Ecstasy (MDMA), Methamphetamine, and Date Rape (Drug-Facilitated Sexual Assault): A Consideration of the Issues

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Abstract—The term "date rape drug" has traditionally been applied by the media to powerful sedatives, such as gamma hydroxybutyrate (GHB) and flunitrazepam (Rohypnol), which can render a person unconscious and hence unable to resist and/or recall an assault. However, some law enforcement agents and others have recently obtained convictions by arguing that the empathy-generating and sensual effects of MDMA, and an occasional increase in disinhibition and sexual desire linked with methamphetamine use, remove a person's ability to give a reasoned consent, turning the person into "a helpless slave" to their own sexual desires and those of the alleged perpetrator. The argument holds that the victim becomes part of the assault because they may appear to be cooperating and colluding with activity which they would not have consented to without taking these drugs. This interpretation of the term "date rape" has been fed by data that sometimes finds MDMA and amphetamines in samples taken from sexual assault victims, and hence these prosecutions sometimes rely on expert testimony from toxicologists, pathologists and police officers rather than psychologists and psychiatrists who are expert in the human effects of these drugs. Some of those in the latter group have dismissed claims that MDMA is an aphrodisiac or a date rape drug as myths propagated by the media. In this article, these arguments and their respective strengths and weaknesses will be examined to assist professionals and others who may become involved in these cases.

Keywords—date rape, drug-facilitated sexual assault, GHB (gamma hydroxybutyrate), ketamine, MDMA (methylenedioxymethamphetamine), methamphetamine

Until recently, the generally understood meaning of drug-facilitated sexual assault (DFSA) was that it probably involves the surreptitious slipping of a drug into a person's beverage or food as a result of which the person becomes severely incapacitated and/or unconscious. It may also involve the voluntary consumption of alcohol, and the voluntary and/or involuntary consumption of other drugs.

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The severely incapacitated person is unable to consent to sexual acts and/or unable to physically resist them. These two features should distinguish DFSA from cases where people who happen to have been drinking or taking other drugs are sexually assaulted against their will, deny consent and/or resist the act.

There have been recent attempts to broaden the definition to include cases where people who have taken MDMA and/or amphetamines cooperate and collude with sexual activities, and then decide when the drugs have worn off that they would not have consented in a drug-free state (e.g. Archambault, Porrata & Sturman 2001). In *Drug Facilitated Sexual Assault: A Forensic Handbook* (LeBeau &

Mozayani 2001), Archambault, Porrata & Sturman (2001) wrote that:

> use of any disinhibiting or impairing drug, especially when used with other drugs, may render the victim either more susceptible to becoming involved in sex, or render her powerless to avoid it. . . . (MDMA) abusers often suck on baby pacifiers . . . "Ravers" may dress in infantile or other exotic dress to distract from the pacifier . . . (it) assures instant friendship with those around the user . . . MDMA users tend to be passive and obsessed with "sensations". This condition makes a young female highly susceptible to being touched and caressed by a virtual stranger leaving her at the mercy of a sexual predator.

It is helpful to understanding this debate to note that Joanne Archambault was a police officer with the San Diego Police Department, Trinka Porrata was a retired California narcotics detective, and Peter Sturman was a senior police officer in London. The alternative perspective is summarized by Holland; in *Ecstasy: The Complete Guide* (2001) she described the claims that "Ecstasy is an aphrodisiac" and "Ecstasy is a date rape drug" as myths. She wrote:

> While MDMA can enhance communication and feelings of closeness between lovers, its physical effects tend to make erections and orgasm more difficult to achieve in most users. Some users do find that MDMA can enhance their appreciation of touch and movement. . . . The American media has a habit of labeling most new drugs as "date rape" drugs, perhaps to instill fear in the minds of news watchers. A date rape drug is one that renders the drug taker unconscious and therefore vulnerable to attack. . . . MDMA does not cause a clouding of consciousness; it is not a sedative.

Julie Holland, M.D. was a psychiatrist at Bellevue Hospital in New York and a faculty member of the NYU School of Medicine. She had a particular interest in clinical studies with MDMA in humans.

The argument that MDMA and methamphetamine are date rape drugs has been furthered by findings that when persons who believe themselves to have been sexually assaulted are asked to provide samples of their body fluids, amphetamines and/or MDMA may be found at least as often as classic media-recognized date rape drugs such as GHB and flunitrazepam (Rohypnol®), and sometimes more frequently (e.g. Hindmarch et al. 2001). A huge range of substances are found on toxicology of such samples, and as they were provided in the context of alleged assault, the whole range are described by some researchers as date rape drugs (e.g. Hindmarch & Brinkmann 1999). However, if this approach is accepted as valid then the terms "drug-facilitated sexual assault" and "date rape drug" appear to lose much of their special meaning, and the differentiation from nondrug-assisted assault is greatly weakened.

Drugs such as MDMA and amphetamines may be found in the toxicology screens of victims of DFSA for several reasons. One likely possibility is that the interaction between perpetrator and victim often starts in a club or bar, or at a party, where such drugs are commonly taken by some of the patrons. A screen of all the patrons in those settings, particularly in some large cities in Europe and the USA where drug use is common, could find that a significant number were positive for ecstasy, amphetamine, cocaine, alcohol, cannabis and related drugs, and a small number would be positive for ketamine and GHB (which is also a drug of abuse). For example, in a recent study by Lua and colleagues (2003), urine samples from participants at a rave party were tested and 75.7% were positive for MDMA, 47% were positive for ketamine, and 41.6% were positive for methamphetamine. If one of the persons attending this rave had accompanied another home and been sexually assaulted, there is a high probability that MDMA would have been detected in body fluid samples. This would not of itself, however, establish that MDMA is a date rape drug.

It is possible that a recent increase in the number of body fluid samples that are positive for amphetamines and MDMA (Hindmarch et al. 2001) may simply reflect the marked increase in the use of these drugs within society at large. Many countries have seen an increase in the general recreational use of amphetamines in recent years (Brecht & von Mayrhauser 2002; Gibson, Leaman & Flynn 2002; Wilkins, Bhatta & Casswell 2002; McMiller & Plant 1996), with detection in students attending a university medical center, for example, rising towards 10% (Bailey 1987).

This increase may have resulted in more specimens being positive for these drugs simply as a reflection of the societal trends, rather than because they have specific features that render them suitable for aiding sexual assault. Random samples from some clubs and bars might produce even higher figures for MDMA, methamphetamine and even ketamine and GHB than are detected in samples such as those in Hindmarch and colleagues (2001), e.g. Lua and colleagues (2003).

Within the more traditional understanding of DFSA, the substances likely to be employed will be those that can physically disable the victim and sedate them into a condition of unconscious anesthesia, depriving them of cognition, including the ability to be oriented (e.g., to know what the date is, to know where they are and who they are with), the ability to form any memory of what took place, and the ability to maintain any conscious awareness. An ideal drug for drug-facilitated sexual assault will thus produce a profound loss of memory for what took place after the drug was administered, lasting at least a few hours. It will also markedly impair motor function (ability to move). Victims often report a substantial period of loss of consciousness during which many will have been moved to another location (Arbanel 2001; Welner 2001). An ideal drug will also be odorless and tasteless and dissolve readily in alcoholic and other beverages, with rapid absorption.

In the typical case, the last event that the victim recalls is drinking a strongly flavored beverage supplied by the perpetrator (e.g., a gin and tonic). They then regain

consciousness some hours later to find that they have been moved to a different location, that some of their clothes are missing, and/or that they do not appear to be dressed correctly, and there may be other evidence of various kinds that they have been subjected to a sexual assault. The typical victim has no memory of the actual assault at all (Arbanel 2001; Welner 2001).

Stimulants such as methamphetamine and MDMA, which usually increase wakefulness and movement, are an improbable choice where the premeditated aim is to produce incapacity, immobility and unconsciousness. This is despite an occasional effect they may have in some people of increasing the desire for sexual activity. These stimulants also tend to have a vile taste (especially MDMA) and are thus most unlikely candidates to be slipped into a drink without the person for whom the drink is intended immediately becoming aware that there is something wrong on first tasting such a beverage.

The victim's state of incapacitation is a key element to consider in these cases, as it has implications for the issue of being able to give or withhold consent. The wider definition of DFSA relies heavily on how this decision of "capacity to consent" is made.

Advocates for the hypothesis that stimulants are more significant as date rape drugs than sedatives may argue that this makes sense because it is not practical to drag an unconscious person from a bar. However, there is research which indicates that the drugs used for DFSA are usually given when two people are alone together, in an environment controlled by the perpetrator, not when they are in a club or bar (Welner 2001), despite the media emphasis on this image.

In contrast, a very powerful sedative such as gamma hydroxybutyrate (GHB), which can easily induce a coma and which has been used in medicine as an anesthetic, is an understandable choice for the purpose of DFSA. Powerful sedatives such as benzodiazepines are also understandable choices. In some countries they are easily obtained from general practitioners. They are easy to dissolve and practically tasteless, and can produce profound sedation and loss of consciousness, especially when combined with alcohol.

The role of ketamine as a date rape drug is more complex. It is a dissociative anesthetic but it can also act as a stimulant and it can be unreliable in its effects. Despite a large amount of media attention, proven cases of DFSA involving ketamine appear to be extremely rare (Jansen 2001a, 2000).

The traditional view of date rape drugs as necessarily producing incapacity, immobility and unconsciousness explains why the law in many places has required that the drug administered be "an anesthetic substance" or "an intoxicating narcotic" or likely to stupefy or similar, for the assault to be covered by drug-facilitated sexual assault legislation. This specific legislation exists in some places because historically the charge of rape in some countries has required some evidence of resistance and/or coercion, and there are difficulties with this where the complainant has no memory of a crime.

STUPOR, TO STUPEFY, AND STUPEFACTION

Consciousness is awareness of the self and the environment. Disorders of consciousness have been classified into several broad categories, including:

- *Coma*: the person shows no external evidence of mental activity and little motor activity other than breathing. There is no response even to strong stimuli. This is an alarmingly frequent result of ingesting GHB and its precursor molecules 1,4-B and GBL (Theron, Jansen & Skinner 2003).
- *Stupor:* in clinical pharmacology, psychopharmacology, neurology, general adult psychiatry and forensic psychiatry, the expression "to stupefy" means "to produce a stupor."

It has generally been accepted that MDMA and amphetamines are not anesthetics and do not produce stupor. However, a prosecution expert witness (Ian Hindmarch, coauthor of work in which a relatively high number of samples from DFSA were positive for amphetamines; see Hindmarch et al. 2001; Hindmarch & Brinkman 1999) recently argued that MDMA and methamphetamine can produce a state of stupefaction, by which he meant "a state in which behavior is no longer under conscious control." The defendant had been charged with administering drugs (including MDMA and amphetamines) with intent to stupefy and there was a legal argument as to the meaning of this term, with one argument being that "to stupefy" in this context meant "to produce stupefaction" and the defense argument being that it meant "to produce a stupor." The original judge determined that the latter meaning should apply.

The matter was then taken to the Court of Appeal where it was decided that "to 'stupefy' means to cause an effect on the mind or nervous system of a person which really seriously interferes with that person's mental or physical ability to act in any way which might hinder an intended crime. Whether any such interference is really serious is a matter of fact and degree for the jury or other trier to determine, just as it is a jury matter whether, in a case of alleged grievous bodily harm, the bodily injury is really serious" (R v Sturm, CA 28/04, CA101/04, Judgement of The Court of Appeal of New Zealand, 1 June 2005; Crown Solicitors). A retrial was ordered, the result of which is awaited.

A survey of the literature conclusively indicated that "stupefaction" is an obscure term in medicine and science and is very rarely used within these disciplines, including the discipline of psychopharmacology. It could not be found in standard works such as Harrison's *Principles and Practice of Internal Medicine* (Fauci et al. 1998), *The Oxford*

Textbook of Psychiatry (Gelder et al. 1996), *The Dictionary of Psychology* (Corsini 1999), and textbooks of descriptive psychopathology such as Professor Andrew Sims' book *Symptoms in the Mind* (Sims 2002 The Medline/ PubMed database currently contains over 11 million papers. At the time of writing, a search of the word "stupor" produced 13,035 papers. A search of the word "stupefaction" produced only five papers, which is an extremely small number relative to the size of this database. Only two are in English, of which one is about drugs; it describes two cases of acute toluene intoxication and describes two patients whose symptoms were "stupefaction, paresis and amnesia" (Muelenbelt, de Groot & Savelkoul 1990). Paresis is another word for "inability to move," and it is clear that the meaning of the word stupefaction here is the same as the medical term stupor.

The standard neurological definition of stupor is as follows: "*Stupor* defines a state in which the patient can be awakened only by vigorous stimuli" (Fauci et al. 1998). This state can be produced by large quantities of alcohol and cannabis, which together account for about 70% of the drugs found in samples taken from victims of sexual assault (ElSohly & Salamone 1999).

In psychiatry, stupor has a second possible meaning: "a condition in which the patient is immobile, mute and unresponsive but appears to be fully conscious, usually because the eyes are open and follow external objects. If the eyes are closed, the patient resists attempts to open them" (Gelder et al. 1996.) By definition, this state is caused by nonorganic mental illness such as catatonic schizophrenia and very severe depression. It is not a result of taking amphetamines, ecstasy or other drugs; these are classified as organic conditions.

The next step in neurological levels of consciousness is *clouding of consciousness*, a state in which the patient is drowsy and reacts incompletely to stimuli. Attention, concentration and memory are impaired and orientation is disturbed. Thinking seems slow and muddled. This is followed by reducing levels of *drowsiness* and then *full alertness*.

In contemporary medicine these terms have largely been replaced by a rating on the Glasgow Coma Scale (GCS), a clinical scoring system for objectively assessing how conscious a patient is (Duff 2001). The original scale had 14 points but this was later changed to 15. Fifteen is the highest score, the "most awake" level. Persons with a score below nine are in a deep coma and need to be promptly considered for definitive airways management, possibly intubation and attachment to a ventilator. Persons who have taken a GHB or GHB precursor (1,4-B or GBL) overdose sometimes present in an extremely deep coma close to death, with the lowest possible score (a GCS of three). Stupor usually involves a score of 12 or less.

The GCS is composed of three parameters: Best Eye Response, Best Verbal Response, and Best Motor Response. It is legally relevant to assessing the mental state of persons who have taken MDMA and/or methamphetamine with respect to the state of anesthesia/ narcosis/ stupor question.

A GCS score of less than 15 is typically produced by substantial doses of sedatives, as the effects involve a loss of alertness. A GCS score below 15 is not typically produced by stimulants such as ecstasy and amphetamines, which increase alertness. Thus where the intent is to stupefy the victim, it is apparent that stimulants are very unlikely to be employed.

The rapid speech which may result from taking amphetamines is not classified as confusion or disorientation and does not result in a loss of one point under Best Verbal Response. Thus a person with mania or schizophrenia who is talking nonsense may still be classified as having a GCS of 15 out of 15 if there is no impairment of the level of consciousness.

The accounts given by complainants of what took place during the sexual activity are usually sufficient to allow a reasonable estimate to be made of their likely minimum score on the GCS retrospectively.

The ability to think, as distinct from level of consciousness, is usually assessed using the Mini Mental State Exam (MMSE). This is widely used by medical practitioners. The test gives directions such as "write a sentence" and "take this piece of paper in your right hand, fold it in half, and put it on the floor" and asks questions such as "what city are we in?" and "what year is it?" Almost all persons who have taken MDMA or methamphetamine will score above 23 on this test. Persons scoring 24 to 30 are classified as having no cognitive impairment, 18 to 23 indicates mild cognitive impairment, and 0 to 17 is severe cognitive impairment (Folstein, Folstein & McHugh 1975). As with the GCS, the accounts given by complainants are usually sufficient to allow a reasonable estimate to be made of their likely minimum score on the MMSE retrospectively.

DO WE NEED A WIDER DEFINITION OF DATE RAPE?

Some of those with an interest in this area have sought to greatly widen the concept of DFSA (e.g., Archambault, Porrata & Sturman 2001). This widened definition essentially considers DFSA to be any sexual assault that occurs while the victim is affected to any degree by a chemical of any kind, and widens the field to all drugs that might be taken at a rave party, for example. In theory, a sexual assault that occurs when a person is slightly elevated by a drink or two would be included as DFSA in this definition, and when the definition is adopted the drug most commonly involved in DFSA immediately becomes alcohol (about 50% to 60% of sexual assault cases) followed by cannabis (about 20% to 30%) (ElSohly & Salamone 1999.)

However, there is a risk that this dilution of the meaning of DFSA will weaken the value of the term, as it then

expands to include most cases of sexual assault and no longer refers to a small and special group with its own particular features and perpetrators which can be separately identified, researched and understood. The perpetrators who have a paraphilia (disorder of sexual preference) which involves having sex with unconscious people and videotaping them (this is on a gradation which ends with necrophilia, having sex with dead people) are then largely lost in the static, as they are merged with the majority of sexual assault perpetrators under this expanded category of DFSA.

Problems may also arise if one assumes that alert people (such as those affected by MDMA and amphetamines) who are not considered to be in a stupor or coma, or insane, and who cooperated in the sexual activity, are not responsible for it and were not in a state where they could give consent, simply because they had taken drugs. The next step is to say that they were insane, but an assessment of this nature would generally need to be made by a psychiatrist licensed to do so under the law, and good practice would require that the psychiatrist interview the person. If it is decided that the person was insane as a result of taking drugs such as amphetamines, then the next step might be the perpetrator claiming that he or she was also insane as a result of having taken the same drugs, and thus also not responsible for actions and impulses.

If definitions are blurred and vague, and nonstandard terminology is introduced such as "stupefaction," it is possible to arrive at a point where a person who buys another a glass of wine and then rapes them may be said by some persons to have administered a substance with intent to stupefy, as the mental state resulting from a glass of wine is no longer 100% normal and they can be said to be impaired. To avoid such scenarios, it is better to use objective criteria of levels of consciousness such as the Glasgow Coma Scale, and objective criteria for assessing cognition such as the Mini Mental State Exam, and to avoid such vague terms as impairment and stupefaction, which give no indication of the level of capacity or incapacity.

However, it should also be noted that neither the GCS nor the MMSE are measures of judgment. Thus a person might score 15/15 on the GCS and 30/30 on the MMSE, but display very poor judgment. Unfortunately, there does not appear to be an objective test for judgment that allows us to give a grading to the faculty that is free of the grader's personal values. Some persons would argue that to take MDMA in the first place indicates poor judgment while others would contest this, but a GCS score and an MMSE score are objective measures free of such influences. To illustrate that the mental faculties of level of consciousness and cognition are separate from judgment, consider the example of a person who is fully alert with an IQ of 170 who suddenly decides to gamble their life savings on a roll of the dice at a casino. One could say that their judgment was very poor, but their consciousness and cognition are unimpaired. If the casino owner had offered the person stimulants with the intent of producing this major impairment in judgment, then even though the gambler took those drugs voluntarily there are some persons who would consider that the owner had a case to answer beyond just supplying controlled drugs. Thus judgment is assessed by how a person behaves relative to certain norms, but establishing those norms can be a challenge. They tend to be decided by the jury.

The expansion of the meaning of DFSA may thus have complex consequences for the cases of persons who are fully alert with normal cognition but impaired judgment.

CAPACITY TO CONSENT: GENERAL CONSIDERATIONS

In many legal cases, whether or not the person had the capacity to consent will be defined by the Court as "an ultimate issue," i.e. an issue which only the jury can decide, not an expert witness. Nevertheless, there are related issues in medicine which it may be relevant to consider. One of these is the capacity to consent to treatment. While it may not be possible to consider whether the person had the capacity to consent to sexual activity, a consideration of this matter having been reserved for the jury, it may sometimes be possible to note that the capacity to consent to treatment, often referred to as competence, is retained in most people who have a serious mental illness, despite the presence (for example) of paranoid and grandiose delusions or pressure of speech. Paranoia, grandiosity and pressure of speech may result from taking stimulants as well as from such conditions as mania and schizophrenia. Many people who are subject to compulsory treatment under mental health legislation nevertheless retain the capacity to consent, and may have decided for themselves that they do not consent. Thus a person with a serious paranoid psychosis may nevertheless give legal consent to controversial treatment such as electroshock therapy, and they are likely to be considered able to decide who they do and do not wish to have sex with in most countries. Although they may sometimes be classified as "vulnerable" by mental health staff, this is a different matter from concluding that they are not able to consent.

A majority of persons who have taken amphetamines or MDMA would be assessed by a liaison psychiatrist as having the capacity to consent to treatment.

It may also be relevant to the issue of considering the capacity to consent in abnormal mental states to consider the criteria of fitness to plead. If someone is so mentally disordered that it is thought unfair to proceed with his trial, then he is said to be "unfit to plead" and the trial is postponed. The criteria emerged through nineteenth century case law, mainly in relation to deaf-mutes who were unable to communicate, which gives some indication of the level of disability historically required. Current criteria under UK

law are: being able to plead with understanding to the indictment; being able to comprehend the evidence; being able to follow court proceedings; knowing that a juror can be challenged; and being able to instruct lawyers. Thus the criteria are concerned with intellectual performance, not with mood, beliefs, perceptions, insight or judgment. A person with mania who speaks quickly and is deluded may still be found to be fit to plead.

The above discussion may give some indication of the extent of impairment which must exist before a psychiatrist will consider that a conscious person has lost the capacity to consent to treatment and to be fit to plead. The discussion has implications for the wider issue of assessing the capacity to consent in other areas such as sexual activity.

MDMA (ECSTASY)

The principal effect that distinguishes this drug from others is an increased sense of empathy and emotional contact (closeness) with other people. Empathy is defined in the psychiatric literature as the "capacity to understand what another person is experiencing from within the other's frame of reference (standing in the other's shoes). In empathy, one feels as the other person does, but recognizes that other feelings are possible; there is no fusion or identification" (Ayd 1995).

Between 1977 and 1985, it was legally possible to give pure MDMA to humans in the United States (Greer & Tolbert 1986), and it has recently become possible to do this again in approved studies (e.g., Grob et al. 1996). These studies indicate that MDMA rarely causes ego disorganization, usually leaving reality testing relatively intact: "As compared with the more familiar psychedelic drugs, it (MDMA) evokes a gentler, subtler, highly controllable experience which invites rather than compels intensification of feelings and self-exploration. The user is not forced onto any mental or emotional path that is frightening or even uncomfortable" (Grinspoon & Bakalar 1986). This is not always the case, and there are certainly some persons who have been frightened by the effects of MDMA, but the quote does provide a general indication of what may be expected by many persons from a dose in the region of 120mg of MDMA.

The capacity to give or withhold consent to treatment is usually maintained in persons who have taken MDMA. This capacity may even be increased in some cases if the person's insight into themselves increases (Greer & Tolbert 1990).

MDMA does not usually cause a clouding of consciousness. It is usually not a sedative. There is usually, but not always, a reasonable retention of the major events that occurred while a person was affected by an average dose of MDMA, although this capacity to recall events can decline if alcohol is also taken and if the person stays up for most or all of the night and becomes fatigued. However, as with all drugs there are some individuals who will have atypical responses. The first author (KJ) has interviewed a small number of persons who did fall asleep within a few hours of taking MDMA, and the substance was tested in an approved laboratory and unequivocally certified to be MDMA. They had generally taken a small dose (less than 65mg, which is half a strong pill) and were very tired or intoxicated with alcohol before taking the MDMA. He has also interviewed persons who became delirious after taking just one pill of certified pure MDMA with disorientation, hallucinations and amnesia, but this is an extremely unusual response (Jansen 2001b).

MDMA is sometimes classified as a hallucinogenic stimulant but it very rarely causes actual hallucinations. It is unlikely to do more than mildly enhance perceptions and sensations in most people, including an enhanced appreciation of touch, sound and movement. It can sometimes appear to sharpen vision and occasionally colors may appear to be brighter (Liester et al. 1992; Greer & Tolbert 1986).

Because of its tendency to produce feelings of intimacy and closeness, MDMA has sometimes been used as an aid to seduction. However, it causes a sharp rise in the quantity of serotonin available for neurotransmission in the brain, and this tends to have an inhibitory effect on the ability to actually perform the act of intercourse. Some persons who take antidepressants such as Prozac® (fluoxetine) experience similar difficulties for related reasons. Many MDMA users find erections and orgasms difficult to attain while they are acutely affected by the drug (Liester et al. 1992). In addition to this mechanism, MDMA is a stimulant which will often (but not always) increase alertness and can mimic stress responses, and it has effects on the blood supply, on the autonomic nervous system, and on mucous membranes which can sometimes impair the ability to attain and sustain an erection, and to ejaculate.

This neurochemical impairment of sexuality is effectively demonstrated in animal studies, where the complications of set and setting are removed. For example, impairment of sexual function by ecstasy is demonstrated in Dornan, Katz & Ricuarte (1991). The effects of repeated systemic administration of MDMA on a variety of parameters of male sexual behavior in sexually vigorous male rats were studied. The results of this study revealed that administration of MDMA to sexually vigorous male rats produced a transient disruption of the expression of male copulatory behavior. In addition, in MDMA-treated males that did display copulatory behavior, both the ejaculation latency and post-ejaculatory interval were dramatically lengthened when compared to saline injected controls.

Nicholas Saunders attended many dance parties and was the author of *Ecstasy Reconsidered* (1997). He concluded:

> Many users never become sexually aroused on ecstasy and find the state incompatible with lust . . . women are more likely to become sexually aroused than men, but both find orgasm suppressed . . . people on ecstasy become more sensual and less lustful. Being at raves during the first few years, where nearly everyone was on E, was very different to that of alcohol based clubs, and seemed to follow from the lack of male sexual aggression. Hugging and even caressing strangers was acceptable on a sensual level without implying a sexual advance.

In the peer reviewed literature is Buffum and Moser's (1986) report on 76 subjects. In it, 85% of users said that ecstasy had no effect on their sexual desires. The authors concluded that ecstasy is not an aphrodisiac, but it does enhance the sensual aspects of sex. They wrote: "it is curious that a drug which can increase emotional closeness . . . does not increase the desire to initiate sex."

Respondents to a major Australian study (100 subjects) also stated that the drug was sensual rather than sexual (Solowij et al. 1992.)

In Liester and colleagues (1992), 45% reported diminished libido as a side-effect of MDMA (and 25% reported increased anxiety, which is usually seen as an antisexual effect).

There are exceptions to the above, and there are some persons who find the effects of MDMA to be sexual. However, this is not the general case. In most people, especially males, the effects are more likely to be an increase in empathy, and to a lesser extent mildly sensual, than they are to be sexual.

It should also be noted that with all drugs "the kicks can go both ways," and that it is entirely possible that the taker may like a person even less after taking MDMA than they did formerly. This is to be expected from an emotional enhancer. There is no drug which in itself can force a person to love another, or in itself force them to engage in sexual activity while they have a GCS score of 13/15 and above and an MMSE score of 24/30 and above, without an element of choice, consent and free will in the matter.

All stimulants can produce anxiety, panic and paranoia at times, and persons who take MDMA will occasionally experience some very bad moments. A person who gives another MDMA with the intent of having sex with them is taking a chance as to their response. A person who renders another unconscious for the purpose of having sex with them is considerably more likely to attain their goal.

The general current use of MDMA involves dancing at clubs and dance parties. The patrons of these events get themselves to venues, buy tickets, meet up with their friends, buy drinks and drugs (i.e., handle their money) and show a great deal of other evidence that they are quite capable of logical and rational thought, as well as deciding who they do and do not wish to have sex with. This illustrates that MDMA does not usually incapacitate most people to the point where they cannot give or withhold their consent to sexual activity.

Arguments about the extent of impairment produced by MDMA sometimes focus on its classification as a hallucinogenic stimulant, with those who have an interest in demonstrating impairment emphasizing the hallucinogenic part of this phrase. However, MDMA very rarely gives rise to hallucinations and almost never causes effects such as synaesthesia. It does not usually put users into a semihallucinatory world (Vollenweider et al. 1998; Liester et al. 1992; Greer & Tolbert 1986).

With respect to considering the effects of doses that people may have taken, tolerance to the empathy effect of MDMA is rapid. It tends not to increase above a dose of about 150mg to170mg, but the side effects do. There is thus little profit in exceeding 170mg, although some people often do so (Jansen 1999).

This illustrates an important general point about stimulants. The sought-after psychological effects of these drugs tend to reach a plateau relatively soon because of the way in which the high is generated in the brain. MDMA releases a flood of serotonin and some dopamine. When the stores are depleted, which will be achieved by 150mg MDMA in most people, they remain depleted for several days. Taking more MDMA may prolong stimulation, but it tends not to prolong or reproduce the empathy effect. Physical side effects, however, will increase with dose even if the mental effects have reached a plateau.

In addition to the above mental effects, it is reasonable to expect a person who has consumed a substantial dose of MDMA to report such effects as teeth grinding, jaw tension, increased energy (although fatigue has also been reported), changes in body temperature (usually warmer), racing pulse, dry mouth, decreased appetite and sweating. Widely dilated pupils are a typical feature of MDMA consumption. Difficulty sleeping for a few days is not uncommon although some people feel deeply fatigued and will sleep more than usual, and a low mood with anxiety is common as the drug wears off. The unpleasant "come down" is sometimes offset by the consumption of other drugs such as alcohol, cannabis and other more sedating drugs. This low feeling is sometimes delayed for a few days after taking MDMA (review: Holland 2001). Most people can take several pills of MDMA without becoming confused.

The effects of MDMA which are likely to be dose-related include teeth grinding, increased pulse rate, elevated blood pressure, and a lowering of the seizure threshold (i.e., people who take high doses over prolonged periods have a higher risk of having an epileptic-type fit).

A double blind placebo controlled study was carried out by Vollenweider and colleagues (1998) in Switzerland. Thirteen volunteers were given "a typical recreational dose" of 1.7mg MDMA per kg body weight (119mg in a 70kg

man). The usual empathogenic effects were found, and the investigators found that the MDMA group did not differ from placebo in the results of the Stroop test, a measure of selective attention. This is important as it illustrates that the capacity to think, of which the capacity to pay selective attention is a feature, is not necessarily impaired.

MDMA can increase the suggestibility of some people in an appropriate set and setting. However, persons who are influenced by suggestion are not usually considered to therefore be in state where they are unable to give or withhold consent. We are constantly subjected to suggestion by political groups, the media, religious groups, advertisers and others. The effects of suggestion can be particularly evident in totalitarian regimes. Nevertheless, the defense that a person was only following orders or was not himself or herself as a result of the suggestion has not generally been well received.

Unlike an unconscious person, many persons who take certified MDMA and are subsequently the subject of undesired sexual advances, of both a heterosexual and homosexual nature, are thus likely to have little difficulty in deflecting, resisting and declining those advances. There are people who have been assaulted while under the influence of MDMA. Some of these people clearly and unambiguously did not consent at the time, there was force and coercion involved, and these incidents were classified as forcible assaults not significantly different in character from forcible assaults in which drugs were not taken (Creighton, Black & Hyde 1991). There was no element of sexual cooperation, collusion, or mutual stimulation once the victim's current boundaries had been crossed, and the person did not report that they had lost control of their free will or their other faculties. It is certain that there are ambiguous cases in which one person (and sometimes both) is (are) subsequently distressed by what has occurred. The alleged perpetrator may argue that the sexual activity did occur but was consensual, and the alleged victim may argue that he or she was not in a state where her or she could consent despite being fully conscious, oriented, and very possibly colluding and cooperating with the sexual activity. These cases can present a particular challenge for expert witnesses and the courts.

A potential difficulty which arises with these cases is that persons who commit crimes while affected by MDMA or methamphetamine are unlikely (in most cases) to be considered to be not responsible for their actions on the basis that they were "not themselves" and were thus unable to form the intent to commit the crime. Difficult contradictions may arise if it is consistently concluded that perpetrators of crimes are "themselves" despite having taken these drugs, while victims are consistently held not to be "themselves," despite having taken the same drugs. If it is held that MDMA and/or amphetamines produce a state of mind in which a person is unable to give or deny consent, then it may also be held that MDMA and/or amphetamines produce a state of mind in which the perpetrator cannot form the intent to carry out a crime. With some exceptions, people affected by MDMA and/or methamphetamine have generally been considered to be responsible for their actions, whatever those actions may be. The request that an exception be made for engagement in sexual activity that they might not have become engaged with had they not taken these drugs, is fraught with difficulty.

METHAMPHETAMINE

The argument that methamphetamine is a date rape drug tends to be based on claims that the drug causes a loss of inhibitions and energized sexuality and that this renders a person vulnerable to being taken advantage of, as they become helpless to resist their sexual desires due to an impairment of the conscious control of behavior (Hindmarch & Brinkman 1999).

The generally accepted effects of methamphetamine include increased wakefulness, improved athletic performance, improved attention and concentration, thinking and problem-solving abilities, and coordination. They often elevate mood, but there are also people who do not like the effects of these drugs. They do not usually render logical and rational thought impossible. Methamphetamine will also increase blood pressure, respiration rate, raise blood sugar levels, dilate the bronchi in the lungs, divert blood flow from internal organs to skeletal muscle, constrict nasal mucous membranes (resulting in dryness), and reduce appetite. These are the effects of methamphetamine listed in most general textbooks about substance misuse (e.g. Liska 2004; Lowinson et al. 1997). Loss of inhibitions and energized sexual activity rarely make the first ten most likely effects. The stress-mimicking effects of amphetamines on the blood supply, on the autonomic nervous system, and on mucous membranes sometimes tend to impair the ability to achieve an erection and ejaculate, and this has been shown in animal studies where the complications of set and setting are removed (Saito et al. 1991).

Methamphetamine has been legally prescribed in many countries for decades, and is marketed as Methedrine, Desoxyn and other brands. Inhaled methamphetamine vapor, smoked in a pipe as crystals, can result in a rush of euphoria, energy, and sometimes intensified sexual pleasure in some people. Studies of methamphetamine users have sometimes concluded that the drug does increase sexual desire in a subgroup of users (e.g., Semple, Patterson & Grant 2002), but it should be noted that these studies have often been carried out on persons who are high frequency users of the drug, who smoke or inject pure methamphetamine crystals, and who are actively involved in the gay party circuit in the USA, a sexualized environment in which sex with multiple partners is built into their expectations (Semple, Patterson & Grant 2002). These studies also tend to conclude that this group of people take a

very wide array of drugs for the purpose of sensation-seeking, as distinct from specifically having sex, and to self-medicate a low mood related to having HIV. For example, Clutterbuck and colleagues (2001) found that the drugs most likely to be taken within two hours of having sex by the group of at-risk-for-HIV men are cannabis and amyl nitrite (poppers), not methamphetamine.

It is not clear how relevant the findings of studies based on the gay party circuit are to DFSA cases that do not involve members of these subpopulations, and that may involve taking 'speed' powder via the nose rather than smoking crystals or intravenous injection.

There are no studies in which people have been given any type of amphetamines against their will and, without choosing to do so and against their volition, have experienced an overwhelming desire for sex which they could not resist.

Amphetamines are legally prescribed far more often than the public realize. In the United States, the annual level of legal production is one-half billion dosage units (tablets and capsules), enough to supply four doses to every American over the age of 18 (Liska 2004). Benzedrine, Dexedrine and also methamphetamine in its noncrystal form are the amphetamines widely used at present (in the USA) to treat obesity. They reduce appetite by mimicking the body's own stress responses.

Physicians who are critical of the prescription of amphetamines tend to cite the reasons as tolerance, dependence, rapid loss of benefits, diversion into illicit use, and nervousness and insomnia leading to the use of sedatives. A loss of inhibitions and energized sexual activity are not usually cited as common reasons. If amphetamines reliably and commonly caused a loss of all inhibitions and energized sexual activity it is very unlikely that this large scale legal production would be tolerated.

Amphetamines tend to increase confidence (one of their most reliable and frequent effects) which may result in grandiosity, and rising doses can make people irritable, suspicious and more aggressive. The likelihood that a self-confident and possibly grandiose person will willingly submit to sexual advances that they do not consent to, or anything else that they do not consent to, will thus tend to decrease rather than increase.

There is a substantial literature which clearly demonstrates that amphetamines improve cognitive performance, including attention, concentration, reaction time and accuracy. These findings have not been invalidated by a recent incident of friendly fire in which the pilot claimed that his error was due to being prescribed amphetamines. For example, Wiegmann and colleagues (1996) examined the effects of methamphetamine on high event rate vigilance and tracking performance in a 13.5-hour sustained-performance session during one night of sleep loss, in a double-blind placebo-controlled randomized trial. Performance on all measures degraded markedly during the night in the placebo group. Both the 5-mg and 10-mg methamphetamine treatments reversed an initial decline, and reversed increases in nonresponses (lapses) and tracking error. No evidence that methamphetamine treatment increased impulsive responding (fast guesses) was observed.

Methamphetamine may be used in drug-assisted seduction, and may have been taken at some point in the day by victims of assault (especially those who go to clubs), but in view of the stimulant effect, it is an unlikely choice of drug for a perpetrator to administer to produce sedation and unconsciousness for the purpose of carrying out a nonconsensual sexual act (which is a different matter from seduction in which there is an "achieved consent"). The hope that they will enhance sexual pleasure in an intended victim represents a considerable gamble. A decidedly unerotic increase in anxiety and suspiciousness are more likely in a nonconsensual situation.

Some users will not accept the fact that most of the psychological effects of amphetamines tend to plateau quite early, and will take more and more stimulants in a vain hope that they will get higher and higher. They may become hyperalert and anxious, but many will not even be mentally confused, and will score 30/30 on the MMSE, by the time they reach a blood level which could potentially kill them by causing a fatal abnormality in heart rhythm, for example (Slaby 1994). People who have taken an amphetamine overdose are often hyperaware of their environment and tend to be suspicious. The likelihood of being able to do anything to them that they do not wish to happen is often markedly less than would be the case for a normal person. They are often able to give a better history than people who have not taken drugs at all. It is rare to see a person who has overdosed on amphetamines who does not have the capacity to consent to treatment, unless they have also had a heart attack, stroke or epileptic fit (Jansen, Griffiths & Vingoe 1997).

Slaby's (1994) *Handbook of Psychiatric Emergencies* lists 19 symptoms of sympathomimetic (a group which includes amphetamines) intoxication and 19 signs. Of the 19 symptoms, at least 16 are very clearly psychological (e.g., irritability, hypervigilance, aggressiveness, anxiety etc.) The list of 19 does not include disinhibition or energized sexual activity. These two features are also entirely missing from the signs.

It is also most unlikely that amphetamine psychosis would render a person more vulnerable to sexual assault because of impaired reality testing. This is because the most typical feature of these states is paranoia with a heightened awareness of the environment, coupled with the increasing social isolation. These people are often intensely suspicious, a state not usually compatible with casual sexual contacts.

Key effects of methamphetamine are euphoria, alertness, increased self-confidence, and increased self-esteem. It is unlikely that a person with increased self-confidence and increased self-esteem will suddenly switch to being a

robot under the control of another. Higher doses cause decidedly unerotic anxiety, nausea, dysphoria, vomiting and sweating (Jansen, Griffiths & Vingoe 1997)

Solomon Snyder (1973) wrote: "A key feature in the definition of the amphetamine psychosis is the retention of *clear consciousness* (italics added) and *correct orientation*. In fact, most patients have a hyperacute memory for all events that transpire during their intoxication."

The effect on human sexuality of combining methamphetamine with alcohol has been specifically studied in young men. There was a clear finding of decreased sexual interest and more suspicion, and the user was more likely to suffer headache (Kipperman & Fine 1974).

In considering a case of alleged DFSA involving intoxication with relatively normal doses of MDMA and/or methamphetamine, a useful question to consider is: if the person had presented himself to an Emergency Room in this state, how would they probably have been treated? In many cases of intoxication with these drugs, it is likely that after a brief assessment, focusing on blood pressure, temperature and heart rate, the staff would have steered the person towards the exit with a diagnosis of "took ecstasy and speed" and nothing more. It is likely that the MMSE would have been 24 or higher. It is very unlikely that the person would have been admitted to the psychiatric unit, or anywhere else, and the person would probably not have been given any medication. It is very unlikely that the staff would have called a psychiatrist. If the elevated mood had changed into marked anxiety, the person might have been given some diazepam (Valium) before being sent home.

There is no drug which will in itself make a person into a robot or slave and make them do whatever they are told without their consent while they have a GCS above 12 and an MMSE of 24 or more. While MDMA can certainly make some people more suggestible, their free will is unlikely to be nullified. The CIA spent a great deal of resources trying to find such a drug in the 1950s, 1960s and 1970s (the MKULTRA project, which sought the secret ingredient in what the CIA assumed were techniques for mind control that had led American soldiers in the Korean War to become persuaded of the rightness of the communist cause; see Marks 1991).

The CIA project was abandoned as a failure, just as sodium amytal was abandoned as a so-called truth serum. The "amytal interview" has also been largely (but not completely) abandoned as a diagnostic tool in psychiatry because of lack of efficacy. Such techniques are not hard to resist by those who choose to resist. The person may lose consciousness or become dissociated, but as long as they are conscious they can choose to resist attempts to obtain information that they do not wish to divulge, or they can choose not to engage in behavior that they sincerely do not wish to engage in.

MDMA and amphetamines are not usually able to rob a conscious person of their free will. It is for this reason that producing unconsciousness is a likely aim of the person intending to perpetrate a drug-facilitated sexual assault, as distinct from those intending to engage in seduction, in which suggestion may play a significant role.

In R v Sturm, a man was accused of giving MDMA and methamphetamine (amongst other allegations) to four people and engaging in sexual activities with them (R v Sturm, CA 28/04, CA101/04, Judgement of The Court of Appeal of New Zealand, 1 June 2005; Crown Solicitors). In all four instances, the people described a degree of cooperation such as giving the accused oral sex or masturbating him. An expert witness in the case, who had detected these drugs in fluid samples in assault cases (Hindmarch et al. 2001), stated that methamphetamine will cause sexual arousal and increased sexual desire outside of the individual's cognitive control. It is well established that sexual desire arises in the human mind and is greatly affected by set and setting. It is not a reliable and mechanistic, push-button process. Anxiety and suspiciousness are a more likely result from taking amphetamines, and these results are not likely to make an intended victim more receptive to sexual advances. Amphetamine-induced psychotic states are characterized by high levels of suspiciousness, paranoia, anxiety, and social withdrawal, and these patients usually do not feel sexual at all (Snyder 1973).

These drugs do not usually switch off the part of the mind that gives or withholds consent. A person may feel an increased desire for sex but be entirely capable of declining to engage in sexual activity with anybody at all.

Stimulants are not more effective for carrying out a sexual assault than sedatives, and this is reflected in the finding that at least 70% of sexual assaults involve alcohol or cannabis or both—not stimulants. In a nationwide study in the USA of 1179 sexual assault victims, amphetamines featured in only 4% of cases (ElSohly & Salamone 1999).

CONCLUSIONS

A range of substances, from the benign such as chocolate, through the less benign such as champagne, to the definitely dangerous such as barbiturates, have been given through history as an aid to a hoped-for seduction. Assault may occur when there is a denial of consent, or the person is unable to consent and subsequently decides that they would not have consented had they had the capacity. At substantial doses in certain sets and settings, some substances can produce a fall in the level of consciousness and an impairment in cognition to the extent that the person is unable to consent or unable to fend off an assailant. Amphetamines and MDMA are not usually considered to be in this category. Alcohol, GHB and its relatives, cannabis and ketamine usually are.

The common tool for assessing a fall in the level of consciousness is the Glasgow Coma Scale. The common tool for assessing impaired cognition is the Mini Mental State Exam.

However, there is a lack of generally agreed upon tools for assessing impaired judgment. There are definitely a group of persons who have taken MDMA and/or amphetamine and then engaged in sexual activity which they would almost certainly not have engaged in had they not taken these drugs. Some of these persons have been sufficiently perturbed to lay a complaint with the police. These cases raise complex issues about the nature of free-will, consent and what constitutes an assault, but it is nevertheless important that the established body of knowledge about the drugs involved be respected, and that expert witnesses are instructed who have either published work on the human psychological and psychiatric effects of the drugs in question, or who have made a thorough study of that body of work, and whose real expertise is not actually restricted to forensic analyses of samples or working in the criminal justice system.

REFERENCES

Arbanel, G. 2001. The victim. In: M. Le Beau & A. Mozayani (Eds.) *Drug Facilitated Sexual Assault: A Forensic Handbook*. San Diego, California: Academic Press.

Archambault, J.; Porrata, T. & Sturman, P. 2001. In: M. Le Beau & A. Mozayani (Eds.) *Drug Facilitated Sexual Assault: A Forensic Handbook*. San Diego, California: Academic Press.

Ayd, F.J. 1995. *Lexicon of Psychiatry, Neurology and the Neurosciences*. Baltimore, Maryland: Williams and Wilkins.

Bailey, D.N. 1987. Amphetamine detection during toxicology screening of a university medical center patient population. *Journal of Toxicology and Clinical Toxicology* 25 (5): 399-409.

Brecht, M.L. & von Mayrhauser, C. 2002. Differences between Ecstasy-using and nonusing methamphetamine users. *Journal of Psychoactive Drugs* 34 (2): 215-23.

Buffum, J. & Moser, C. 1986. Report on 76 subjects: MDMA and human sexual function. *Journal of Psychoactive Drugs* 18 (4): 355-59.

Clutterbuck, D.J.; Gorman, D.; McMillan, A.; Lewis, R. & Macintyre, C.C. 2001. Substance use and unsafe sex amongst homosexual men in Edinburgh. *AIDS Care* 13 (4): 527-35.

Creighton, F.J.; Black, D.L. & Hyde, C.E. 1991. 'Ecstasy' psychosis and flashbacks. *British Journal of Psychiatry* 159: 713–15.

Corsini, R.J. 1999. *The Dictionary of Psychology*. London: Brunmer Mazel.

Dornan, W.A.; Katz, J.L. & Ricuarte, G.A. 1991. The effects of repeated administration of MDMA on the expression of sexual behavior in the male rat. *Pharmacology, Biochemistry and Behavior* 39 (3): 813-16.

Duff, D. 2001. Review article: Altered states of consciousness, theories of recovery, and assessment following a severe traumatic brain injury. *Axone* 23: 18-23

ElSohly, M.A. & Salamone, S.J. 1999. Prevalence of drugs used in cases of alleged sexual assault. *Journal of Analytical Toxicology* 23: 141-46.

Fauci, A.S.; Braunwald, E.; Isselbacher, K.J.; Wilson, J.D.; Martin, J.B.; Kasper, D.L.; Hauser, S.L. & Longo, D.L. 1998. *Harrison's Principles and Practice of Internal Medicine, Fourteenth Edition*. New York: McGraw Hill.

Folstein, M.F., Folstein, S.E. & McHugh, P.R. 1975. Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research* 12: 189-198.

Gelder, M.; Gath, D.; Mayou, R. & Cowen, P. 1996. *Oxford Textbook of Psychiatry, Third Edition*. Oxford, England: Oxford University Press.

Gibson, D.R.; Leamon, M.H. & Flynn, N. 2002. Epidemiology and public health consequences of methamphetamine use in California's Central Valley. *Journal of Psychoactive Drugs* 34 (3): 313-19.

Greer, G. & Tolbert, R. 1990. Testing psychotherapies and drug therapies: The case of psychedelic drugs. In: S.J. Peroutka (Ed.) *Ecstasy: TheClinical, Pharmacological and Neurotoxicological Effects of the Drug MDMA*. Boston: Kluwer Academic Publishers.

Greer, G. & Tolbert, R. 1986. Subjective Reports of the Effects of MDMA in a clinical setting. *Journal of Psychoactive Drugs* 18 (4): 319-27.

Grinspoon, L. & Bakalar, J. B. 1986. Can drugs be used to enhance the psychotherapeutic process? *American Journal of Psychotherapy* 40 (3): 393-404.

Grob, C.S.; Poland, R. E.; Chang, L. & Ernst, T. 1996. Psychobiological effects of 3,4-methylenedioxymethamphetamine in humans. *Behavior and Brain Research* 73: 103-07.

Hindmarch, I. & Brinkmann, R. 1999. Trends in the use of alcohol and other drugs in cases of sexual assault. *Human Psychopharmacology: Clinical & Experimental* 14: 225-34.

Hindmarch, I.; ElSohly, M.; Gambles, J. & Salamone, S. 2001. Forensic urinalysis of drug cases of alleged assault. *Journal of Clinical Forensic Medicine* 8: 197–205.

Holland, J. 2001. *Ecstasy: The Complete Guide*. Rochester, Vermont: Park Street Press.

Jansen, K.L.R. 2001a. *Ketamine: Dreams and Realities*. Sarasota, Florida: Multidisciplinary Association for Psychedelic Studies. (order from : info@maps.org)

Jansen, K.L.R. 2001b. Mental health problems associated with MDMA use. In: J. Holland (Ed.) *Ecstasy: The Complete Guide*. Rochester, Vermont: Park Street Press.

Jansen, K.L.R. 2000. A review of the nonmedical use of ketamine: Use, users and consequences. *Journal of Psychoactive Drugs* 32 (4): 419-33.

Jansen, K.L.R. 1999. Ecstasy (MDMA) dependence. *Drug and Alcohol Dependence* 53 (2): 121-24.

Jansen, K.L.R.; Griffiths, P. & Vingoe, L. 1997. Amphetamines: Mode of action, health consequences of use and other harms. In: P. Griffiths & L. Vingoe (Eds.)*The Use of Amphetamines, Ecstasy and LSD in the European Union: A Data Synthesis*. London: National Addiction Centre.

Kipperman, A. & Fine, E.W. 1974. The combined use of alcohol and amphetamines. *American Journal of Psychiatry* 131 (11): 1277-80.

Le Beau, M. & Mozayani, A. (Eds.) 2001. *Drug Facilitated Sexual Assault: A Forensic Handbook* San Diego, California: Academic Press.

Liester, M.B.; Grob, C.S., Bravo, G.L. & Walsh, R.N. 1992. Phenomenology and sequelae of 3,4-Methylenedioxymethamphetamine use. *Journal of Nervous and Mental Disease* 180: 342-52.

Liska, K. 2004. *Drugs and the Human Body. Seventh Edition*. Upper Saddle River, New Jersey: Pearson Education.

Lowinson, J.H.; Ruiz, P.; Millman, R.B. & Langrod, J.G. 1997. *Substance Abuse: A Comprehensive Textbook. Third Edition*. Baltimore, Maryland: Williams & Wilkins.

Lua, A.C.; Lin, H.R.; Tseng, Y.T.; Hu, A.R. & Yeh, P.C. 2003. Profiles of urine samples from participants at rave party in Taiwan: Prevalence of ketamine and MDMA abuse. *Forensic Science International* 136 (1-3): 47-51.

Marks, J.D. 1991. *The Search for the Manchurian Candidate: The CIA and Mind Control*. New York: W. W. Norton & Co.

McMiller, P. & Plant, M. 1996. Drinking, smoking and illicit drug use among 15 and 16 year olds in the United Kingdom. *British Medical Journal* 313: 394-97.

Muelenbelt, J.; de Groot, G. & Savelkoul, T.J. 1990. Two cases of acute toluene intoxication. *British Journal of Industrial Medicine* 47 (6): 417-20.

R V Sturm, CA 28/04, CA101/04, Judgement of The Court of Appeal of New Zealand, 1 June 2005; Crown Solicitors.

Saito, T.R.; Aoki, S.; Saito, M.; Amao, H.; Niwa, T; Terada, M.; Sugiyama, M. & Takahashi, K.W. 1991. Effects of methamphetamine on copulatory behavior in male rats. *Jikken Dobutsu* 40 (4): 447-52.

Saunders, N. (Ed.) 1997. *Ecstasy Reconsidered*. London: NYDTP Studio.

Semple, S.J.; Patterson, T.L. & Grant, I. 2002. Motivations associated with methamphetamine use among HIV+ men who have sex with men. *Journal of Substance Abuse Treatment* 22 (3): 149-56.

Sims, A. P. 2002. *Symptoms in the Mind: An Introduction to Descriptive Psychopathology. Third Edition*. London: W.B. Saunders.

Snyder, S.H. 1973. Amphetamine psychosis: A 'model' schizophrenia mediated by catecholamines. *American Journal of Psychiatry* 130: 61-67.

Slaby, A.E. 1994. *Handbook of Psychiatric Emergencies Fourth Edition*. Norwalk, England: Appleton & Lange.

Solowij, N.; Hall, W. & Lee, N. 1992. Recreational MDMA use in Sydney: a profile of 'Ecstasy' users and their experiences with the drug. *British Journal of Addiction* 87 (8): 1161-72.

Theron, L.; Jansen, K.L.R. & Skinner, A.M. 2003. New Zealand's first fatality linked to use of 1,4-Butanediol (1,4-B, Fantasy): No evidence of coingestion or comorbidity. *New Zealand Medical Journal* 116 (1184): U650.

Vollenweider, F.X.; Gamma, A.; Liechti, M. & Huber, T. 1998. Psychological and cardiovascular effects and short-term sequelae of MDMA ('Ecstasy') in MDMA-naïve volunteers. *Neuropsychopharmacology* 19: 241-51.

Wiegmann, D.A.; Stanny, R.R.; McKay, D.L.; Neri, D.F. & McCardie, A.H. 1996. Methamphetamine effects on cognitive processing during extended wakefulness. *International Journal of Aviation Psychology* 6 (4): 379-97.

Welner, M. 2001. The perpetrators and their modus operandi. In: M. Le Beau & A. Mozayani (Eds.) *Drug Facilitated Sexual Assault: A Forensic Handbook*. San Diego, California: Academic Press.

Wilkins, C.; Bhatta, K. & Casswell, S. 2002. The emergence of amphetamine use in New Zealand: Findings from the 1998 and 2001 National Drug Surveys. *New Zealand Medical Journal* 115 (1166): U256.

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