Relationship Between Initial Reactions to Cocaine, Expectancy of Reactions to Cocaine, and Use Patterns

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Abstract

Nine-hundred and sixty-two psychology students were administered a short self-report questionnaire that probed their actual initial and expected initial reactions to cocaine. The frequency of experimentation with the drug was quite low; only 30 admitted to having ever used cocaine. For these subjects, measures of Global Positive and Global Negative effects were obtained for their first use. Cocaine experienced subjects were also asked what they would expect their next cocaine experience to be like. The remaining subjects were asked what they expected the effects of cocaine to be on their first experiences and subsequent ones. The initial Global Positive and initial Global Negative scores were correlated with whether or not subjects had used cocaine a second time and with lifetime frequency of use of the drug. Only the initial Global Positive was correlated with latency to second use of cocaine. Neither the expected Global Positive nor the expected Global Negative were correlated with second use, lifeuse, or latency to second use. Comparisons between users and nonusers demonstrated that the latter group expected greater negative effects on initial and subsequent uses of cocaine than those experienced by or expected by users. Future studies examining the origin of cocaine abuse should consider the causes of variability in initial reactions.

Actual reactions (Haertzen, Kocher, & Miyasoto, 1983) and expectancies of reactions (Schafer and Brown, 1991) to drugs can be used as predictors of subsequent use patterns. Variability in initial reactions may predict the potential for cocaine abuse, with those individuals who have more positive reactions tending to use cocaine at a higher frequency (Davidson, Finch, & Schenk, in press). Thus, identification of high risk groups for cocaine abuse may benefit from studies on initial reactions to the drug. These studies have not been extensively undertaken because of the ethical implications involved in performing a controlled laboratory investigation in this area. Studying cocaine effect expectancies is also relatively new. Alcohol effect expectancies, on the other hand, have been widely researched and have been demonstrated to affect the development of drinking problems (O'Malley & Maisto, 1985) as well as relate to the drinking patterns of non-problem drinkers (Brown, Goldman, & Christiansen, 1985). Expectancies of drug effects exist in nonusers and may mediate their decision to abstain from using the drugs (Schafer and Brown, 1991). Researching expectancies of cocaine effects is therefore important to the development of prevention programs. Both of these factors, actual and expected reactions to cocaine, are important because of the strong possibility that they can predict those individuals who are prone to cocaine abuse.

Although heavy cocaine users have been studied previously (Waldorf, Reinarman, & Murphy, 1991; Haertzen, et al, 1983), the

reactions of relatively inexperienced users to cocaine are relatively unexplored. Research in this area is important in identifying those groups who are at risk for cocaine abuse. Waldorf et al (1991) reported a wide variety of first-time reactions to cocaine in a sample of heavy cocaine users. These ranged from positive to negative, but many subjects in their sample experienced no discernible initial effects from cocaine. An intriguing question concerns these subjects who experienced neutral initial effects from cocaine and why they continued to use the drug until addicted. The answer may lie in their expectations of the effects of continued use of cocaine. Although Waldorf's subjects expected an unimpressive response to cocaine on their first experiences with the drug, they also believed this reaction would change and become more positive with continued use; thus, both the actual experiences and expected future experiences may have contributed to the subsequent abuse patterns of these subjects. Schafer and Brown's (1991) results suggest that most individuals are not familiar with the expectation of an enhanced positive response through repeated exposure to cocaine. In their study of cocaine expectancies, subjects who had never experimented with cocaine tended to have higher expectations of positive effects than infrequent users. Thus, in contrast to Waldorf's group, many nonusers expected a very powerful first response to cocaine and may consequently have been disappointed in the initial effects of the drug. Not expecting the effects to improve, they may become one-time only

or infrequent users.

The importance of an individual's initial reactions to cocaine and their relationship to subsequent use patterns has been identified. In a sample of heavy opiate users, more positive first experiences with drugs in nine categories were correlated with continued use of those drugs (Haertzen at al, 1983). This relationship was strongest for the category of drugs involving cocaine. Therefore, the more positive one's first reactions to cocaine, the more likely cocaine would be used again and the more times it was used overall. The study of very experienced users has contributed greatly to our understanding of some of the factors that may predispose subjects to drug abuse; however, inclusion of infrequent users is quite important if one is to generalize findings to a broad group of cocaine users.

Davidson et al (in press) have documented variability in initial reactions to cocaine in relatively inexperienced users. In this study, the magnitude of self-reported initial positive reactions to cocaine was positively related to lifetime frequency of cocaine use and negatively related to the latency between first and second use of the drug. Thus, subjects who reported that this first experience was more positive tended to use cocaine a second time with a shorter latency and tended to have used cocaine more frequently.

Animal studies have also shown variability in reactions to cocaine. Both rhesus monkeys (Deneau, Yanagita, & Seevers, 1969) and rats (Bozarth, Murray, & Wise, 1989) vary in their

susceptibilities to self-administration of cocaine. Thus, certain individuals seem to be at risk for cocaine abuse. The basis for this variability in initial responses to cocaine has been investigated in animal studies.

Horger, Shelton, and Schenk (1990) found that prior exposure of rats to other stimulants enhanced the rewarding properties of cocaine. Rats that were exposed previously to other stimulants, including nicotine and methylphenidate (Ritalin), self-administered larger amounts of cocaine, more quickly, than did the control animals. Caffeine (Horger, Wellman, Morien, Davies, & Schenk, 1991) and amphetamines (Horger, Giles, & Schenk, 1992) have also been shown to demonstrate these effects. The preexposed groups of animals seemed to be sensitized to the positive effects of cocaine. Prior stimulant use may cause this variability in initial responses to cocaine and is therefore an important area of investigation in human populations. Based upon the sensitizing effect of prior stimulant exposure derived from animal studies, one could hypothesize that previous exposure to stimulants in humans could account for the variability in initial reactions to cocaine. Exposure to other stimulants prior to an individual's first experience with cocaine could predispose that individual to cocaine abuse.

Several hypotheses were derived from the various phenomena discussed above. First, initial reactions to cocaine were expected to vary with overall rates of cocaine use. Both positive and negative reactions to cocaine were predicted to

relate to frequencies of subsequent use of the drug. People who actually experience a highly positive first response to cocaine will likely use the drug again, more quickly, than those who do not have a positive response. This group is analogous to the results found in Haertzen's (1983) opiate user study.

Second, it was predicted that variability in cocaine effect expectancies would correlate with rates of cocaine use. Specifically, the more positive expectations were, then the more cocaine would be used. On the other hand, individuals who do not expect highly positive effects from initial cocaine use, but do expect the effect to get increasingly better with subsequent cocaine use, will be more likely to continue to try cocaine, searching for a "higher high." Schafer and Brown's (1991) study showed that in their sample at least, subjects are not very familiar with the idea of an enhanced positive response to cocaine--for their nonusers tended to expect highly positive first responses to cocaine.

We further hypothesized that nonusers of cocaine have similar effect expectancies which differ from the expectancies of cocaine users. Nonusers were predicted to report more positive initial reactions than those expected by relatively inexperienced users, but less positive than those expected by regular users. In addition, nonusers were predicted to expect more negative reactions than those experienced by users. Users were also predicted to expect more positive and less negative reactions on their next use of cocaine than those expected by nonusers if

cocaine were to be used more than once. For the purpose of these comparisons, the initial reactions and subsequent expectancies of users were compared with the effect expectancies of nonusers.

Finally, prior exposure to other stimulants (besides cocaine) was expected to sensitize subjects to cocaine. Previous stimulant use was predicted to increase the positivity of one's initial reactions to cocaine, thus increasing the potential for abuse.

The present study investigated a broader subject pool than those used by Waldorf (1991) or by Haertzen (1983) in order to study variability in initial responses and expectancies of reactions to cocaine. These two factors, expectancies and actual reactions, were investigated by studying both users and nonusers of cocaine. First, we investigated users' expectancies of future reactions to cocaine, variability in initial reactions to cocaine, and how this variability may be related to biological sensitization through other stimulants. Second, we investigated the expectation patterns of cocaine effects in nonusers. The results found by Schafer and Brown (1991) suggest that nonusers generally have misconceptions about the initial effects of cocaine (overemphasizing both positive and negative effects) when compared to users.

Method

Subjects

Subjects were 962 psychology undergraduate students from Texas A&M University. Analyses were performed for 883 subjects;

data from 79 were omitted due to incomplete responses. Three-hundred forty-six were male, 534 were female; 13 failed to report gender but were included in all data analyses. The average age of the sample was 18.5. Thirty subjects (18 male, 12 female) reported previous experiences with powder cocaine (crack was specifically excluded). A similar questionnaire distributed at Texas A&M University has yielded a comparable rate of experimentation with cocaine (Davidson et al, in press).

This rate of experimentation with cocaine is typical for the age group which was investigated. The average age at the time they completed the questionnaire was 18.5. Cocaine experimentation typically begins at a later age. The average age of the user sub-group, for example, was 19.2. The National Institute on Drug Abuse (NIDA) has determined that only 2.4% of 12 to 17 year olds used cocaine at some time in their lives; however, 17.9% of 18 to 25 year olds experimented with the drug (1991). The average age of the subjects in the current sample was probably too young to have been widely exposed to cocaine. Cocaine experimentation normally begins at a later age than does experimentation with other illegal drugs (Kandel, Kessler, & Margulies, 1978).

The gender of the subjects may also account for the rate of cocaine use found in the present study. Over 61% of the current sample is composed of females whereas in the user sub-group, only 40% are female. NIDA found that 2.8% of males between the ages of 18 and 25 used cocaine at the time of the survey; only 1.3% of

females were current users (1991). Such an apparently low rate of cocaine experimentation in a sample that is nearly two-thirds female is therefore not surprising.

Initial Effects Measure

All participants completed a 15 item scale derived from the cocaine expectancy measure developed by Schafer and Brown (1991). From the original measure, Davidson et al (in press) developed a shorter questionnaire which was used in the present study. The questionnaire that was used consists of 15 items, 8 positive and 7 negative (see Tables 1 and 2 for the individual items). Subjects responded on a scale of 1 to 4 for each item, ranging from 1--not at all true, to 4--very true. One item on the negative scale, "Cocaine decreased my sexual performance" was eliminated from analyses because in a previous study, 34% of subjects indicated that it did not apply (Davidson et al, in press). Nonusers of cocaine were asked to answer each question regarding their expectancies of initial reactions to cocaine; users, however, were asked to answer these questions regarding their initial responses to cocaine.

Users were also asked to indicate their patterns of cocaine usage. On a scale of 1 to 4, they reported how long ago their first experience with cocaine was (1=One month or less, 2=1 to 6 months, 3=6 months to 1 year, 4=more than one year). They were also asked whether they used cocaine again. If they had, subjects indicated on a scale of 1 to 5 the period of time between their first and second use of cocaine (1=one week or

less, 2=1 week to 1 month, 3=1 month to 6 months, 4=6 months to 1 year, 5=more than 1 year). Subjects were asked to estimate their total lifetime use of cocaine on a scale of 1 to 4 (1=one to 2 times, 2=3 to 9 times, 4=10 to 39 times, 4=greater than 40 times). Finally, subjects were asked to indicate their use of cocaine (on a 1 to 4 scale like that used for lifeuse) during the two months prior to completing the questionnaire. Lifeuse, whether or not cocaine was used a second time, and latency to second use were included as indicators of abuse potential. Use of cocaine in the two months prior to the collection of data was not included in analyses because only 5 of the user sub-group reported using cocaine in this period. In addition, individuals who had used cocaine only one time were compared to those who used cocaine repeatedly in respect to their initial reactions to cocaine.

Expected Effects Measure

The same items from the initial effects measure were repeated on a second scale, the expected effects measure. This time, all participants were asked to report expectancies of cocaine effects. Users were asked to report their expectancies of reactions to cocaine if they were to use the drug again; nonusers were asked to report expectancies of reactions if cocaine was to be used a second time. The purpose of requesting expectancy data was to determine whether users and nonusers expected the magnitude of the positive response to increase with subsequent use and to determine whether this was related to

previous experience.

In addition to the initial and expected effects scales, participants were asked to indicate their previous usage of other drugs including stimulants other than cocaine. This set of questions was an attempt to gather data to investigate the relationship between prior stimulant exposure and cocaine responses in humans as opposed to the animal studies in which this idea was developed. Subjects were asked to report how often they had used various drugs, such as: marijuana, hallucinogens, tranquilizers, and prescription medications (e.g. allergy medications). The two stimulants that were specifically mentioned were nicotine and Ritalin (methylphenidate).

Procedure

To ensure the anonymity of subjects, all testing materials were placed into envelopes and the envelopes were then distributed. Within each envelope was one copy of the questionnaire, one scantron answer form, two consent forms, and one debriefing form. After completing the questionnaire, subjects were instructed to place the questionnaire and the scantron back into the envelope. The envelope was then given to experimenters separately from the signed consent form. The subjects were instructed to keep the other consent form and the debriefing for their own reference.

Results

We have presented the data for the two groups (users and nonusers) in two separate sections. Comparisons between users

and nonusers are presented in a third section.

Study 1: Users

Thirty subjects reported having used cocaine at least once. Eighteen were male and 12 were female. The average age was 19.2 at the time they completed the questionnaire (range was 18 to 23 years). The ages at which they first tried cocaine ranged from 14 to 21 years; the average was 16.8. Seventy-seven percent of respondents reported that they used cocaine for the first time more than one year previously. Only 1 subject used cocaine for the first time within the month prior to completing the questionnaire. Nineteen (63%) used cocaine 2 or more times. Of these, 79% indicated they used cocaine the second time within 1 month after their first experience with the drug. Only 4 (13%) of the sample reported using cocaine more than 40 times in their lifetime, 3 (10%) estimated their total usage to be between 10 and 39 times, 9 (30%) reported using cocaine between 3 and 9 times, and 14 (47%) had used cocaine only 1 to 2 times in their life. Only 5 (26% of repeat users) reported using cocaine in the previous month.

Internal Consistency. The internal consistency estimate of reliability (Chronbach's coefficient alpha) for the 8-item initial Global Positive scale was .80; for the expected Global Positive, it was .83. For the 6 item negative scale, the coefficient alpha for the initial Global Negative was .60; for the expected Global negative, it was .75.

Means and Standard Deviations. The mean and standard

deviation for the initial Global Positive were 2.63 and .616. The means for individual items ranged from 1.83 (SD=.791) to 3.23 (SD=1.12). For the expected Global Positive, the mean and standard deviation were 2.67 and .668. The means for individual items were between 1.76 (SD=.858) and 3.23 (SD=1.13).

For the initial Global Negative, the means and standard deviations were 2.20 and .583. Individual items ranged from 1.43 (SD=.728) to 2.87 (SD=1.17). The mean and standard deviation for the expected Global Negative were 2.48 and .659. The means and standard deviations for individual items were between 1.67 (SD=.890) and 3.03 (SD=1.16).

Initial Scale. Table 1 shows the correlations between the initial positive items and 1) total lifetime use of cocaine, 2) whether or not subjects had used cocaine a second time, and 3) latency to second use. Analyses that dealt with latency to second use were performed only on those subjects who used cocaine more than once (N=19); the other analyses used the whole user sub-group (N=30). The initial Global Positive, an average of all the positive items, was correlated with overall lifetime use of cocaine ($r=.50$, $p<.005$). Thus, individuals with higher Global Positive scores on initial use of cocaine tended to use cocaine more often in their lifetime than individuals with lower scores. The initial Global Positive also correlated with whether cocaine was used a second time ($r=-.47$, $p<.009$), and with latency to second use of cocaine ($r=-.49$, $p<.03$). Therefore, individuals who reported higher positive reactions on their first experience

with cocaine had a tendency to use cocaine again with a shorter interval of time between their first and second uses. Several individual initial positive effect items also correlated with overall lifeuse and second use of cocaine. One individual item significantly predicted latency to second use (See Table 1).

Insert Table 1 about here

Table 2 shows the correlations between the initial negative items and 1) overall lifeuse, 2) whether cocaine was used a second time, and 3) latency to second use. The initial Global Negative scores predicted both lifeuse ($r=.49$, $p<.006$) and second use ($r=-.43$, $p<.02$) but not latency to second use. Thus, the more negative an individual's first experience with cocaine, the less likely he/she was to use it again, but the more he/she used cocaine overall. Two of the initial individual items correlated with lifeuse, two correlated with whether cocaine was used a second time, and two correlated with latency to second use (see Table 2). The satisfaction/craving item correlated with all three of these factors and thus may be a powerful predictor of abuse potential.

Insert Table 2 about here

Expected Scale. Correlational analyses performed on the expected positive effects for next use revealed no significant

relationships between the individual items or the expected Global Positive with overall lifeuse or second use. Latency to second use was also not significantly related to the expected Global Positive. One expected effect item, however, did predict latency to second use, "cocaine made me feel like I could do anything" ($r=-.57$, $p<.01$). The expected Global Negative did not significantly predict lifeuse, whether cocaine was used a second time, or latency to second use. Table 3, however, shows that two of the individual negative items significantly predicted overall lifeuse--the same two that predicted lifeuse on the initial scale. Therefore, the more shaky cocaine was expected to make an individual feel, and the higher the expectation was to crave cocaine, then more cocaine was used. The expected craving item also predicted second use and latency to second use of cocaine. One other item correlated significantly with latency, "I do not expect my thoughts to be as deep when I am on cocaine."

Insert Table 3 about here

Main Effects and Interactions. The relationship between the initial Global Positive and lifeuse of cocaine was assessed through an Analysis of Variance. One-time only users were compared to all repeat users. Results showed that repeat users had significantly higher Global Positive scores than did one-time only users ($F(1,28)=7.83$, $p<.009$). The mean for the one-time only users was 2.26 ($SD=.71$); for the repeat users, it was 2.85

(SD=.45). Analysis of variance also revealed a significant effect of initial Global Negative ($F(1,28)=6.22$, $p<.02$). The mean for the one-time users was 1.88 (SD=.53) while that of the repeat users was 2.39 (SD=.54). Repeat users therefore have significantly higher initial Global Negative scores. The analysis of Variance of expected Global Positive scores indicated no significant effects when comparing one-time users and repeat users ($F(1,28)=.01$, NS). Similarly, expected Global Negative scores did not reveal significant differences between the two groups ($F(1,28)=.38$, NS).

Other Drug Use. In order to test the sensitization hypothesis, we asked subjects to report how frequently they used other drugs in their lifetime. Specifically, we were interested in their experiences with stimulants other than cocaine. Because none of the cocaine users in this sample had ever been users of Ritalin, we were unable to test the sensitization hypothesis using Ritalin as the sensitizing drug. The frequency of nicotine use was also low in this population of cocaine users: 23% (n=7) had never used any form of nicotine regularly. Five (17%) used nicotine infrequently or less than once per week. Five more reported having used nicotine regularly for a time period of 6 months to 1 year. Finally, 13 (43%) reported using nicotine regularly for more than 1 year. Only 14 (47%) indicated that they used nicotine regularly at the time of completing the questionnaire; 43% (n=6) of the regular smokers reported smoking approximately half a pack a day. None of the smokers reported

using any more than this amount.

We chose to collapse across the four categories to increase the number of subjects in each. Subjects who indicated they had not used nicotine or had used it regularly for less than 6 months were put into one category (n=14); subjects who had used nicotine regularly for at least 6 months to over a year were placed in a separate category (n=16). An Analysis of Variance indicated no significant differences between the two groups of nicotine users in relation to the initial Global Positive ($F(1,28)=.19$, NS). Possibly, the number of subjects in each category was still too small to reveal an effect. Another explanation could be that the amount of nicotine used by the subjects in this sample was too small to produce a sensitizing effect on another stimulant such as cocaine (the most any nicotine user had smoked regularly was half a pack of cigarettes a day).

Study 2: Nonusers

Most of our original sample never used cocaine (n=853, 97%). Sixty-one percent (n=521) were female and 39% (n=328) were male. Their ages ranged from 17 through 32; the average was 18.3.

Internal Consistency. Chronbach's coefficient alpha was again used to determine the internal consistency estimate of reliability for the expected cocaine effects. On the initial Global Positive scale for nonusers, the alpha was .80; for the expected Global Positive, it was .89. The coefficient alpha on the initial Global Negative was .68; for the expected Global Negative, it was .69.

Means and Standard Deviations. The mean and standard deviation for the initial Global Positive were 2.41 and .690. Individual items ranged from 1.56 (SD=.802) to 3.08 (SD=1.14). For the expected Global Positive, the mean and standard deviation were 2.48 and .708. The means and standard deviations for individual items were between 1.64 (SD=.871) and 3.06 (SD=1.08).

For the initial Global Negative, the means and standard deviations were 2.87 and .636. Individual items ranged from 2.41 (SD=.913) to 3.31 (SD=1.11). The mean and standard deviation for the expected Global Negative were 2.95 and .627. Individual items were between 2.57 (SD=.908) and 3.32 (SD= 1.06).

Initial and Expected Scale Differences. The MacNemer Test for the significance of changes was used to determine if any significant differences occurred between the initial and expected scales. No significant changes were indicated for the initial to the expected Global Positive scales (X^2=2.814, NS), nor for the initial to the expected Global Negative scales (X^2=.879, NS).

Comparisons of Users and Nonusers

Analyses of Variance were used to determine the significance of differences between users and nonusers on the Global Positive and the Global Negative scales. There were marginal differences in the initial Global Positive value ($F(1,881)=2.96$, $p<.09$). On the scale of 1 to 4 with 1 being not very true, the mean for users was 2.63 (SD=.619) and for nonusers, 2.41 (SD=.690). The trend, then, seems to be in the direction of users reporting a more positive initial experience with cocaine than what the

nonusers expected to occur. The two groups were not different in terms of expected Global Positive effects for next use (users) or second use (nonusers),(F(1,881)=2.09, NS),(See Table 4).

In comparing the initial Global Negative values between the two groups, however, users reported a significantly lower level than what nonusers expected (F(1,881)=31.87, p<.0001). The mean for the users was 2.20 (SD=.583) and for the nonusers, 2.87 (SD=.636). An Analysis of Variance performed in relation to the expected Global Negative also found significant differences between users and nonusers (F(1,881)=16.57, p<.0001). The mean for users was 2.48 (SD=.659) and for nonusers, 2.95 (SD=.627). Nonusers expected more negative effects from cocaine on second use than did users on their next use of cocaine.

Insert Table 4 about here

Discussion

Various hypotheses were explored in this study. First, the strength of initial reactions to cocaine was expected to predict subsequent use of the drug. The second hypothesis predicted that preexposure to other stimulants would predispose individuals to cocaine abuse. In addition, cocaine effect expectancies were predicted to correlate with subsequent use of the drug. Finally, the effect expectancies of users and nonusers were predicted to differ: users were expected to report more positive expectancies and nonusers, more negative ones.

We reasoned that more positive initial reactions to cocaine would motivate users to seek cocaine more quickly and repeatedly after their first exposure to the drug. The positivity of initial reactions was also expected to predict overall lifetime use of cocaine. The initial Global Positive score statistically predicted all three of these measures of abuse potential: latency to second use, repeated use, and lifetime frequencies of cocaine use. Thus, it seems that the initial Global Positive is and adequate predictor of the potential for cocaine abuse. The results of Schafer and Brown (1991) comply with the findings of the present study. Their results demonstrate that the means of the Global Positive effects scale steadily increased as the frequencies of cocaine use rose. In other words, infrequent users had lower Global Positive scores than did recreational users, who had lower scores than did regular users. The present findings also confirm those of Davidson et al (in press).

Individual initial positive items were also significantly correlated with lifeuse, latency, and repeated use. Several of the significant relationships found previously by Davidson et al. (in press), however, were not reproduced in the present study. For example, the relationship between the item involving euphoria and latency to second use was significant in the previous study, whereas the present investigation revealed no such significance. The correlation, however, was still high (-.35); the non-significance may be related to the small sample size in the current study. The same trend was demonstrated for other

individual positive items.

The initial Global negative score and individual negative items were also related to lifeuse, latency, and second use of cocaine. The directions of several relationships were surprising. First, the initial Global Negative was positively related to lifeuse and negatively related to latency. Thus, the more negative one's initial reactions were, then the more quickly cocaine was used again and the more often it was used overall. The satisfaction/craving item followed this same pattern in both the present study and that of Davidson et al (in press) and may account for the positive relationship between the initial Global Negative and lifeuse. This item, with its high correlations, obviously plays a major role in the decision (or need) to use cocaine again. Therefore, if more cocaine was craved, then cocaine was likely to be used a second time, in a shorter time period, and more cocaine was used overall.

The satisfaction/craving item was the only individual negative effect item that consistently predicted all three abuse potential indicators in the present study and that of Davidson et al (in press): overall use, whether or not cocaine was used a second time, and latency. The other individual negative items that were significantly related to abuse potential only predicted one of the three indicators in the present study and did not replicate previous studies (Davidson et al). For example, "cocaine made my judgement worse" was negatively related to latency to second use in the present study. It is unclear at

this time why higher responses on this item would influence cocaine users to try cocaine a second time, more quickly. Other surprising relationships that were revealed could be dose related. For example, "cocaine made me shaky" was positively related to lifeuse, and "I became fearful on cocaine" was negatively related to whether cocaine was used a second time. At higher doses, the positive effects from cocaine may outweigh the unwanted side effects, such as fear and shakiness.

Preexposure to nicotine did not significantly relate to the initial Global Positive score and therefore could not predict any of the three measures of the potential for cocaine abuse. The sensitization hypothesis was consequently not supported in humans by the current data. Because the number of nicotine users in the current sample was so small, the idea of sensitization across stimulants should not be abandoned. Instead, this hypothesis should be further pursued in various populations with larger frequencies of both nicotine and cocaine use in order to determine if sensitization does play a role in the abuse of stimulants in human populations.

We were unable to use Ritalin as the drug of sensitization in our analyses because none of the cocaine users had ever used it. Investigation of Ritalin, however, is of utmost importance because of the high numbers of prescriptions of this drug distributed to America's children. Following populations of children who have been prescribed Ritalin and collecting data on other stimulant use in these populations is one way to

investigate stimulant sensitization.

The expectancies of future reactions to cocaine as reported by users of cocaine were related to the three measures of abuse potential. Neither of the Global items were significantly related to the measures of cocaine abuse; possibly, the sample size was too small to produce stronger effects. One expected positive effect was related to latency, "I expect cocaine to make me feel like I can do anything." Therefore, the more powerful cocaine was expected to make a person feel, the more quickly that person used cocaine again. Several individual negative expectancy items statistically predicted lifeuse, whether cocaine was used a second time, and latency. The expected satisfaction/craving item was related to all three. Searching for satisfaction, then, is a powerful determinant of lifeuse of cocaine. The expected "shaky" item was also related to lifeuse. Thus, the more shaky one expects to feel, then the more cocaine was used. This effect could again be dose related wherein higher doses are needed to produce a desired effect and shakiness is an unwanted side effect. In this case, the desired effects outweigh the unwanted ones.

The effect expectancies (and initial reactions) of users and nonusers differed in some respects. In accordance with the results of Schafer and Brown (1991) nonusers of cocaine had greater expectations of negative effects than did individuals who had used the drug previously. This effect was found for both the initial scale and the expected scale. Therefore, nonusers

expected more negative initial reactions than those experienced by users, and those expected by users. These findings suggest that expectations of negative effects may mediate nonusers' decisions not to use cocaine. Although, significant differences between users and nonusers were not found on the expected positive scale, marginally significant differences ($p<.09$) were found for the initial positive scale. Users tended to have greater expectations of positive effects than did nonusers. Schafer and Brown (1991) found that low users reported less positive expectancies than those reported by nonusers or regular users. Therefore, the most frequent use of cocaine (regular users) in their study had greater expectations of positive effects ($M=10.00$) than recreational or infrequent users ($M=6.96$ and 6.41, respectively). Recreational or infrequent users also reported less positive expectancies than nonusers ($M=8.29$). Although only 4 individuals in the present study reported using cocaine 40 or more times overall, their scores might have raised the scores of the user sub-group above those of nonusers.

The current study documents how variability in initial reactions and expectancies of reactions to cocaine relate to cocaine use patterns. These findings in regard to positive effects confirm those reported by Davidson et al (in press) and Schafer and Brown (1991). The role of negative experiences in users remains to be clarified. All of these studies, however are limited because they use retrospective reporting of initial effects of cocaine. Although variability in initial reactions

has been found to relate to subsequent patterns of cocaine use, a prospective, longitudinal study could be quite valuable as further confirmation.

A further limitation of the present study is found in the small user sub-group size. Because of the small size, we were unable to perform analyses that could have been worthwhile. For example, separate gender analyses of the reactions and expectancies of both users and nonusers would have been interesting. Analyzing interactions between effect expectancies and initial reactions and how these predict rates of usage would also have been meaningful. Future studies should target populations with larger numbers of nonusers so analyses like the ones suggested above are feasible.

Because initial reactions are becoming more definitely correlated to cocaine use patterns, it is important to identify what factors mediate initial reactions. Biological sensitization among stimulants, as documented in animal studies (Horger et al., 1990, 1991, 1992), provides one possibility for determining the factors affecting initial reactions in humans. The present study found no significant effects between nicotine use and initial reactions to cocaine; however, this finding may be a result of the sample size. This hypothesis should therefore be investigated again, with a larger number of subjects. If biological sensitization is evident in humans, groups at risk for cocaine abuse can be identified and the problem of cocaine addiction attacked.

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TABLE 1

Correlation coefficients for the relationship between the initial positive effect items and: 1) lifeuse, 2) second use, and 3) latency to second use of cocaine (* indicates $p<.05$).

POSITIVE ITEMS	LIFEUSE N=30	SECOND USE N=30	LATENCY N=19
Cocaine made anything I talked about more interesting.	.49*	-.49*	.09
I was euphoric when I was on cocaine.	.35*	-.48*	-.35
I was more capable of getting things done when I was on cocaine.	.43*	-.18*	-.29
Cocaine made me feel as though I was on top of things.	.50*	-.41*	-.42
Cocaine made me feel like I could do anything.	.48*	-.46*	-.60*
Cocaine made me more sociable.	.09	-.19	-.09
Cocaine made me feel very happy.	-.01	.10	-.26
I thought more clearly on cocaine.	.13	-.19	.12
Initial Global Positive.	.50*	-.47*	-.49*

TABLE 2

Correlation coefficients for the relationship between the initial negative effect items and 1) lifeuse, 2) second use, and 3) latency to second use of cocaine (* indicates $p<.05$).

NEGATIVE ITEMS	LIFEUSE N=30	SECOND USE N=30	LATENCY N=19
Cocaine made me shaky.	.41*	-.28	.08
My thoughts were not as deep when I was on cocaine.	.02	.20	-.16
I was never satisfied when I was on cocaine.	.56*	-.54*	-.47*
Cocaine caused hallucinations.	.14	-.07	-.16
Cocaine made my judgement worse.	.23	-.23	-.46*
I became fearful on cocaine.	.20	-.39*	-.13
Initial Global Negative.	.49*	-.43*	-.41

TABLE 3

Correlation coefficients for the relationship between the expected negative effect items and 1) lifeuse, 2) second use, and 3) latency to second use of cocaine (* indicates $p<.05$).

NEGATIVE ITEMS	LIFEUSE N=30	SECOND USE N=30	LATENCY N=19
I expect cocaine to make me shaky.	.48*	-.29	-.05
I do not expect my thoughts to be as deep when I am on cocaine.	.11	.10	-.48*
I expect that I will not be satisfied when I am on cocaine...I will always want more.	.55*	-.47*	-.56*
I expect cocaine to cause hallucinations.	-.14	.20	-.05
I expect cocaine to make my judgement worse.	.02	.05	-.22
I expect that I will become fearful on cocaine.	.03	.09	.10
Expected Global Negative.	.31	-.12	-.31

TABLE 4

Mean values and standard deviations of initial and expected positive and negative values from Analyses of Variance comparing users and nonusers (* indicates $p<.05$).

	USERS		NONUSERS		
GLOBAL ITEMS	MEANS	SD	MEANS	SD	F
Initial Positive	2.63	.619	2.41	.690	2.96
Expected Positive	2.67	.668	2.48	.708	2.09
Initial Negative	2.20	.583	2.87	.636	31.87*
Expected Negative	2.48	.659	2.87	.627	16.57*