implications of such a finding would largely depend on a number of epidemiological factors of which we currently know little or nothing. For example, let us imagine that research establishes that MDMA does indeed cause some form of significantly harmful neurotoxicity but only in cases involving high dosage-binge use, as opposed to the more common pattern of infrequent ingestion of low to moderate doses. Good epidemiological data would prove invaluable in providing some idea as to the general prevalence of binge use and the user groups commonly associated with it. As a result, public health warnings or interventions could be quickly and appropriately designed in a cost-effective fashion for target populations at risk.

With these considerations in mind, it is essential to obtain better epidemiological data on MDMA use. Our current lack of knowledge underscores the need for additional exploratory research. Because MDMA is such a new drug on the street, user subcultures or "social worlds" are just beginning to develop. Out of these social worlds, a body of "user folklore" evolves that informs and conditions individuals to accept certain norms as to appropriate and inappropriate use, overall expectations, and perceived benefits and harms. In essence, the user subculture becomes remarkably effective in defining and/or influencing the attitudes, use patterns, and overall drug experience of the individual user.

The power of user expectations in shaping the drug experience has significant public health implications. Utilizing marijuana and LSD as examples, Becker noted that as both substances became popularized, there appeared to be a growing consensus among users regarding appropriate set and settings, expectations, and perceived benefits and risks. He then went on to demonstrate how the development of a drug-using subculture tended to minimize adverse reactions and redefine the drug experience as something positive (rather than "going crazy") [90]. These ideas were later given credence by Bunce, who found a sharp decrease in LSD-related emergency room admissions in the late 1960s and early 1970s despite continued increases and eventual stabilization of LSD use during that time [91].

MDMA presents a particularly interesting research challenge since it happens to be a new and unique substance that may still be gaining in popularity, yet remains unknown throughout much of the country. As such, it allows us the rare opportunity to examine how the process of gradually evolving user subcultures actually unfold.

The significance of current research findings greatly depends on knowing the actual extent and various patterns of MDMA use. A larger, more representative survey of MDMA use would allow us to test many of the theories or hypotheses emerging from our exploratory research on broader populations.

For a variety of reasons, implementing such a survey would not be an easy endeavor. MDMA's illegality and small user population provide formidable obstacles to obtaining a representative sample of users. An obvious solution would be the inclusion of MDMA questions in one or both of the well-respected high school senior or household surveys [92, 93]. Owing to its recent emergence and small user population, MDMA has not been covered in these national surveys. Unfortunately, it is also unlikely to be included in the near future, considering the significant limits placed by time factors on the allowable number of separate drug categories. In fact, the tendency of most surveys has been to lump all psychedelics (often including PCP) together as a result of their comparatively small user populations. Therefore, a survey of MDMA use should also gauge levels of other psychedelic use as well.

Failing inclusion in these larger studies, the remaining strategy calls for conducting an anonymous and representative survey of a much smaller sample. Certain considerations dictate the best choice of target population in attempting to obtain a representative sample of MDMA users. Although MDMA use appears to be increasing, the number of users remains small compared to the total population of the nation. The two major user groups appear to be college students and young professionals. Attempting to obtain a representative sample of the latter group large enough to include MDMA users faces seemingly insurmountable obstacles from cost considerations alone. Although high schools provide fairly representative samples for particular age groups, the number of high school users appears to be too small at this time to justify the time and expense involved in a survey.

This leaves colleges, where we have identified what appears to be the largest proportion of MDMA users. The challenge lies in gaining the needed cooperation of selected schools across the country in constructing a survey that could be implemented anonymously to a representative sample of students. Obviously, such a survey would only tell us about users at particular colleges. Nevertheless, it would provide a needed perspective on perceived benefits, harms, and extent and patterns of use among a significant population of MDMA users. It could also prove extremely useful in examining student use of other drugs as well.

Media accounts and various professionals in the drug field have often dismissed MDMA as a short-term fad. Such an observation seems safe, considering the significant reduction in the use of most illicit drugs in the 1980s, particularly among those groups commonly associated with MDMA use. Nevertheless, MDMA may prove to be an exception to this trend. The surprising percentage of users found in Peroutka's study, combined with our preliminary findings from both dealer and user interviews, strongly suggests

that MDMA remains extremely popular among current user groups, while slowly spreading to new populations.

In a manner reminiscent of media portrayals of LSD two decades before, a recent *New York Times* article proclaimed that MDMA "has soared in popularity this year, occupying center stage in a wider social drama combining fashion, music, and youthful restlessness" [94]. Not mentioned in the article is the fact that this new scene originated in London nightclubs, where it is commonly referred to as "Acid House." Possessing "its own music, dress code, and language," a London periodical reports:

> Record and fashion industries have been rushing to catch up with the fad, and even commercial radio disc jockeys have drawn on the ecstatic commentary devised by their counterparts in nightclubs. What many appear to ignore is that the drug may not be so much part of the cult, as the point of it [95].

As of this writing, the only sizeable "Acid House" following in the United States appears to be in Manhattan. Whether the popularity of MDMA grows as a result of this phenomenon remains to be seen. However, one should not underestimate the potent combination of marketing savvy and media sensationalism in contributing to increased curiosity throughout the country.

Regardless of any particular "fad" appeal, there remain a number of more enduring reasons why MDMA has become a "drug of choice" for many Americans. Whether taking MDMA for primarily therapeutic or recreational purposes, most users praise the remarkable ease with which the high itself is usually experienced. The therapeutic and euphoric qualities associated with MDMA, combined with this relative ease of experience, are likely to attract new users in spite of the current anti-drug climate. As the author of a recent article titled "Drugless in L.A." described it, "For veterans of the 60s, it is interesting to note that the major new drug of the 80s, Ecstasy, has been hyped as a drug that is not really a drug" [96].

As this chapter has sought to demonstrate, MDMA is indeed a powerful drug with potential benefits and harms that are likely to have profound public health implications. Given how little we really know about MDMA and its users, the obvious recommendation is for more research exploring all facets of this fascinating yet controversial substance.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the efforts of Drs. Marsha Rosenbaum and Patricia Morgan, as well as those of other researchers involved with this study: Joel Brown, Jennifer Ham, Deborah Harlow, Lynne Jackson, Doug McDonnell, and Sheigla Mörphy.

REFERENCES

1. Shulgin, A., 1985. What is MDMA? PharmChem. Newsletter 14(3):3–5, 10–11.
2. Greer, G., 1985. Written Testimony Submitted on Behalf of Drs. Grinspoon and Greer,

Professors Bakalar and Roberts, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
3. Grinspoon, L., 1985. Written Testimony Submitted on Behalf of Drs. Grinspoon and Greer, Professors Bakalar and Roberts, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
4. Lynch, R.D., 1985. Written Testimony Submitted on Behalf of Drs. Grinspoon and Greer, Professors Bakalar and Roberts, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
5. Strassman, R.J. 1985. Written Testimony Submitted on Behalf of Drs. Grinspoon and Greer, Professors Bakalar and Roberts, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
6. Wolfson, P.E. 1985. Written Testimony Submitted on Behalf of Drs. Grinspoon and Greer, Professors Bakalar and Roberts, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
7. United States Department of Justice, Drug Enforcement Administration, 1985. Fact Sheet.
8. Sapienza, F., 1985. Written Testimony Submitted on Behalf of Drug Enforcement Administration. United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
9. Holsten, D.W. and Scheister, D.W., 1985. Controls over the manufacture of MDMA. California Society for the Treatment of Alcohol and Other Drug Dependencies News 12: 14–15.
10. Beck, J., 1986. MDMA. The popularization and resultant implications of a recently controlled psychoactive substance. Contemp. Drug Problems 13(1):23–63.
11. Nichols, D.E., 1986. Differences between the mechanism of action of MDMA, MBDB, and the classic hallucinogens. Identification of a new therapeutic class: entactogens. J. Psychoactive Drugs (18):305–313.
12. Seymour, R.B., 1986. MDMA. San Francisco: Haight Ashbury Publications.
13. Dye, C., 1982. XTC: The chemical pursuit of pleasure. Drug Survival News 10(5):8–9.
14. Mullen, F.M., 1984. Schedules of controlled substances placement of 3,4-methylenedioxymethamphetamine into Schedule I. Fed. Regis. 49(146):30210–30211.
15. Getting high on 'ecstasy.' Newsweek, April 15, 1985, p. 96.
16. Kueny, S., 1980. Report on a study to examine the feasibility of using 3,4-methylenedioxymethamphetamine (MDMA) to facilitate psychotherapy. Unpublished paper.
17. Greer, G., 1983. MDMA: A new psychotropic compound and its effects in humans. Self-published.
18. Beck, J. and Rosenbaum, M. 1988. The scheduling of MDMA ("Ecstasy"). In *Handbook of Drug Control in the United States* (Inciardi, J.A., ed.). Westport, CT: Greenwood Press.
19. Sapienza, F. 1986. MDMA and the Controlled Substances Act. Paper presented at MDMA: A Multidisciplinary Conference, San Francisco.
20. Lawn, J.C., 1985. Schedules of controlled substances. Temporary placement of 3,4-methylenedioxymethamphetamine (MDMA) into Schedule I. Fed. Regis. 50(105):23118–23120.
21. Beck, J. and Morgan, P.A., 1986. Designer drug confusion: A focus on MDMA. J. Drug Educ. 16(3):287–302.
22. Ricaurte, G., Bryan, G., Strauss, L., Seiden, L., and Schuster, L., 1985. Hallucinogenic amphetamine selectively destroys brain serotonin nerve terminals. Science 229:986–988.
23. The trouble with Ecstasy, 1985. Life, September, pp. 88–94.
24. Cohen, S., 1960. Lysergic acid diethylamide: Side effects and complications. J. Nerv, Ment. Dis. 130:30–40.
25. McGlothlin, W.H. and Arnold, D.O., 1971. LSD revisited. A ten-year follow-up of non-medical LSD use. Arch. Gen. Psychiat. 24:35–49.
26. Brecher, E.M. and the editors of Consumer Reports, 1972. *Licit and Illicit Drugs*. Mt. Vernon, NY: Consumers Union.
27. Grinspoon, L. and Bakalar, J.B., 1979. *Psychedelic Drugs Reconsidered*. New York: Basic Books.
28. Kleinman, J.E., 1985. Rebuttal Testimony Submitted on Behalf of Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.

29. Sheahan, J.M., 1985. Rebuttal Testimony Submitted on Behalf of Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
30. Snyder, L., 1985. Rebuttal Testimony Submitted on Behalf of Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
31. Tocus, E.C., 1985. Written Testimony Submitted on Behalf of Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
32. Shulgin, A.T., 1988. Personal communication.
33. Docherty, J.P., 1985. Written Testimony Submitted on Behalf of Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
34. Shannon, H.E., 1985. Rebuttal Testimony Submitted on Behalf of Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
35. Downing, J., 1986. The psychological and physiological effects of MDMA on normal volunteers. J. Psychoactive Drugs 18:335–340.
36. Docherty, J.P., 1985. Oral Testimony Given at Drug Enforcement Administration Hearings — Washington, D.C., October 11.
37. Young, F.L., 1986. Opinion and Recommended Ruling, Findings of Fact, Conclusions of Law and Decision of Administrative Law Judge, Submitted in the Matter of MDMA Scheduling. Docket 84-48, May 22.
38. Stone, S.E. and Johnson, C.A., 1986. Government's Exceptions to the Opinion and Recommended Ruling, Findings of Fact, Conclusions of Law and Decision of the Administrative Law Judge, Submitted in the Matter of MDMA Scheduling. Docket No. 84-48, June 13.
39. Lawn, J.C., 1986. Schedules of controlled substances. Scheduling of 3,4-methylenedioxymethamphetamine (MDMA) into Schedule I of the Controlled Substances Act Fed. Regis. 51(198):36552–36560.
40. Harbin, H., 1988. MDMA. Narcotics, Forfeiture and Money-Laundering Update. United States Department of Justice 2(1):14–19.
41. United States vs. Caudle, 1987. 828 F. 2d 1111 (5th Circuit Court).
42. United States vs. Spain, 1987. 825 F. 2d 1426 (10th Circuit Court).
43. United States vs. William Waldo Emerson, 1988. 88 F. 2d 3106 (9th Circuit Court).
44. Grinspoon, M.D. vs. Drug Enforcement Administration, 1987. 828 F. 2d 881 (1st Circuit Court).
45. Lawn, J.C., 1988. Schedules of controlled substances: Scheduling of 3,4-methylenedioxymethamphetamine (MDMA) into Schedule I of the Controlled Substances Act; remand. Fed. Regis. 53(54):5158.
46. Controlled Substances Analogue Enforcement Act, 1986. 21 U.S.C. 802(32) and 813.
47. Doblin, R., 1988. A Proposal for Orphan Pharmaceuticals, Inc. Self-published.
48. U.S. Department of Health and Human Services, 1987. *Drug Abuse and Drug Abuse Research.* The Second Triennial Report to Congress from the Secretary of Health and Human Services. Rockville, MD: NIDA.
49. Seymoure, R.B., Wesson, D.R., and Smith D.E., 1986. Editor's introduction, MDMA: Proceedings of the conference. J. Psychoactive Drugs 18(4).
50. Cohen, S., 1965. LSD and the anguish of dying. Harper's 231:69–78.
51. Nichols, D.E., 1987. Discovery of novel psychoactive drugs: Has it ended? J. Psychoactive Drugs 19(1).
52. Smith, D.E. and Seymour, R.B., 1985. How the Federal Government classifies drugs: From medical use to abuse potential. High Times, August 30.
53. Barnes, D.M., 1988. New data intensify the agony over Ecstasy. Science 239:864–866.
54. Ricaurte, G.A., Forno, L.S., Wilson, M.A., DeLanney, L.E., Irwin, I., Molliver, M.E., and Langston, J.W., 1988. 3,4-methylenedioxymethamphetamine selectively damages central serotonergic neurons in nonhuman primates. JAMA 260(1):51–55.
55. Ricaurte, G., DeLanney, L., Irwin, I., and Langston, W., 1988. Toxic effects of MDMA on central serotonergic neurons in the primate: Importance of route and frequency of drug administration. Brain Res. 446:165–168.

56. Schmidt, C.J., 1987. Neurotoxicity of the psychedelic amphetamine, methylenedioxymethamphetamine. J. Pharmacol. Exp. Therap. 240:1.
57. Doblin, R., 1988. MDMA: Risk assessment and the FDA. Unpublished paper.
58. Researchers say "ecstasy" is dangerous, 1986. Associated Press, Jan. 16.
59. Cotton, R., 1988. Letter dated 6/5/88 to Secretary Margaret Heckler, Department of Health and Human Services, Washington, D.C.
60. Schuster, C.R., Lewis, M., and Seiden, L.S., 1986. Fenfluramine: neurotoxicity. Psychopharmacol. Bull. 22(1):148–151.
61. Johanson, C.E., 1985. Report from the University of Chicago Drug Abuse Research Center. Problems of Drug Dependence, 1984. Proceedings of the 46th Annual Scientific Meeting. The Committee on Problems of Drug Dependence, Inc. (Harris, L., ed.), NIDA Research Monograph 55. Rockville, MD: NIDA, pp. 78–81.
62. *1988 Physician's Desk Reference*, 1988. Oradell, NJ: Medical Economics Company, Inc., pp. 1694–1695.
63. Renfroe, C.L., 1986. MDMA on the street: Analysis Anonymous. J. Psychoactive Drugs 18:363–369.
64. A crackdown on Ecstasy, 1985. Time, June 10, p. 64.
65. Ecstasy: the lure and the peril, 1985. Washington Post, June 1, pp. 1,4.
66. Siegel, R.K. 1985. Direct Testimony Submitted on Behalf of the Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48.
67. Doblin, R., 1988. Personal communication.
68. Beck, J., 1987. MDMA. Drug Abuse Information and Monitoring Project, California Department of Alcohol and Drug Programs.
69. Siegel, R.K., 1986. MDMA: Nonmedical use and intoxication. J. Psychoactive Drugs 18:349–354.
70. Peroutka, S.J., Newman, H., and Harris, H., 1988. Recreational use of 3,4-methylenedioxymethamphetamine (MDMA, Ecstasy). *Neuropsychopharmacol.* 1:273–277.
71. Peroutka, S.J., 1987. Incidence of recreational use of 3,4-methylenedioxymethamphetamine (MDMA, "Ecstasy") on an undergraduate campus. N. Engl. J. Med. 317:1542.
72. Rosenbaum, M. and Morgan, P.A., 1988. Ecstasy use among professionals. Paper presented at the American Society of Criminology, Chicago, November.
73. Smith, D.E. and Seymour, R.B., 1985. Clarification of "designer" drugs. U.S. J. of Drug and Alc. Abuse, November.
74. Seymour, 1986. Personal communication.
75. Griffiths, R.R., Lamb, B., and Brady, J.V., 1985. A preliminary report on the reinforcing effects of racemic 3,4-methylenedioxymethamphetamine in the baboon. Document Submitted on Behalf of the Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84:48.
76. Harris, L.S., 1985. Preliminary report on the dependence liability and abuse potential of methylenedioxymethamphetamine (MDMA). Document Submitted on Behalf of the Drug Enforcement Administration, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84:48.
77. Newmeyer, J.A., 1986. Some considerations on the prevalence of MDMA use. J. Psychoactive Drugs 18(4):361–362.
78. Smith, D.E., Wesson, D.R., and Buffum, J., 1985. MDMA: "Ecstasy" as an adjunct to psychotherapy and a street drug of abuse. California Society for the Treatment of Alcoholism and Other Drug Dependences News 12(2):1–3.
79. Young, F.L., 1985. Opinion and recommended decision on preliminary issue. Submitted in the Matter of MDMA Scheduling, United States Department of Justice, Drug Enforcement Administration Hearings, Docket No. 84-48. June 1.
80. Reidlinger, J.E., The scheduling of MDMA: A pharmacist's perspective. J. Psychoactive Drugs 17(3): 167–171.
81. Baum, R.M., 1985. New variety of street drugs poses growing problem. Chem. Eng. News, September 9, pp. 7–16.
82. Shulgin, A.T., 1988. The Controlled Substances Act: A Resource Manual of the Current Status of the Federal Drug Laws. Self-published.
83. Woody, G.E., O'Brien, C.P., and Greenstein, R., 1975. Misuse and abuse of diazepam: An

increasingly common medical problem. Int. J. Addict. 10:843–848.
84. Budd, R.D., Walkin, E., Jain, N.C., and Sneath, T.C., 1979. Frequency of use of diazepam in individuals on probation and in methadone maintenance programs. Am. J. Drug Alc. Abuse 6:511–514.
85. Peroutka, S.J., Pascoe, N., and Faull, K.F., 1987. Monoamine metabolites in the cerebrospinal fluid of recreational users of 3,4-methylenedioxymethamphetamine (MDMA "Ecstasy"). Res. Commun. Substance Abuse 8:125–138.
86. Naranjo, C., 1973. The Healing Journey — New Approaches to Consciousness. New York: Random House.
87. Naranjo, C., Shulgin, A.T., and Sargent, T., 1967. Evaluation of 3,4-methylenedioxyamphetamine (MDA) as an adjunct to psychotherapy. Med. Pharmacol. Exper. 17:359–364.
88. Turek, I.S., Soskin, R.A., and Kurland, A.A., 1974. Methylenedioxyamphetamine (MDA) subjective effects. J. Psychedelic Drugs 6(1):7–13.
89. Yensen, R., DiLeo, F.B., Rhead, J.C., Richards, W.A., Soskin, R.A., Turek, B., and Kurland, A.A., 1976. MDA-assisted psychotherapy with neurotic outpatients: A pilot study J. Nerv. Ment. Dis. 163(4):233–245.
90. Becker, H.S., 1967. History, culture and subjective experience: An exploration of the social bases of drug-induced experiences. J. Health Soc. Behav. 8(9):163–176.
91. Bunce, R., 1979. The social and political sources of drug effects: The case of bad trips on psychedelics. J. Drug Issues, Spring:213–233.
92. Johnston, L.D., Bachman, J.G., and O'Malley, P.M., 1987. National Trends in Drug Use and Related Factors Among American High School Students and Young Adults. Rockville, MD: NIDA.
93. Miller, J.D., et al., 1983. *National Survey on Drug Abuse: Main Findings 1982.* Rockville, MD: NIDA.
94. Foderaro, L.W., 1988. A drug called "Ecstasy" emerges in nightclubs. The New York Times, December 11, p. 26.
95. The hyping of Ecstasy, 1988. The Illustrated London News, October, pp. 29–30, 32.
96. Kaye, E., 1986. Drugless in L.A.: The new trend is sobriety. New Age Magazine, May.