

Adverse effects of stimulant drugs in a community sample of drug users

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Abstract

A sample of drug users ($n = 158$) were contacted and interviewed in non-clinical community settings about their use of Ecstasy, cocaine powder, and amphetamines and the adverse effects of these drugs. Subjects reported a wide range of adverse effects including anxiety problems, depression, mood swings, feelings of paranoia, and panic attacks. Sleep and appetite disturbances were the most commonly reported problems. About half of all subjects reported depression and paranoid feelings associated with their stimulant use. Many of those reporting problems stated that these were mild. However, for all drugs, a substantial minority of users reported adverse effects which they rated as 'severe'. Between 30 and 55% of the sample reported having had at least one 'severe' adverse effect (30% cocaine, 35% Ecstasy and 55% amphetamine). There were clear differences between the different drugs in the likelihood and reported severity of adverse effects. Amphetamine use was associated with significantly more adverse effects and with more severe adverse effects than Ecstasy or cocaine. Cocaine powder was associated with the least severe adverse effects. A common pattern of drug use involved the use of depressant drugs such as opiates and benzodiazepines in addition to stimulants. The stimulant and depressant users were more likely than the stimulants-only users to use stimulants by injection and more likely to report adverse effects associated with stimulant use. The stimulant and depressant users were also more likely to have been treated for a drug problem. Approximately a quarter of the sample stated that they had stopped using stimulants up to the point of interview as a result of their bad experiences. © 1997 Elsevier Science Ireland Ltd.

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1. Introduction

Stimulant drugs are widely used. Reports from the UK suggest that amphetamines have been tried by about 14% of young people, Ecstasy (MDMA) by 6% and cocaine by 3% (Ramsay and Percy, 1996). Klee (1992a) noted that amphetamine sulphate is cheap, widely available throughout the UK and that it is second only to cannabis in popularity. Similar observations about the widespread use of amphetamines have been noted in other countries (Hall and Hando, 1993). Drug research has often focused upon a limited number of drugs or drug classes, and the opiates are the drugs

that have most often been investigated. The stimulants have been less thoroughly studied (Klee, 1992a). Changes in the preparation and route of cocaine administration during the 1980s led to an increased awareness of the potential problems associated with cocaine (Gossop et al., 1994; Strang et al., 1993). More recently, Ecstasy (MDMA) has been widely used as a 'dance drug' by young people. MDMA is a stimulant drug which is structurally related to amphetamine, though its effects are less well understood. Although it has been suggested that

among knowledgeable individuals...MDMA is reasonably safe, produces positive mood changes in users, does not cause negative problems (if used sparingly and episodically) and is without evidence of abuse

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(Downing, 1986), other studies have voiced concern about the toxicity and risks of this drug (Steele et al., 1994).

Some of the adverse effects of stimulants are well-known and adverse effects such as amphetamine or cocaine psychosis can be serious. With Ecstasy, there have been reported fatalities associated with its use (Dowling, 1990). Such extreme adverse effects appear not to be common among stimulant users. However, there is still a comparative lack of information about the type and severity of adverse effects experienced by stimulant users. In some studies, Ecstasy has been reported as having minimal adverse effects (Nichols and Glennon, 1984). More recent studies have described a number of adverse effects associated with the use of Ecstasy. A recent study in Scotland (Anderson, 1994) has revealed that Ecstasy use is now widespread and increasing, as is the level of serious adverse consequences, including severe headaches, anorexia, insomnia, tachycardia, paranoia, depression and panic attacks.

Where research has focused on dependent or high-dose drug users, or upon clinic attenders, levels of problems are likely, almost by definition, to be high. Chronic/high dose cocaine and amphetamine use has been associated with a wide range of adverse effects from paranoid ideation through to psychosis (Post, 1975; Siegal, 1982). Hall et al. (1996) examined psychological morbidity among 301 amphetamine users. Depression, anxiety, paranoia, hallucinations and violent behaviour were the most commonly reported symptoms subsequent to the onset of amphetamine use. Frequency of use and route of administration, in particular injection of amphetamine were found to be significant independent predictors of psychological morbidity. Washton and Gold (1987) examined the effects of cocaine among respondents using a cocaine telephone line. Typical callers reported feeling chronically depressed, irritable and overwhelmed with problems. Intranasal cocaine use, intravenous use and cocaine smoking were all associated with a wide range of adverse effects, though smokers and injectors reported more numerous and more severe adverse reactions. Other studies have investigated the effect of route of drug administration in relation to severity of dependence and found that cocaine taken by injection was associated with the highest levels of dependence and intranasal use was associated with the lowest dependence levels (Gossop et al., 1994).

We have examined adverse effects associated with the use of stimulant drugs among a sample of drug users recruited in non-clinical community settings, looking at the use of three different stimulants-MDMA/Ecstasy, cocaine and amphetamines. The types and the severity of adverse effects reported by users of these three types of stimulant drugs are presented and subjects using

stimulants and depressants are compared with subjects who use only stimulants.

2. Method

2.1. Subjects and procedure

The sample consisted of 158 current drug users. Current use was defined as having used a drug on at least one occasion in the last month. All subjects had used one or more of the following: Ecstasy, cocaine powder (cocaine hydrochloride) or amphetamine. The authors believe it important to distinguish between the use of cocaine powder and crack cocaine. It is likely that the use of these different cocaine preparations will differ with regard to the populations who use them, the patterns of use, their usual route of administration, and the types of effects, (including adverse effects) associated with them. The adverse effects of crack cocaine have been widely reported (Washton and Gold, 1987; Siegal, 1982; Colliver, 1987).

All subjects were contacted and interviewed by a team of 'privileged access interviewers' (PAI), who had existing contacts or could develop contacts with illicit drug users in the community, and who had personal attributes that made them non-threatening to the respondents. We have previously described this approach in more detail (Griffiths et al., 1993) and have acquired considerable expertise in conducting research in this manner. Interviews were conducted by a team of 17 PAIs in non-clinical settings in the London area. The data were collected as part of a structured interview which was devised for the purposes of this study. The structured interview covered current drug use, adverse effects of stimulant use, social problems, treatment history and crime. Severity of dependence (SDS) was also measured for each drug using the Severity of Dependence Scale. (Gossop et al., 1995). Interviewers were trained to administer the interview and were paid for their time. All interviews were tape recorded and checked to ensure that they had been properly conducted.

The data on adverse effects were collected in two ways. These involved asking open-ended questions about the three types of drugs ('Have you ever had a bad experience when you have taken [named drug]? 'What happened when you last had a bad experience?'), and also presenting a list of adverse effects and asking subjects to rate the severity of each effect on a four-point scale. The items listed were sleeping problems, weight loss, appetite loss, paranoia, depression, mood swings, lethargy, anxiety, irritability and panic attacks. A series of statistical analyses were performed to examine the relationship between patterns of stimulant use and adverse effects. All analyses were conducted using the Statistical Package for the Social Sciences.

Table 1
Patterns of stimulant drug use

	Ecstasy/MDMA	Cocaine	Amphetamine
Used in the last year	82 (52%)	94 (60%)	104 (66%)
Used in the last month	57 (70%)	47 (51%)	68 (67%)
Mean number of days used in the last month	4	5	7
Modal score (number of days used in the last month)	4	8	4
Mean amount used per occasion	2 tablets	0.79 g	0.93 g
Route of use	99% oral	60% snort 25% inject 14% smoke 1% oral	41% snort 38% oral 20% inject 1% smoke
Mean age first used	24	21	19
Periods of daily use in the last year	10 (13%)	23 (25%)	29 (28%)
Used other drugs to come down from (named drug)	38 (47%)	49 (54%)	49 (49%)
Most commonly reported drug used to help comedown	55% cannabis	47% heroin	60% cannabis

3. Results

3.1. Demographics of users

All 158 individuals had used one or more of the following drugs in the last month: Ecstasy, cocaine powder and amphetamines. For all three stimulants the demographics were very similar. The majority of the sample were male (62%), white (93%), unemployed (76%), with a mean age of 30 (range 14–59, median 29). Only a minority were currently on probation and had cases pending (19%). Most of the respondents ($n = 140$, 89%) were polydrug users and the majority ($n = 82$, 52%) had used more than one of the three stimulants in the last year. One hundred and four users (66%) had used opiates, and/or benzodiazepines in the last year in addition to stimulants.

3.2. Patterns of stimulant drug use

Table 1 contains information on the patterns of use of the three stimulant drugs. Amphetamine was the drug most likely to have been used in the last year, while ecstasy was the drug most likely to have been used in the last month. Mean scores indicate that amphetamine was the most frequently used drug, followed by cocaine and ecstasy. Routes of administration varied for cocaine and amphetamine use, with snorting being the most common route. Ecstasy was in all but one case taken orally. Approximately half the sample used other drugs to help with the comedown from the three stimulants.

Half of the ecstasy users ($n = 40$, 52%) reported reduced use of Ecstasy compared to 1 year previously, and only 21% ($n = 16$) were using more. Three major reasons were given for using less Ecstasy: the cost of the drug, the novelty of using had worn off, and the decline in the purity and quality of Ecstasy. Users were also asked whether they were replacing their Ecstasy use

with other drugs. Twenty percent ($n = 14$) reported that they had done so. Amphetamines were the most common substitute: six subjects had replaced Ecstasy with amphetamines. Other drugs which were being used in place of Ecstasy included heroin ($n = 3$), alcohol ($n = 3$), cocaine ($n = 2$), cannabis ($n = 2$) and crack ($n = 1$).

3.3. Adverse effects of stimulant use

Subjects were first asked an open-ended question 'Have you ever had a bad experience when you have taken [named drug]?' 'What happened when you last had a bad experience?'. In response to these questions, 17 (21%) individuals reported having had a bad experience whilst using Ecstasy, and 16 (20%) reported having had one in the last year. The mean number of bad experiences in the last year was 1.9, with a range of between 1 and 5. When asked to describe what had happened during their last bad experience, the two most common responses were felt paranoid (7%, $n = 6$) and felt faint/about to collapse (4%, $n = 3$). The majority of these bad experiences occurred in clubs (77%, $n = 13$). Of the individuals who had a bad experience, 11 (65%) said it had affected the way they used Ecstasy: four of these said as a result they had stopped using the drug, whilst others stated that they used Ecstasy less frequently or more carefully.

Twenty two (24%) individuals reported having had a bad experience on cocaine. Fifteen people (16%) had one in the last year with a mean of 3.5 in the last year and a range of between 1 and 20. When asked to describe what had happened during their last bad experience, the two most common problems reported were felt paranoid (8%, $n = 7$) and felt faint/about to collapse (5%, $n = 5$). Of the individuals who had a bad experience, thirteen (65%) said the bad experience had affected the way they used cocaine and three of these said as a result they had stopped using cocaine. Six stated that they used cocaine less frequently as a result of the bad experience.

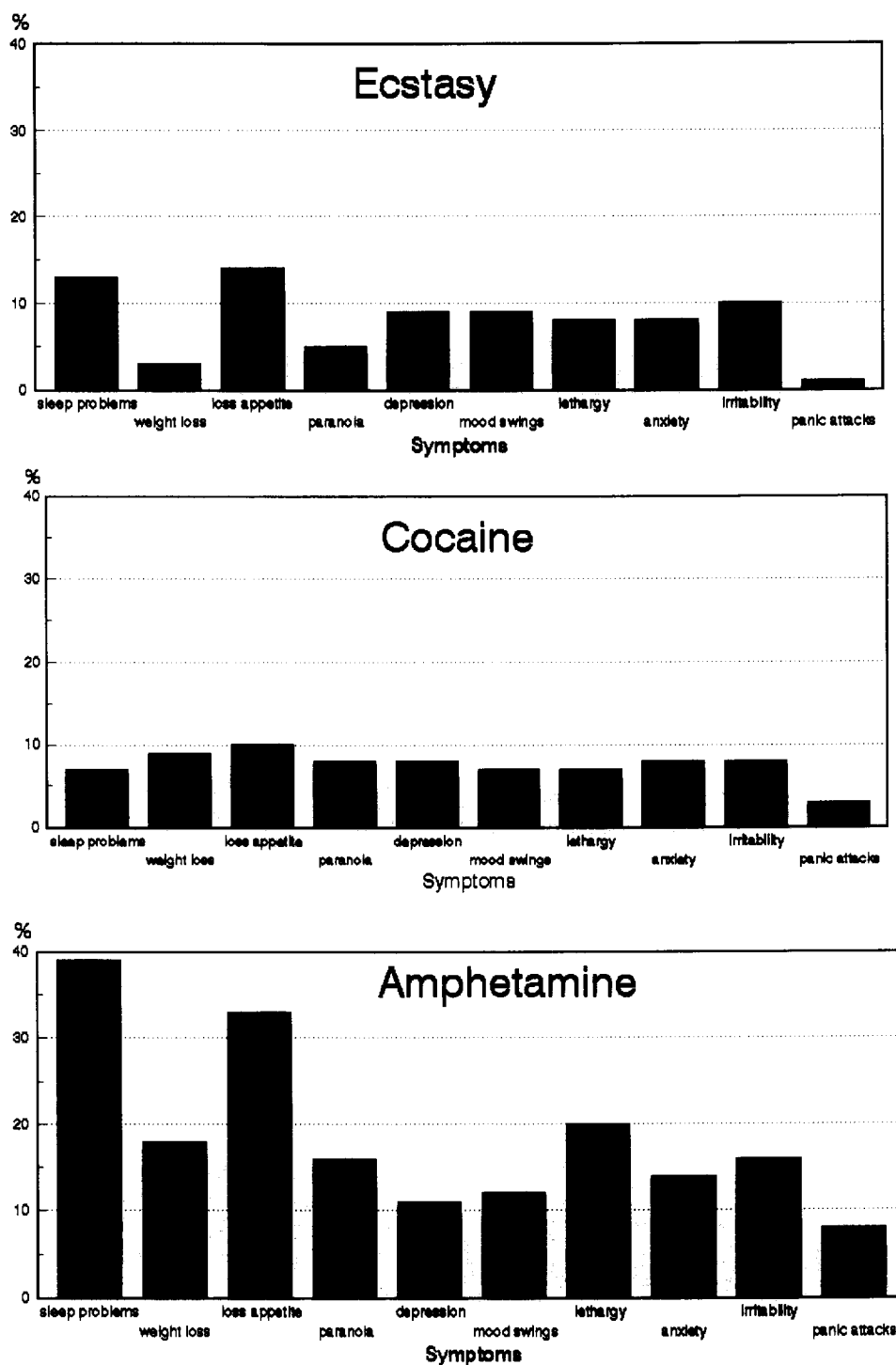


Fig. 1. Number of respondents reporting severe adverse effects.

Thirty one (30%) amphetamine users reported having had a bad experience. Twenty of them (19%) had one in the last year with a mean of 4.5 in the last year, and a range of between 1 and 20. When asked to describe what had happened during their last bad experience, the most common responses were—felt paranoid (9%, $n = 9$), panicked/felt anxious (6%, $n = 6$) and psychosis/psychological problems (6%, $n = 6$). Of those individu-

als who had a bad experience, 16 (57%) said it had affected the way they used amphetamine. Four of these (25%) said as a result they had stopped using amphetamine and four (25%) stated that they used smaller amounts of amphetamine.

Subjects were also presented with a list of ten adverse effects and asked to rate the severity of each effect on a four-point scale (0, not a problem; 1, a mild problem; 2,

a moderate problem; and 3, a severe problem). Fig. 1 illustrates those respondents reporting severe adverse effects. Many of the users reported adverse effects after having taken Ecstasy. The frequency with which adverse effects were reported varied from 21% for panic attacks to 79% for loss of appetite. In terms of severity, the majority of effects associated with use of Ecstasy were classed as mild by respondents. Trouble sleeping and loss of appetite scored most highly in severity with a mean score of 1.3, along with mood swings and lethargy with a mean score of 1.2.

A higher percentage of the cocaine users reported having experienced such effects in comparison with responses to the open ended question. The frequency with which adverse effects were reported varied from 29% for panic attacks to 73% for loss of appetite. In terms of severity, the majority of effects experienced were classed as mild by respondents. Loss of appetite scored highest in severity with a mean score of 1.2, along with irritability and lethargy with a mean score of 1.

Most amphetamine users reported having experienced a range of adverse effects (from 31% for panic attacks to 88% for sleep problems). As for the other drugs, the majority of effects experienced were classed as mild. The items which scored the highest in severity were trouble sleeping (mean score 2.0), and loss of appetite (mean 1.9).

The sum of scores for all ten adverse effects was calculated to create a total severity score for the three drugs and to enable comparisons between the drugs. Cocaine received a severity score of 8.3, Ecstasy a score of 9.6 and amphetamine a score of 12.4. Sleep problems, appetite and weight loss were rated the most severely. Respondents reported more severe problems after having taken amphetamine than after using cocaine ($t = 4.69$, $df = 51$, $P < 0.001$) or Ecstasy ($t = 3.67$, $df = 53$, $P < 0.005$).

Comparisons were made between respondents using different routes of administration with respect to their total adverse effect scores. There were no statistically significant differences between injectors, snorters or oral users of amphetamine in their adverse effect scores ($F(2,93) = 1.05$ NS), nor between injectors, smokers or snorters of cocaine and their adverse effect scores ($F(2,82) = 1.21$ NS). No such comparisons were made for ecstasy since all but one subject took ecstasy orally.

Low mean severity of dependence scores were reported for all three drugs, and there were no statistically significant differences between the SDS scores for these drugs. The lowest severity of dependence score was associated with the use of Ecstasy (mean score 1.0, range 0–4); for amphetamine, the mean score was 1.9 (range 0–14), and for cocaine powder the mean score was 1.3 (range 0–8). About half of the stimulant users returned zero scores for the SDS scale; 50% scored zero

with regard to their use of Ecstasy, 49% for cocaine powder and 40% for amphetamine. There was a significant positive correlation between total SDS scores and amount of use for amphetamine ($Corr = 0.40$, $P < 0.05$) but not for ecstasy ($Corr = 0.14$, $P = 0.22$) or cocaine ($Corr = 0.27$, $P = 0.06$). There was also a significant positive correlation between SDS scores and adverse effect scores for cocaine ($Corr = 0.37$, $P < 0.05$) but not for ecstasy ($Corr = 0.2$, $P = 0.13$) or amphetamine ($Corr = 0.07$, $P = 0.33$).

3.4. Comparing stimulant and depressant users and stimulant only users

Comparisons were made between stimulant only users, that is those who had used stimulants but not opiates and benzodiazepines (these will now be referred to as S users), and subjects who had used stimulants and depressant drugs such as opiates, and benzodiazepines (these will now be referred to as S–D users). A total of 34% of the sample had used stimulants only and fell into the S user category and 66% had used stimulants and depressants and were categorised as S–D users. The S users were individuals who had used cocaine powder, crack, amphetamine, or Ecstasy. S–D users had also used heroin, methadone, palfium (dextromoramide), DF118 (dihydrocodeine), diconal (dipipanone), temazepam, diazepam and temgesic (buprenorphine) in the last year.

Respondents were asked for their main drug of use. Cannabis was the most commonly reported main drug for S users (38%), followed by amphetamines (15%), ecstasy (15%), alcohol (15%), cocaine (13%), and LSD (3%). Heroin was the most commonly reported main drug of use for S–D users (49%), followed by cannabis (17%), methadone (16%), amphetamines (4%), ecstasy (4%), alcohol (4%), crack cocaine (4%), cocaine powder (2%), solvents (1%) and LSD (1%).

There were no significant differences between the S–D and S users in either the amount of stimulant drugs used, the frequency of use or age of first use of Ecstasy, cocaine and amphetamine. S–D users were significantly older than S users ($t = 2.86$, $df = 122$, $P < 0.01$), and they had been using cocaine and amphetamine for a significantly longer period of time ($t = 2.21$, $df = 73$, $P < 0.05$; $t = 2.75$, $df = 83.6$, $P < 0.01$, respectively). There was no significant difference between S–D users and S users in length of ecstasy use. S–D users were more likely to report daily use of one or more of these drugs within the previous year (35% of S–D users compared to 12% of S users; $\chi^2 = 10.4$, $df = 1$, $P < 0.005$). There were significant differences in route of use of cocaine and amphetamine. When compared with S users, the S–D users were more likely to use cocaine by injection whereas S users were more likely to use by snorting. A total of 36% of S–D users

used cocaine by injecting, 16% by smoking and 48% by snorting and 3% of S users used cocaine by injecting, 10% by smoking and 87% by snorting ($\chi^2 = 14.8$, $df = 2$, $P < 0.001$). S–D users were more likely to use amphetamine by injecting and S users were more likely to use by smoking or snorting ($\chi^2 = 7.6$, $df = 2$, $P < 0.05$). Forty three percent of S–D users used the drug by injecting, and 55% by snorting; only 2% reported using amphetamines by smoking. Among the S users, 90% used by snorting and 10% by injecting.

3.5. Adverse effects of polydrug use

The S–D group reported significantly more severe problems after using cocaine ($t = 2.34$, $df = 85$, $P < 0.05$) and amphetamines ($t = 2.48$, $df = 97$, $P < 0.05$) than the S group. The S–D group also reported more severe problems after using Ecstasy, though this effect was just below the 5% level ($t = 0.55$, $df = 77$, $P = 0.58$).

The S–D users reported more problems rated as severe than the S users resulting from their use of cocaine and amphetamines. The S–D users reported more severe problems with trouble sleeping ($t = 2.73$, $df = 80.1$, $P < 0.05$), aggression ($t = 2.73$, $df = 83.7$, $P < 0.05$) and panic attacks ($t = 2.55$, $df = 85.45$, $P < 0.05$) which they attributed to their cocaine use. S–D users reported a greater severity of the following symptoms associated with their amphetamine use: feelings of being watched ($t = 2.51$, $df = 98.7$, $P < 0.05$), hearing voices ($t = 2.79$, $df = 89.2$, $P < 0.05$) and panic attacks ($t = 2.64$, $df = 98.81$, $P < 0.05$).

S–D users also were more likely to report using other drugs to come down from cocaine and amphetamines. Of S–D users, 69% used other drugs to come down from cocaine compared to 21% of S users ($\chi^2 = 18.8$, $df = 1$, $P < 0.001$); 62% of S–D users used other drugs to come down from amphetamines compared to 30% of S users ($\chi^2 = 9.6$, $df = 1$, $P < 0.005$).

Respondents were questioned as to how their drug use had effected five areas of their life over the last year. These five areas were close relationships, how unhappy they felt, physical health, problems with the police and their life in general. S users and S–D users differed significantly on four of the measures. S–D users were significantly more likely to report that their drug use had made their close relationships worse ($t = 4.1$, $df = 142.1$, $P < 0.001$), had made them feel more unhappy ($t = 3.0$, $df = 170.1$, $P < 0.005$), had made their physical health worse ($t = 3.3$, $df = 159.3$, $P < 0.005$) and had a more detrimental effect on their life in general ($t = 5.2$, $df = 141.3$, $P < 0.001$). There was no significant difference between the two groups regarding problems with the police.

However, S–D users were significantly more likely to have been charged with a non drug related criminal offence ($\chi^2 = 22.3$, $df = 1$, $P < 0.001$), a drug offence

($\chi^2 = 13.9$, $df = 1$, $P < 0.001$), and to have ever been in custody ($\chi^2 = 24.8$, $df = 1$, $P < 0.001$).

S–D users were significantly more likely to have (ever) received treatment for a drug problem ($\chi^2 = 59.4$, $df = 1$, $P < 0.001$) and significantly more likely to have thought they needed help ($\chi^2 = 16.3$, $df = 1$, $P < 0.001$). Only 3% of the S users had ever received treatment compared with 64% of the S–D users.

4. Discussion

Within our community sample of drug users, the prevalence of use for Ecstasy (MDMA), cocaine powder and amphetamines was similar, with between 1/2 and 2/3 of the sample having used at least one of these drugs during the last year. Typically, stimulants were used on one or 2 days a week, though periods of daily use were also reported within the previous year by a minority of the users. Daily use was more often reported for amphetamines and cocaine powder than for Ecstasy, and daily use of stimulants was also more likely to occur among S–D users. The majority of drug users in this study reported using Ecstasy less frequently than a year ago. It is unclear if this reflects changes in the population of Ecstasy users, or is indicative of a decline in the popularity of Ecstasy as a drug. Three major reasons were given for reduced use of Ecstasy—the cost of the drug, the novelty of using had worn off, and the quality and purity of Ecstasy had declined.

There were differences in the frequency and route of administration of the three stimulant drugs. Ecstasy was usually taken by mouth, cocaine powder by snorting, amphetamine by snorting and by mouth. A substantial minority of the cocaine and amphetamine users injected these drugs. Ecstasy was very rarely taken by injection. Solowij et al. (1992) also reported a low prevalence of Ecstasy injecting, though a recent study of Scottish drug injectors (Green et al., 1995) reported that more than a quarter of drug injectors had also taken Ecstasy by injection. Severity of dependence scores for the three stimulant drugs within our sample were very low and much lower than the scores of amphetamine users in Sydney, Australia (Gossop et al., 1995).

Despite the patterns of occasional use and the low levels of dependence, a range of adverse effects associated with the use of Ecstasy, cocaine and amphetamines were reported. Between 1/3 and 1/2 of the sample rated at least one of these adverse effects as severe. Amphetamines were associated with the greatest number of adverse effects and these effects were also rated as more severe, in comparison to Ecstasy and cocaine. Cocaine powder was associated with the least severe adverse effects. Route of administration was not related to overall number of adverse effects.

More than 1/3 of the amphetamine users described having had severe sleep disturbances, and between 10–20% reported severe problems with paranoia, depression, anxiety and irritability. These terms, especially paranoia, anxiety and depression, should be interpreted with reference to their common usage rather than as psychiatric states or conditions. Other adverse effects including loss of appetite, weight loss and lethargy were also noted. Some of these effects, such as loss of appetite or weight loss, may be regarded by some users not as adverse effects but as desired or incidental effects. On the other hand, it is difficult to see effects such as anxiety, paranoia, depression, or panic attacks as anything other than unpleasant states, and it is disturbing that such effects were reported by so many users of these drugs. Sleep disturbances were noted by many amphetamine users and in an earlier study of withdrawal effects among heavy amphetamine users in treatment, a persistent and subjectively unpleasant disturbance of sleep patterns was observed (Gossop et al., 1982).

The low levels of adverse effects associated with cocaine use in this sample may appear surprising. Much attention has been paid to the adverse effects of cocaine (Gold and Washton, 1983—unpublished; Colliver, 1987). However, it is likely that the occurrence and the severity of adverse effects of cocaine are related to route of administration. This effect does not relate to low purity of the drug which has been steady at approximately 40–50% in the UK (Strang et al., 1993). In a previous study we found that severity of dependence upon cocaine was related to route of administration, with injectors and smokers reporting significantly higher levels of dependence than intranasal users (Gossop et al., 1994), and in other studies we have found that severity of dependence was itself associated with health risk behaviours (Gossop et al., 1993a,b).

Subjects who had used opiates and/or benzodiazepines as well as stimulants were more likely to report adverse effects associated with their stimulant drug use. It is possible that some sort of 'stage' effect may contribute to this finding since the S–D users were older than the S users and had been using amphetamine and cocaine for a longer period of time. This finding may also be related to the broader pattern of drug misuse among these subjects or to the more problematic patterns of use by the S–D users, e.g. greater likelihood of daily use, higher frequency of injection, more mixing of different drug types, interaction with dependence upon opiates or other drugs. Gove et al. (1979) also found that multiple drug users were more likely to have poor overall mental health scores than any other drug using group. Similarly Darke et al. (1994) found that amphetamine users who used benzodiazepines reported higher levels of psychopathology and poorer health than amphetamine users who did not use benzodi-

azepines. The majority of the S–D users had already received treatment for a drug problem and it is likely that this related to their use of such other drugs as heroin and benzodiazepines. Where subjects were in contact with drug treatment services, a thorough assessment procedure should have elicited patterns of stimulant use and helped to indicate appropriate decisions about the need for support or intervention. Contact with treatment services was very low among S users (those who only took stimulant drugs). Although severe adverse effects were less commonly reported by this group, there is still reasons for concern that some of these drug users experienced serious adverse effects and there may be a need to provide advice and support for such users about how to respond to paranoid thoughts, panic attacks, anxiety, depression and sleep problems.

Different methods of assessment lead to different results. Open ended questions about adverse effects produced fewer reported problems than rating scales. In response to the open-ended questions, about a quarter of the sample reported a bad experience on Ecstasy, cocaine and/or amphetamine, whilst responses to the rating scale for each of the three drugs indicated that between 54 and 65% had experienced such effects. In part, this difference of response may reflect the fact that many of the effects were rated as mild, and possibly were not prominently identified as of sufficient severity to qualify as 'bad' effects in response to an open-ended question. Heather and Stallard (1989) found a similar effect when identifying reasons for relapse amongst alcoholics. Substance-related cues were more prominent among reasons given for relapse in response to rating scale methods than when open-ended questions were used. Where a comprehensive picture is required of the adverse effects of drug use, a number of research methods, including rating scales, should be used.

One of the most striking findings from our study is of the overall high level of adverse affects from use of stimulants drugs amongst a community sample of drug users. A large proportion of this morbidity passes unobserved and untreated by health care agencies. Our findings raise issues about the extent to which these adverse effects constitute areas of unmet need. The different stimulant drugs were associated with different 'casualty rates', with levels of adverse effects for amphetamine being even more frequent than for cocaine. In view of the substantially greater use of amphetamines than cocaine outside the London area in the UK, (Klee, 1992b) and despite greater media preoccupation with cocaine, research and health care attention might more constructively be focused on problems with amphetamines. In keeping with earlier findings (Gove et al., 1979), polydrug use is often associated with higher levels of problems. This association does not necessarily relate directly to the polydrug use and may alternatively be another expression of

more chaotic drug use which itself led to the polydrug use. Finally, there is encouraging evidence of the capacity of the drug users in this sample to modify their drug taking behaviour in the light of these adverse experiences, with more than half subsequently modifying the way they use the drug (approximately half of whom thereafter reduced the amount of drug used). If stimulant users in the community are able to modify their drug taking behaviour in the light of experience, then this should encourage the development of health education strategies aimed at non treatment populations.

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