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DESIGNER DRUG CONFUSION: A FOCUS ON MDMA

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ABSTRACT

This article discusses the competing definitions and issues surrounding the various designer drugs, but is primarily devoted to an examination of MDMA, an increasingly popular substance often labeled as a designer drug. Also known as "Ecstasy" or "Adam," MDMA possesses both stimulant and psychedelic properties which combine to produce a unique effect desired by many users. The authors offer a rationale for why interest in MDMA will continue to grow despite the drug's recent illegality and the increasing evidence of neurotoxicity. MDMA's recreational attraction and therapeutic potential are discussed. Much more research is necessary to address both the potential benefits and risks of this controversial substance.

This article attempts to resolve some of the confusion and controversy surrounding groups of substances increasingly referred to as "designer drugs." In the process, we will discuss various synthetic opiate and phencyclidine (PCP) analogues that have been introduced on the street market with the primary intention of circumventing the law. The major focus of this article, however, centers on MDMA (3, 4-methylenedioxymethamphetamine). This is an increasingly popular substance that does not neatly meet the major criteria for the designer drug label, although it is often referred to as such. Nevertheless, we will explore why MDMA could have a much greater long-term impact on our society than all of the other so-called designer drugs combined.

DESIGNER DRUGS

The label "designer drugs" adds a catchy term to the substance abuse lexicon. Unfortunately, a good deal of confusion has been engendered by its varied application to particular drugs. This confusion can be better understood by examining the dual meaning that has arisen for the term. In one sense, a designer drug can be any substance that is tailor-made for specific selected effects. A large number of substances appearing throughout history could easily fit this definition. The pharmaceutical industry constantly attempts to market new products that meet consumer needs. For example, efforts are continually being made to create new antidepressants that provide faster-acting beneficial action with less anticholinergic side effects (e.g., dry mouth, blurred vision).

However, the more commonly accepted definition of designer drugs involves a process of chemically engineering existing controlled substances to create a drug that is not currently illegal. As Wesson defines them, these are "substances wherein the psychoactive properties of a scheduled drug have been retained, but the molecular structure has been altered in order to avoid prosecution under the Controlled Substances Act" [1, p. 1]. Charles Schuster, the Director of the National Institute on Drug Abuse (NIDA), recently testified before the House Subcommittee on Crime concerning this issue. He declared that:

> The danger these substances pose to the health and safety of Americans is at least as serious as that posed by their analogous parent compound in terms of overdose or neuronal damage and may pose increased toxic threats as a consequence of previously unknown impurities or unusual pharmacological properties due to the subtle chemical alterations. The number of potential synthetic analogs that theoretically can be made is very large and virtually anyone with a background in college chemistry can obtain the information necessary to synthesize them [2, p. 1].

Excluding MDMA and similar substances, three major types of designer drugs have been available recently on the street drug market. These are the synthetic analogues of phencyclidine (PCP), meperidine, and fentanyl.

PCP Analogues

Since the late 1970s, several PCP analogues occasionally have shown up in confiscated street drug samples. Because many of these substances were often found in combination with PCP, there is some question as to whether these compounds came about more as a result of sloppy synthesis than an actual attempt to create uncontrolled substances. One contaminant, the carbonitrile of phencyclidine (PCC), has been associated with violent gastrointestinal reactions and a few fatalities [3]. Schuster notes that although the synthesis of PCP analogues is relatively simple, such analogues have not presented major problems [2].

A Meperidine Analogue

The second type of designer drug is MPPP (1-methyl-4-phenyl-4-propionxy-piperidine), an analogue of meperidine (Demerol). This substance first appeared in the early 1980s, primarily in the San Francisco Bay Area. Unfortunately, a contaminant, MPTP (1-methyl-4-phenyl-1, 2, 3, 6-tetrahydropyridine), was also present in most samples. What followed was a combination of a fascinating detective story and a human tragedy, both of which are still evolving. MPTP has been found to be a potent neurotoxin that can induce irreversible Parkinson's Disease in individuals exposed to it. Preliminary results from a federally-funded study suggest that several hundred persons may have been exposed to MPTP [2]. Although only a few are currently in treatment for Parkinsonian symptoms, other individuals who used MPTP may be at significant risk later in life. This is because the neurotoxic damage has already occurred and may be augmented by losses of neural efficiency associated with aging. An article by Langston gives an intriguing account of a complex medical detective story and identifies, as a positive outgrowth of the tragedy, implications for research into Parkinson's Disease [4]. Although a sample of MPPP/MPTP was identified in Florida in 1985, it is doubtful that this drug will reappear in any quantity in the near future. In contrast to heroin, the substance produces a burning sensation upon injection and has effects (e.g., hallucinations) that differ from a normal opiate high.

Fentanyl Analogues

The third type of designer drug, the fentanyl analogues, also originated in California. Fentanyl itself is a narcotic frequently used in surgical procedures as a preanesthetic analgesic (marketed as Sublimaze). Fentanyl and most of its analogues have pharmacological properties similar to heroin or morphine. A significant difference, however, is that many of the fentanyl analogues are tens or hundreds of times more potent than heroin. In December 1979, "China White," or "synthetic heroin," began appearing on the streets. It was later found to be alpha methyl fentanyl, an uncontrolled substance. After it was made illegal, new and even more potent analogues, such as 3-methyl fentanyl appeared. Since 1980, some drug users who insisted they were addicted to heroin but whose urine results were negative began turning up in California methadone clinics. They were later found to be using one of the fentanyl analogues. This has led some researchers to estimate that up to 20 percent of the state's estimated 100,000 addicts might be regular users of one of the fentanyls [5, 6]. With effective doses in the microgram levels, the potential for overdose is the major hazard presented by these substances. So far, over 100 deaths have been attributed to the various fentanyl analogues, primarily among novice or occasional users, who possess a low opiate tolerance.

The advent of designer drugs, particularly the fentanyl analogues, led to the passage of a federal law allowing for the emergency scheduling of, that is,

designating as a controlled substance, any substance posing an "imminent hazard to public safety" [7, p. 23118]. This amendment to the Controlled Substances Act gives the acting administrator of the Drug Enforcement Administration (DEA) the authority to place such a drug into Schedule I for a period of one year (plus an additional six months, if necessary),while the final scheduling process is underway.[1]

In addition, Congress is currently considering new designer drug legislation. This will further dampen the enthusiasm of underground chemists who synthesize uncontrolled drugs (usually opiates) with the intention of making enormous profits with little or no risk. Unless a new analogue possesses actions that make it much more attractive than the substance it resembles, underground chemists will have little incentive to produce it, because it will be considered *a priori* a controlled substance. This certainly rules out MPPP and its frequent contaminant, MPTP, which even without the Parkinsonism problem did not provide a desirable high. The fentanyl analogues are more likely to stay around, especially when heroin is in short supply. These substances are relatively inexpensive to produce and possess a high that is preferred by at least some addicts over that of heroin [8, 9].

MDMA

This brings us to MDMA, which, along with other amphetamine and methamphetamine analogues, is often regarded as a designer drug. However, MDMA was first synthesized and patented in 1914, long before passage of the 1970 Controlled Substances Act. There is little doubt that its previously uncontrolled status encouraged at least some manufacturers and users.[2] However, it appears that MDMA became more popular than its Schedule I cousin, MDA (3, 4-methylenedioxyamphetamine), primarily because its effects were much more desirable. There have been reports of other still uncontrolled amphetamine and methamphetamine analogues on the street. To date, however, their popularity has been rather limited, despite their legal status. The remainder of this article is devoted to discussing the emerging popularity of MDMA, along with its possible social and health consequences.

MDMA, also known as "Adam," "Ecstasy," or "XTC," seems to possess a multiple personality. Many physicians and therapists view the drug as a valuable therapeutic aid, see minimal harm associated with carefully monitored use, and

[1] Of the five schedules provided by the Controlled Substances Act, Schedule I is reserved for those drugs possessing no recognized medical use and allegedly having a high potential for abuse (e.g., heroin, LSD).

[2] Employing its emergency scheduling power, the Drug Enforcement Administration temporarily placed MDMA in Schedule I on July 1, 1985. In response to therapists' and researchers' challenges, three federal administrative hearings were held to determine the final scheduling of MDMA. As this article was going to press, the administrative law judge in agreement with many of the therapists' arguments issued his recommendation that MDMA be placed in Schedule III of the Controlled Substances Act. The final decision by the DEA administrator is still pending. For a more thorough policy analysis, see [10, 11].

claim successful results in most cases [12-15]. Drug enforcement officials, on the other hand, see a dangerous substance with potentially harmful adverse effects, accompanied by increasing abuse outside of the therapeutic community [16-18].

The uniqueness of this substance can also be seen in the controversy generated over the proper terminology for MDMA [10, 11]. As an N-methyl analogue of MDA, it is related to both mescaline and the amphetamines. Although MDMA most commonly has been labeled a psychedelic drug, it possesses stimulant properties as well. Moreover, although the drug has been used for "mind altering" experiences, it is not hallucinogenic (except at very high doses) and thus rarely produces delusions or the mental confusion common to other psychedelics.

In terms of popular use, MDMA is essentially the successor to MDA, the counterculture "love drug" of the late 1960s and early 1970s. MDA first appeared on the streets in 1967 and became known as a drug which produced a sensual, easily managed psychedelic high [19]. After MDA was placed in Schedule I of the Controlled Substances Act in 1970, its use seemed to level off and gradually decline. Although MDMA first appeared on the street in the early 1970s, use remained very limited until the end of the decade. Of those who had experienced both drugs, the majority preferred MDMA. Beck gives three major reasons for this [10]: first, the stimulant side effects of MDA are more troublesome; second, MDMA has a greater perceived euphoric and therapeutic effect; and finally, the illegality of MDA undoubtedly drew some users toward MDMA, which was a legal substance until July 1985.

The growth of MDMA as a popular drug is also directly traceable to the media's coverage of its use by psychotherapists as a therapeutic adjunct. Pharmacologists Alexander Shulgin and David Nichols in 1978 contributed the earliest discussion of the psychological effects of MDMA. They stated that the drug "appears to evoke an easily controlled altered state of consciousness with emotional and sensual overtones" [20, p. 292]. A few years later, reports of the drug's contribution as a therapeutic adjunct began surfacing. According to most reports [10, 11], psychotherapists had been using the drug as part of therapeutic programs since the mid- to late 1970s and found it to be beneficial for a wide variety of patients.

It has been only recently, however, that the public has become aware of MDMA as a street drug. One reason for its popularity in Texas was undoubtedly the open sales of MDMA in well-patronized, mostly student-oriented bars and in gay bars. The blatancy of the sales presented a very public, and hence, potentially problematic drug use pattern to authorities [17, 21]. A major reason for MDMA's emergence in the rest of the country was the publicity accompanying the proposed scheduling. In 1985, *Newsweek* [22], *Life* [21], *Time* [23], and numerous other popular magazines printed major stories on the subject, often sensationalizing the reputed euphoric and therapeutic

qualities of MDMA. With the rise in publicity has been an increased street demand. In testimony submitted for the federal administrative hearings to determine final scheduling, psychopharmacologist Ronald Siegel stated that street use "escalated from an estimated 10,000 doses distributed in all of 1976 to 30,000 doses distributed per month in 1985" [24, p. 2]. The Drug Enforcement Administration (DEA) estimates that MDMA has spread throughout the country; the DEA bases its estimate on laboratory analyses from more than half the states [17]. MDMA now possesses a vocal, influential group of adherents, both in the professional psychotherapeutic community and among recreational users; they tend to be from well-educated higher socio-economic backgrounds, with both groups spread throughout the United States.

Although research examining recreational use patterns of MDMA has been minimal, the drug appears to be most popular in urban areas, especially college towns [10, 25].[3] Many users belong to groups who have traditionally been associated with MDA use. Prominent among these are gays and college students. *Newsweek* noted that MDMA "has become popular over the last two years on college campuses, where it is considered an aphrodisiac" [22, p. 96]. This reputation explains why MDMA seems to be increasing in popularity even among groups such as college fraternities, which are not traditional psychedelic users [10].

One of the first media accounts of MDMA described it as a "yuppie psychedelic" whose popularity was spreading rapidly among educated professionals in their thirties and forties. The article stated that "in contrast to the mind-bending hallucinogens of the '60s, Adam is reported to leave one's faculties fairly clear" [26, p. A2]. The same article quoted a drug abuse program director as noting that "some of these people haven't touched a psychedelic for ten or fifteen years, but cocaine is really scaring folks these days. They are turning elsewhere" [26, p. A2]. Many individuals describe using MDMA on occasion while claiming to rarely or never use other more commonly available illegal drugs or even alcohol [10, 11]. As the author of a recent article titled "Drugless in L.A." stated, "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" [27, p. 34].

MDMA's cost has ranged from $50 to $120 a gram, yielding five to fifteen doses per gram. The price has increased slowly since MDMA became illegal. The oral route is by far the most common method of ingestion, although some individuals occasionally inhale the drug. Intravenous (IV) use seems to be rare; users describe its effects as less satisfying than that provided by methamphetamine

[3] Most of the information available regarding street use of MDMA is based on anecdotal accounts given to the media, therapists, and substance abuse professionals, as well as preliminary research conducted by Jerome Beck [10]. Through his capacity as a drug educator and counselor at the University of Oregon and in the San Francisco Bay Area, Beck has been able to interview hundreds of individuals who reportedly used MDMA over the past ten years.

injection [11]. The oral method is generally preferred because it produces the longest, smoothest high with the least amount of stimulant side effects. At times a small quantity of MDMA will be swallowed or inhaled as a "booster" after the initial oral dose begins to wear off. A continuous use of boosters, however, generally leads to great fatigue the next day.

Although MDMA has been described occasionally as a "party drug," that is not its most common use pattern. Most individuals describe taking it with a small intimate group or another person, usually a close friend, spouse, or lover. As noted, a major exception was certain bars in the Dallas, Texas area, where tablets were purchased at the door or counter, and where, according to the Drug Enforcement Administration, 30,000 dosage units of MDMA a month were sold to one local dealer alone, right up until the scheduling ban [16].

The MDMA dosage range between effectiveness and toxicity is fairly narrow. The effectiveness threshold is around 50 mg, and toxic effects begin to increase sharply over the 200 mg dose level. The usual dose ranges from 100 to 150 mg, with 125 mg about average. Effects generally appear within twenty to sixty minutes, when the user experiences a "rush" usually described as mild but euphoric. The "rush" may last from a few minutes to half an hour or not occur at all, depending on the user's mental set and the environment, the dose ingested, and the MDMA's quality. Zinberg described a similar pattern with MDA in an early field study [28]. After the rush, the high levels off to a plateau usually lasting from two to three hours and followed by a gradual "coming down" sensation, ending with a feeling of fatigue. Insomnia, however, may persist long after the fatigue stage, depending on the dosage and the user.

MDMA, although milder and shorter-lasting than MDA, still exerts strong amphetamine-like effects on the body, including dilated pupils, dry mouth and throat, tension in the lower jaw, grinding of the teeth, and overall stimulation. The side effects are less troublesome when a small or moderate dose is taken by a healthy individual. Moreover, MDMA usually exerts a strong paradoxical effect of relaxation, bringing less attention to the side effects [10].

Other psychological side effects are also noted. Users cite a dramatic drop in defense mechanisms and increased empathy for others. Combined with the stimulant effect, this generally produces an increase in intimate communication. Although both MDA and MDMA have been labeled "aphrodisiacs," users most often report a more sensual experience. Researchers, too, have noted that both compounds enhance the pleasure of touching but interfere with erection in men and inhibit orgasm in both men and women [10, 11, 29, 30].

Psychotherapeutic Effects

Studies evaluating MDA as a psychotherapeutic tool preceded the use of MDMA for such purposes. They all described similar outcomes and unanimously supported the therapeutic potential of MDA [31-34]. Subjects described an

intensification of feelings, facilitation of self-insight, and heightened empathy as qualitative characteristics of MDA.

Zinberg published the only naturalistic study of either drug [28]. He interviewed twenty-three experienced MDA users either individually or in groups while they were high in natural settings. None of the users reported negative experiences: Zinberg observed no panic reactions or hallucinatory episodes with MDA use.

The most complete study of MDMA's effects published to date was conducted by Greer who administered the drug to twenty-nine subjects (none with severe mental disorders) in a therapeutic setting [35]. Most of the subjects were given an oral dose of 75–150 mg of MDMA. After about two hours, they were offered a second dose of 50–75 mg. Greer reported that all the subjects experienced some benefits. Each described feeling closer and more intimate with the others present, and almost all reported positive changes in their feelings and attitudes. Moreover, seventeen subjects reported some cognitive benefit (e.g., an expanded mental perspective and insight into personal patterns or problems). Follow-up questionnaires were given at a median time of about nine months after the last session, and the majority of subjects reported positive changes in work, relationships, mood, and attitude. Half reported decreased use of mood-altering drugs, often mentioning that these substances seemed less appealing after experiencing MDMA. According to Greer, "The ability not only to feel free of conflict—which can be provided by many drugs of abuse—but to learn how to prevent conflicts in everyday life seems unique to MDMA as a therapeutic adjunct" [35, p. 12].

Recently, several psychiatrists testified on behalf of MDMA at the federal administrative hearings concerning permanent scheduling. Wolfson cited optimistic results in the treatment of a few psychotic patients [15]. He concluded that "MDMA provides a positive alternative to the dark and negative experiences of people experiencing psychotic states" [15, p. 9]. In general, therapists attending the hearings believed that a major advantage of MDMA (less so with MDA) over the traditional psychedelics is that it produces far less distortion of sensory perception and fewer unpleasant emotional reactions. The 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 is in sharp contrast to the effects of most other psychedelics, where the experience is often perceived as unfamiliar and transpersonal. As Grinspoon asserts, "MDMA appears to have some of the advantages of LSD-like drugs without most of the corresponding disadvantages" [13, p. 3]. Although research suggests that MDMA has significant therapeutic potential, the notable absence of well-controlled, double-blind studies limits conclusions about the possible efficacy of MDMA in therapy. As Siegel recently noted, "MDMA has been promoted as a cure for everything from personal depression to alienation to cocaine addition. . . . It's got a lot of notoriety, but the clinical claims made for its efficacy are totally

unsupported at this time" [36, p. 14]. Researchers and therapists are aware that only formal, well-controlled research will adequately assess the true therapeutic value of MDMA. However, as Greer optimistically noted, "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" [12, p. 6].

Health Risks

Physiological problems – Although little is known about the potential toxicity for humans of MDA, MDMA, or any of the other amphetamine psychedelics, some research has assessed toxic and lethal doses in animals [37, 38]. Assuming the results of the data on animals can be generalized to humans, indications are that a lethal IV dose for 50 percent of 150-pound individuals would be about 1100 to 1780 mg. Thus, a lethal dose for injected MDMA may be a little over ten times the usual 100-150 mg dose. A recent study, however, suggested a much lower toxicity level when MDMA is ingested orally, approximately corresponding to 150 times the human therapeutic level [39].

Street use of MDA has been connected to a number of deaths, although not clearly, because other drugs were also involved [40]. Some deaths reported in 1972 and 1973 to be a result of MDA toxicity are now known to have occurred as a result of ingesting another amphetamine derivative: PMA (paramethoxyamphetamine) [41]. The PMA compound, frequently passed off as MDA, often caused a dangerous rise in blood pressure at effective doses. Fortunately, PMA appears to have been totally withdrawn from circulation [42].

Although a few deaths have been ascribed to the use of MDMA, later investigation revealed that the role played by the drug, if it was even involved, was questionable in most cases [43]. In addition, only twenty emergency room incidents for MDMA have been listed in the Drug Abuse Warning Network (DAWN) maintained by NIDA [44]. Ignorance of the substance undoubtedly contributes to underreporting, although the number of mentions still appears to be rather low when compared with the suspected extent of use described by Siegel [24].

Although associated with relatively few overdoses or deaths, MDMA's neurotoxic potential is cause for concern. Studies conducted at the University of Chicago indicate that large intravenous doses of MDA and MDMA in rats are associated with suspected degeneration of serotonergic nerve terminals in certain areas of the brain [45, 46]. Another recent study, which administered very large oral doses of MDMA to rats, supports those findings [47]. Schuster summarized these studies in his testimony before the House Subcommittee on Crime:

> A single dose of MDA can selectively destroy serotonergic nerve terminals in the brains of a variety of animal species. More recently, it has been shown that MDMA causes the same type of neuronal damage at even lower doses. The serotonergic system which is also present in man plays a role in regulating sleep, mood, sexual activity, and sensitivity to adversive

stimuli. It should be noted that the doses producing MDA neurotoxicity are very close to those producing amphetamine-like and LSD-like subjective effects. This suggests that, in order to produce significant psychological effects, humans may very well be exposing themselves to neurotoxic doses of these compounds [2, p. 4].

However, the University of Chicago researchers acknowledge that "Because of the differences in species, dose, frequency, and route of administration, as well as differences in the way in which rats and humans metabolize amphetamine, it would be premature to extrapolate our findings to humans" [46, p. 988]. In addition, our overall lack of knowledge concerning serotonin makes it extremely difficult to interpret the significance of these findings.

Although the MDMA experience is usually perceived as pleasurable and/or therapeutic, a number of acute and chronic problems have been identified. MDMA may exert an adverse action on the immunological response of some individuals. This effect is most often associated with repeated high dosages, particularly in individuals who have used the drug over a long period of time. Long-term users often describe increasingly uncomfortable and prolonged "burn-out" periods, sometimes lasting two or more days. Many individuals have also reported an increased susceptibility to various ailments, particularly sore throats, colds, flus, and herpes outbreaks [10]. These reactions appear to be rare in novice users and individuals in good physical and mental health.

Generally, many of the side effects of MDMA are similar to those of amphetamine. Weil noted that adverse reactions to MDA were dose-related [29]. One of the most common annoying effects is a tension of the jaw muscles, often progressing to involuntary grinding of the teeth, an effect also noted with MDMA and amphetamine-like drugs in general. 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. As with other stimulants, individuals under the influence of MDMA are often capable of ingesting large quantities of alcohol with few discernible effects until a short time later. Thus, overdose of alcohol likely plays a significant role in the next day's hangover [10]. The potentially toxic interaction between MDMA and alcohol merits further investigation.

One research project studied the effects of a single exposure to MDMA among twenty-one healthy individuals. All these 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 physiological effects which are transient and free of clinically apparent major toxicity [48, p. 5-6].

The research design of this experiment was heavily criticized by an FDA pharmacologist at the administrative hearings [49]. He concurred with the study's conclusion that "there is insufficient evidence to judge accurately either harm or benefit" [48, p. 6].

Based on the limited information available, researchers have identified the following medical conditions as possible contraindications to MDMA use: diabetes, diminished liver function, epilepsy, glaucoma, heart disease, hypertension, hypoglycemia, hyperthyroidism and pregnancy [10, 11, 35].

Psychological problems – Although less numerous, several potentially serious psychological problems have been associated with the use of MDMA. Rare episodes of hyperventilation have been noted [10, 11, 24]. These almost always occur during the onset of the experience as part of a generalized panic reaction. Reassurance that the phase is transitory generally lessens this problem.

The potential for dependency and/or abusive use patterns must also be addressed. Although Seymour [11] states that MDMA doesn't seem to pack a "euphoric punch" or "rush" comparable to other drugs, Beck [10] finds just the opposite to be true. Among individuals who have tried both MDMA and cocaine, the majority usually express a strong preference for the longer, smoother euphoria provided by MDMA. As one individual interviewed by the NIDA-funded Cocaine Cessation Project described it:

> Cocaine usually gives me an up-and-down jagged feeling that lasts for only a short time. I alternately like it and hate it, though for some reason it has very seductive qualities. "Ecstasy," on the other hand, is just as the name implies. It's "state of the art." It puts me in a place of total bliss for 3 or 4 hours. Whereas coke often makes me feel jittery, MDMA is very smooth. I know it has amphetamine in it, but I feel so relaxed. . . . [50].

The strong euphoria associated with MDMA points toward a high abuse potential. Recent studies at Johns Hopkins found that primates will self-administer MDMA at regular intervals (although not quite as frequently as cocaine) [18]. In sharp contrast to cocaine, however, there appear to be relatively few cases of what might be considered heavy abuse of MDMA [10, 11, 24, 35]. In an ongoing study of MDMA users, Seigel cited that the most common patterns of use are "experimental" (ten times or less in lifetime) or "social-recreational" (one to four times per month) [24]. He also said that "compulsive patterns marked by escalating dose and frequency of use have not been reported with MDMA users" [24, p. 2-3].

The most frequent use of MDMA usually occurs during the first months following the initial experience. After first exposure, some individuals will attempt to continually reexperience the positive aspects of the drug. However, this abusive cycle tends to be brief. Within a short time, the frequent use of MDMA almost invariably produces a strong dysphoric reaction, which is only exacerbated with continued use. The increasing number of unpleasant side effects

coupled with an almost total loss of desired effects occurs with greater rapidity and intensity than they do with other more commonly abused substances [10, 11, 35, 51]. However, since the popularity of MDMA is fairly recent, more time is needed to see how use patterns develop among various groups introduced to the drug.

Although rare, some additional psychological problems have recently been noted in an ongoing study conducted by Mim Landry of the Haight Ashbury Training and Education Project. For instance, high doses of MDMA occasionally produce a variety of symptoms ranging from a "caffeine-like jitteryness to a well-defined break with reality, accompanied by disordering of thought, mood, and behavior" [11, p. 55]. With lesser amounts of MDMA, psychopathology is more rarely displayed, although some restlessness, anxiety, and insomnia may occur. Symptoms for both acute high dose and chronic low dose problems seem to ease with cessation of use and resumption of healthy living patterns [11].

A "delayed anxiety disorder" has also been observed in a few individuals. This problem typically occurs among novice users of MDMA, and the manifestations "range from a mild anxiety or concentration difficulties to a full-blown disorder such as a panic attack with hyperventilation and tachycardia, phobic disorders, parathesias, or other anxiety states" [11, p. 56]. Usually, the drug was taken in a nonprofessional setting for quasi-therapeutic reasons. The project report notes, however, that:

> On the basis of interviews with several of these clients, it can be inferred that through taking MDMA, much of their repressed anxiety, hostility, guilt, or other so-called negative feelings were released into their conscious minds. Prior to the time that this suppressed material was released into conscious consideration, they were probably protected by their normal defense mechanisms. After the release of this material, they are undefended and conscious of what emotional and psychological work needs to be done. . . . In the cases we have observed so far, the clients seemed excellent candidates for psychotherapy before taking MDMA and most were comfortable with being told that psychotherapy was probably the treatment indicated for their present discomfort [11, p. 57].

These initial findings underscore a growing danger of unsuccessful attempts at "self-therapy" by individuals who run the risk of exacerbating their emotional problems with unsupervised episodes.

Although current legislation will most likely reduce the availability and types of designer drugs, regulation will probably have more impact on professional therapeutic use and research with MDMA than on recreational use [10, 11]. As Smith, Wesson, and Buffum conclude [52, p. 3]:

> 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.

CONCLUSION

Although media accounts occasionally describe MDMA as a short-term fad, this portrayal is most likely inaccurate. The perceived therapeutic and/or euphoric effects combined with the ease with which MDMA is usually experienced will continue to attract new users. Unfortunately, our current knowledge regarding almost every aspect of MDMA is extremely limited and based almost exclusively on anecdotal data. Therefore, research is greatly needed to determine the potential benefits and risks of a substance which is rapidly establishing itself in our drug culture.

The confusion and controversy generated by the designer drugs concept is an example of our expanding and increasingly complex "drug technology." Individuals of all ages are surrounded by an environment that advertises and encourages the use of an amazing array of licit and illicit substances. Vast amounts of money are spent each year in promoting prescription, over-the-counter, and recreational drugs. Private and government sources indicate that despite enhanced interdiction efforts, illegal drugs are so readily obtainable in most communities that one has to wonder if their easy availability is not advertisement enough. Unfortunately, the increase in types, numbers, and use of drugs has not been accompanied by sufficient increase in the public's knowledge of these substances. The majority of people go through life with little understanding of the powerful and complex substances they use for recreational and palliative purposes.

The media, as well as various professionals in the field, often do not adequately contribute to the public's information and have sometimes added to the public's confusion. For example, MDMA has often been confused with the synthetic opiate analogues. Consequently, MDMA has occasionally been cited in the press as leading to the fatal overdoses and/or Parkinsonism associated with the opiate analogues. In addition, other accounts attribute the Parkinsonism produced by MPTP to the fentanyl analogues. As a result, heroin addicts interviewed by the first author for another study, were concerned about developing Parkinsonism which they associated with the fentanyl, or "China White," they had tried.

Drug educators and treatment specialists must be extremely cautious in learning about the different designer drugs and the unique effects of each. As an article examining the media response to MDMA concluded: "We must take a vested interest in critically evaluating stories on the benefits and dangers of this drug. And we should be much less forgiving than we were with LSD when we identify factual errors, distortions and oversights [53, p. 11]. We also need policy decisions that do not inhibit research, but instead further general understanding of substances that can alternately be viewed as fascinating or frightening.

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