

Alcohol, Tobacco, and Marijuana Use: Relationships to Undergraduate Students' Creative Achievement

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The researchers examined the relationship between 176 undergraduates' responses to the Creative Behavior Inventory (Hocevar, 1979) and the Core Alcohol and Drug Survey (Presley, Meilman, & Lyerla, 1994). A majority of participants were female (56.7%), and students identified themselves as 92.9% Caucasian, 2.4% Native American, 1.8% African American, and 3.0% other ethnic group or groups. The age at which students first used specific drugs was negatively or negligibly related to creative achievement, and past use of drugs was generally not significantly correlated with creative achievement. However, limited evidence of a social expectancy effect was found (i.e., past creative achievement was correlated positively with current marijuana and female tobacco use and negatively with male alcohol use).

The link between creativity and the use of alcohol and other drugs has long been a focus of popular attention. One does not have to be a serious student of literary history to know about Ernest Hemingway's, F. Scott Fitzgerald's, and Edgar Allan Poe's alcohol use, and the use of marijuana, heroin, and other drugs by certain musicians is widely reported by the press. Indeed, news of the latest musical sensation entering a drug rehabilitation program raises few eyebrows.

The popular assumption that drug use enhances creativity has several negative effects, perhaps none more serious than the belief among children, adolescents, and college students that this relationship actually exists. For example, adolescents believe or expect that alcohol and marijuana use enhances creativity and other types of cognitive functioning (Novacek, Raskin, & Hogan, 1991), a belief that is a relatively strong predictor of future drug use (Christiansen, Smith,

Roehling, & Goldman, 1989; Newcomb, Chou, Bentler, & Huba, 1988; Wiers, Hoogeveen, Sergeant, & Gunning, 1997). In a related vein, researchers have found that the expectation of alcohol consumption is related to increased creativity in placebo group subjects (Lang, Verret, & Watt, 1984; Lapp, Collins, & Izzo, 1994), further supporting the position that people believe that alcohol and other drugs enhance creativity.

But does the relationship exist or not? The answer to this question has a substantial impact on drug and alcohol counseling, drug and health education curricula, clinical interventions in health-care and educational settings, and education in general (e.g., the high school music teacher whose prized student is caught smoking marijuana). Although drug use is associated with long-term psychological, physiological, and educational problems (Johnson & Kaplan, 1990; Newcomb, 1987; Newcomb & Bentler, 1988), the literature provides startlingly little information on the influence of drug use on creativity.

REVIEW OF LITERATURE

Alcohol and Creativity

The possibility that alcohol enhances creativity, especially during writing, has been the subject of much theoretical speculation and occasional empirical investigation (Andreason, 1987; Goodwin, 1973, 1988; Grant, 1981; Roe, 1946; Rothenberg, 1990), with most researchers questioning the presence of any significant benefits but allowing for the possibility that alcohol reduces inhibitions and otherwise helps alleviate "writer's block." This "disinhibition hypothesis" has received limited empirical support (Brunke & Gilbert, 1992; Gustafson & Källmén, 1989; Koski-Jännes, 1985).

Studies that provide evidence supporting the

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disinhibition hypothesis have usually provided an equal amount of evidence that creativity is negatively influenced by alcohol use. For example, Gustafson and Källmén (1989) concluded that alcohol may facilitate creativity by removing inhibitions. However, the researchers also noted that creative processes may not be actively enhanced and that locus of control tends to become external under the influence of alcohol. Given research suggesting that external locus of control is known to have a negative influence upon creative production (Amabile, 1979; Amabile, Hennessey, & Grossman, 1986; Sternberg & Lubart, 1995), the benefits of alcohol-induced disinhibition appear to be balanced with equally important motivational and cognitive deficits.

Very few studies have suggested the presence of a uniformly positive alcohol-induced effect—even those studies widely cited as providing evidence of a positive effect contain limited evidence of a negative effect or lack thereof (e.g., Hajcak, 1976; Koski-Jännes, 1985). A consensus is emerging that moderate alcohol consumption has at best a negligible effect on creativity (Gustafson, 1991; Gustafson & Norlander, 1994; Kerr, Shaffer, Chambers, & Hallowell, 1991; Lapp et al., 1994; Rowe, 1994) and that heavy consumption has a negative effect (Ludwig, 1990; Noble, Runco, & Ozkaragoz, 1993).

Smoking and Creativity

The relationship between creativity and smoking (i.e., nicotine use) is not a common topic in the research literature. This absence may be due to the fact that, as Newcomb and Bentler (1989) noted about smoking research in general, "cigarette abuse among teenagers is often not considered a focus of treatment [because] there are rarely if ever short-term problems with such behavior, despite the fact that some evidence indicates that cigarettes may be the most deadly drug from a long-term perspective" (p. 248). Considering the serious, long-term consequences of nicotine exposure (and the increase in teen smoking rates), research on the relationship between smoking and creativity is warranted.

Substantial research has occurred on nicotine's effects on other aspects of cognitive

performance. Again, results are complex and contradictory. For example, nicotine is linked to higher scores on various intelligence tests, increased information-processing speed, and enhanced working memory function (Peters & McGee, 1982; Revell, 1988; Rusted, Graupner, O'Connell, & Nicholls, 1994; Stough, Bates, Mangan, & Pellett, 1995; Stough et al., 1995; Stough, Mangan, Bates, & Pellett, 1994; Wesnes & Warburton, 1983). However, Spilich (1994) noted that a majority of these experiments compared active smokers' cognition with that of smokers ordered to abstain from smoking. The empirical differences may be more indicative of a withdrawal effect than nicotine-enhanced information-processing. Although Spilich's perspective is controversial (e.g., Rusted et al., 1994), an exhaustive review of nicotine studies by Heishman, Taylor, and Henningfield (1994) supported Spilich's position and found little evidence of increased cognitive performance associated with nicotine use.

Marijuana and Creativity

In a comparison of substance use among artists, writers, musicians, and a control group, a slightly higher percentage of musicians reported at least occasional marijuana use (Kerr et al., 1991). Similarly, anecdotal evidence of the relationship between music and marijuana is well-documented (Boyd, 1992), but empirical studies of marijuana-creativity relationships are generally not available (even with respect to the possible impact on musical creativity).

With respect to general cognitive skills, light-to-moderate marijuana use appears to have a generally neutral impact upon cognitive performance. However, long-term, heavy use is associated with considerable deficits in intellectual development and working memory (Block & Ghoneim, 1993). Additionally, achievement motivation may be reduced in heavy users, especially if the marijuana use is associated with depression (Musty & Kaback, 1995).

In the study most relevant to creativity, Block, Farinpour, and Braverman (1992) found that people who smoked marijuana provided more original (i.e., statistically infrequent) responses on a test of associative ability than members of a

placebo group (see also Block & Wittenborn, 1984, 1985). Given the theoretical link between associative thinking, creativity, and problem solving (Mednick, 1962; Merten, 1995; Runco & Chand, 1995), this study provides limited support for a beneficial relationship between creative processes and marijuana use. However, the researchers also found that marijuana use had negative effects upon a wide variety of other cognitive performance tasks related to creative thinking, such as slowed reaction time during associative tasks, decreased text comprehension, and degraded short-term memory (Block et al., 1992).

Does Creativity Cause Substance Use?

Although the reviewed research provides little evidence of a beneficial drug-creativity relationship, the possibility that creativity causes increased alcohol consumption has yet to be investigated fully. Two reasons for such a cause have been suggested. First, individuals may seek to alleviate the strenuousness of creative activity through the use of alcohol (Gustafson & Norlander, 1995). The writers interviewed by Kerr et al. (1991) made comments in support of this position; however, the control subjects made similar comments regarding the use of alcohol as a coping mechanism. This suggests that the cause of drug use is stress and not creativity itself. Second, given the popular association of creativity and drugs, creative individuals may feel as though they are expected to engage in the consumption of alcohol and other drugs (Ludwig, 1990; see also expectancy research of Lapp et al., 1994). Given the social comparison processes at work among undergraduate students (especially with respect to alcohol use; cf. Perkins & Berkowitz, 1986; Prentice & Miller, 1993), the possibility exists that creative individuals experiment with and regularly use alcohol, nicotine, and other drugs because they feel that using such drugs "is what creative people do." This rationale is certainly a paradox: Creative individuals, usually assumed to be nonconformist, engaging in conformist behavior in order to be considered creative. The oft-reported use of alcohol and other drugs to alleviate creativity-induced stress may simply be a rationale for certain creative

individuals to justify behavior that is perceived to be undesirable by the general public.

Weaknesses in the Literature

Considerable weaknesses exist in the creativity-drug literature. Many studies use case studies of eminent creators (e.g., famous writers and artists) or practicing creators who are well-established in their fields; some concentrate solely on famous creators who had well-known substance abuse problems. Few of the available studies use average people, and even fewer include young adults in their samples. Given the ethical issues involved with providing minors with alcohol, nicotine, and marijuana in experimental settings, the exclusion of younger subjects is understandable. Regardless, the difference between studying the impact of alcohol on creative achievement and studying the creativity of alcoholics, the use of alcohol in eminent creators, and the effects of acute intoxication on creative processes could not be more different.

The reliance upon experimental studies introduces problems in addition to the restriction of age issue. The life of Ernest Hemingway is a case in point. Hemingway maintained a productive writing routine for many years before his alcohol abuse overwhelmed him. This hypothesized ability to mask certain drug-induced deficits, referred to as the "compensatory hypothesis," has received limited research support (Ham & Parsons, 1997; Tracy & Bates, 1994). By restricting the measurement of creativity to a few tests of divergent thinking administered under experimental conditions, the true longitudinal impact of drug experimentation and regular use may be masked by users' compensatory mechanisms.

The purpose of the current study was to investigate the relationship between undergraduate students' creative achievement and their drug consumption (i.e., alcohol, marijuana, and tobacco).

METHOD

Sample

Participants were drawn from two different groups of undergraduate students. The first group ($n = 50$) included undergraduates who committed

a minor alcohol- or drug-related offense (e.g., underage drinking, holding a party in a dorm room, smoking marijuana) on the campus of a public university in the northeastern United States. These students were charged with student conduct code violations and were required to attend a drug and alcohol counseling session. All 50 students returned completed surveys. The second group of students completed the two instruments as an extra credit assignment for an undergraduate educational psychology class. Of the 132 students in the class, 126 returned completed surveys to the researchers. Of the 176 students in the total sample, 9.7% of the participants identified themselves as first-year undergraduates, 44.0% second-year, 32.6% third-year, and 13.7% fourth-year or higher. The average age was 21.1 years ($SD = 5.0$), but this distribution was positively skewed due to the participation of a few nontraditional college students. Most of the students (79.3%) were 21 years old or younger when they completed the surveys, but 6.3% of the participants were over the age of 30 at that time. With respect to ethnicity, 92.9% of the students identified themselves as Caucasian, 2.4% as Native American, 1.8% as African American, and 3.0% as belonging to another ethnic group or groups. The sample had slightly more female (56.7%) than male students (43.3%). The students reported an average GPA of 2.76 ($SD = .73$), with GPAs normally distributed. Demographically, the two subsamples were similar, except that the educational psychology class contained all of the nontraditional students.

In all cases, statistical analyses were conducted separately for the two groups of students comprising the sample. No practical differences were noted between the two groups, which could be due to the minor nature of most students' substance abuse policy violations in the disciplinary group. To increase the statistical power of the analyses, groups were combined into one sample for the analyses reported in this paper.

Instrumentation

Participants completed the Creative Behavior Inventory (CBI)(Hocevar, 1979) and the Core Alcohol and Drug Survey (Core Survey)(Presley, Meilman, & Lyerla, 1994). Hocevar developed the

CBI to provide researchers with a reliable and valid criterion measure of creativity. The CBI consists of 75 items on six scales representing creativity in: science and mathematics (10 items), literature and writing (14 items), crafts (19 items), music (12 items), performing arts (12 items), and fine arts (8 items). When completing the CBI, respondents indicate the frequency with which they have participated in certain creative activities (e.g., wrote music for an instrument, made a leather craft, applied math in an original way to solve a practical problem, choreographed a dance, made a sculpture). Response categories for each item include never (scored 1), once or twice (2), three to five times (3), and more than five times (4). Scale scores were calculated by adding responses to each of the scale items then dividing by the number of items. As a result, each scale score had a possible range of 1 to 4.

The Core Survey was constructed to provide higher education staff with an instrument for evaluating substance abuse prevention programs. To date, the instrument has been completed by over a half million college students (Presley et al., 1994). Questions on the version used in this study address personal demographics; number of drinks per week; frequency of binge drinking; use of alcohol, tobacco, marijuana, and other drugs over the past month and past year; and age of first use for each drug. Frequencies of use for drugs other than alcohol, tobacco, and marijuana were too low to be included in the data analyses.

Extensive evidence of reliability and validity is available for the Core Survey (Presley, Meilman, & Cashin, 1996; Presley, Meilman, Cashin, & Lyerla, 1996; Presley, Meilman, & Lyerla, 1993, 1995). With respect to reliability, stability estimates for questions on the Core Survey range from .82 to .99, and Cronbach's alpha for questions range from .64 to .90. With respect to validity, the survey was designed through the use of a rigorous procedure that emphasized content validity, and an exploratory factor analysis was generally supportive of the intended factor structure of the survey. A more detailed discussion of the psychometric integrity is beyond the scope of this paper, and interested readers are strongly encouraged to obtain the relevant technical reports from the Core Institute Web site

TABLE 1.
Descriptive Statistics and Reliability Evidence for CBI Scores

	Mean	SD	Kurtosis	Skewness	Alpha	SEM ^a
Total	1.54	.36	0.31	0.76	.94	.09
Scales						
Science/Math	1.36	.38	2.00	1.40	.64	.23
Literature/Writing	1.55	.41	-0.43	0.61	.76	.20
Crafts	1.84	.58	-0.27	0.55	.89	.19
Music	1.40	.51	3.29	1.81	.83	.21
Performing Arts	1.29	.38	5.14	1.99	.82	.16
Fine Arts	1.64	.63	0.92	1.16	.80	.28

Note. SE(Kurtosis) = .36; SE(Skewness) = .18

^a SEM = standard error of measurement

at http://www.siu.edu/departments/coreinst/public_html/index.html.

Procedure

Based on research that seriously questioned the construct validity of subject-specific scale scores derived from creative behavior inventories (Plucker, in press), student responses to the CBI were totaled to achieve a Total Creative Achievement score in addition to the six scale scores. The analyses proceeded in four distinct areas. First, descriptive statistics of students' drug consumption was compared to national norms.

Second, to determine whether differences in creative achievement existed between students who had used drugs and lifelong abstainers, creativity scores of students who reported never having used tobacco or marijuana were compared to students who had reported use of these substances. Alcohol was not included in this set of analyses because so few students reported never using alcohol.

Third, the students' creativity scores were correlated with responses to questions regarding frequency of alcohol consumption in the past week, past month, and past year; frequency of marijuana and tobacco consumption in the past month and year; and the age at which each person first consumed alcohol, marijuana, and tobacco.

These analyses provided information about the relationship between frequency of drug use and creative achievement.

Fourth, to determine the impact of amount of alcohol use on creativity, analyses were conducted using data on the number of binge-drinking episodes (i.e., five or more drinks at one sitting) over the previous 2 weeks. A reviewer noted that the time of year of data collection may have an impact on the frequency of binge drinking. Information on time-specific effects on the measurement of binge drinking could not be found in the literature. Regardless, when interpreting the results, readers should be aware that data was collected during the first half of the spring semester.

With respect to variable selection, age of first use was included because of recent research on the impact of first use on subsequent substance abuse (Hawkins et al., 1997). For example, Dana, Pratt, and Kochis (1993) found that undergraduate students who reported earliest experiences of intoxication also reported the greatest frequency of substance abuse problems. Consumption of substances over the previous 12 months was collected to provide a measure of past use; consumption over the previous month (and previous week for alcohol) was gathered to allow investigation of social expectancy effects.

TABLE 2.
Percentage of Students Reporting Specific Number of Drinks Consumed per Week

Drinks per Week	Current Sample (N = 176)	Norm Sample (N = 53,644)
0 or 1	29.5	52.2
2 to 5	21.6	22.0
6 to 9	9.7	7.0
10 to 15	19.9	10.2
16 or more	19.3	8.5

Note. Normative sample data drawn from Presley et al. (1994). Due to rounding, normative sample percentage totals do not equal 100%.

RESULTS

Descriptive statistics and reliability evidence for the CBI total score and scale scores are included in Table 1. The scores were sufficiently variable for correlational analysis. Estimates of internal consistency were similar to those obtained by Hocevar (1979). The distributions for the total creativity scores and six scale scores were positively skewed.

Descriptive statistics for students' Core Survey responses were compared to the norm sample's responses as reported in Presley et al. (1994). In the current study, students reported an average alcohol consumption of 8.7 drinks per week, slightly higher than the average of 7.1 drinks per week reported by Presley et al. (1994) for college students in the Northeastern United States. Table 2 contains a comparison of the distributions of drinks per week for the sample in this study and the norm sample, and Table 3 includes a comparison of the most frequently used drugs. In each case, the differences between the norm sample and the sample used in the current study were probably due to subregional differences in drug use and the presence of nontraditional students in the sample (Presley, Meilman, & Lyerla, 1993). For example, past

research with both samples from the general state population and this specific population of college students found evidence of elevated alcohol consumption (e.g., Dana, 1997; Dana, Pratt, & Kochis, 1993).

Users Versus Lifelong Abstainers

Of the 176 participants, 51 reported never having used tobacco. The CBI score for the lifelong abstainers ($M = 1.49, SD = .30$) was slightly lower than that for the students reporting some use ($M = 1.56, SD = .39$). Using the creative achievement score as the dependent variable and ever having used tobacco as the independent variable, an analysis of variance provided little evidence of a statistically or practically significant difference, $F(1, 174) = 1.29, p = .26, \eta^2 < .01, d = .20$.

Forty-six students reported never having used marijuana. Average scores were nearly identical for non-users ($M = 1.55, SD = .35$) and users ($M = 1.54, SD = .37$). As the descriptive statistics suggest, analysis of variance did not provide any evidence that a significant difference existed between the two groups of students, $F(1, 174) = .02, p = .89, \eta^2 < .001, d = .02$.

TABLE 3.
Percentage of Students Reporting Use of Specific Drugs During Previous 12 Months

Drug	Current Sample (N = 174)	Norm Sample (N = 52,518)
Tobacco	58.0	39.8
Alcohol	98.3	85.2
Marijuana	63.8	26.4
Cocaine	6.4	5.2
Hallucinogens	14.9	4.9
Amphetamines	9.2	4.9

Note. Normative sample data drawn from Presley et al. (1994). Due to slightly different response rates across questions, sample Ns are not identical for each question.

TABLE 4.
Correlation Between Total CBI Scores and Substance Use

	Tobacco			Alcohol				Marijuana		
	Age	Month	Year	Age	Week	Month	Year	Age	Month	Year
Total	-.16	.01	.01	-.02	-.27**	-.11	-.15	-.18*	.23*	.20*
<i>n</i>	(125)	(81)	(101)	(144)	(145)	(153)	(169)	(130)	(76)	(111)
Men	-.10	-.14	-.12	-.07	-.37**	-.17	-.23	-.20	.18	.32*
<i>n</i>	(56)	(36)	(43)	(68)	(60)	(63)	(67)	(54)	(30)	(46)
Women	-.27*	.29	.23	-.04	-.05	-.03	.00	-.17	.46**	.17
<i>n</i>	(59)	(37)	(49)	(92)	(72)	(77)	(89)	(65)	(39)	(54)

Note. Age = age of first use; Week = frequency of use in past week; Month = frequency of use in past month; Year = frequency of use in past year

* $p < .05$. ** $p < .01$.

Creativity and Frequency of Drug Use

The correlations between the total CBI scores and reported substance use appear in Table 4. Age of first use was negatively and generally insignificantly correlated with creative achievement scores for each of the three drugs, with correlations ranging in absolute value from .02 to .18. Further analysis by gender produced nearly identical results.

Overall, correlations between creative achievement and reported frequency of tobacco and alcohol use over the previous 12 months were not significant and were small in magnitude (i.e., ranging from $-.23$ to $.23$). Frequency of marijuana use in the previous 12 months was moderately correlated ($r = .32, p < .05$) with creative achievement. With respect to more recent drug use and creativity, the number of drinks consumed in the past week was negatively correlated with creative achievement ($r = -.27$), and frequency of marijuana use in the previous month was positively correlated with the creativity scores ($r = .23$). The marijuana correlation was much higher among females than males (.46 vs. .18), and the magnitude of the alcohol-creativity correlations was marked by the opposite pattern, with a negligible relationship among females and a considerable negative relationship among males.

Another gender discrepancy was found among the correlations between frequency of tobacco use and creativity scores, with evidence that the correlations were negligible (if not slightly negative) for males but moderate for females. Given the magnitude of the correlations, the lack of statistical significance for females was probably due to insufficient power associated with the reduced sample sizes.

Creativity and Amount of Alcohol Use

The measures used to this point in the analyses provided measures of frequency of use, but only the reported number of drinks in the previous week provided an estimate of degree of use. The other direct estimate of use intensity on the Core Survey was a question about the number of binge drinking episodes in the 2 weeks prior to the completion of the survey. Students' were divided into two groups: those reporting 0 to 2 binge drinking episodes and those reporting 3 or more episodes. Results of a one-way analysis of variance ($F = 5.334, p = .022$) suggested that the low-binge-drinking group had significantly higher creativity scores than the high-binge-drinking group, but the uncorrected effect size estimate ($hh = .03$) was very small. Subsequent analyses, in which students reporting 2 episodes or 3 to 5

episodes were removed to heighten the between-group contrast, produced similar results.

DISCUSSION

Although the correlations between creative achievement and addictive substance use were predominantly nonsignificant, we noted that correlations between alcohol use and creativity were uniformly negative, marijuana use was positively correlated with creative achievement, and tobacco use relationships differed by gender. Ages of first alcohol, tobacco, and marijuana use were, at an a priori alpha level of .01, not significantly associated with creative achievement. Given the considerable evidence that first use is related to later drug use, these results may suggest a lack of statistical power due to reduced sample sizes, further evidence that substance use has a predominantly negligible effect on creative achievement, or the presence of a sample that was too young to show detriments in creativity caused by prolonged drug use. Although all three interpretations appear to be plausible, we suspect that the last possibility is most directly responsible for the lack of relationship between age of first use and creative achievement.

Marijuana use in the previous 30 days was positively correlated with creative achievement. Because the correlations between creativity and use in the previous year were smaller and statistically insignificant, the hypothesized social expectancy effect (i.e., I am creative, therefore I should smoke pot or tobacco) may help to explain this result. This effect was much stronger among female students than their male peers, except with respect to alcohol, where creativity was negatively associated with recent alcohol consumption among males.

This expectancy effect could be a specific manifestation of the well-documented general expectancy effects toward alcohol and other drugs among college students (Perkins & Wechsler, 1996). For example, researchers have found that college students have unrealistic perceptions of drinking norms (Baer, Stacy, & Larimer, 1991; Perkins & Berkowitz, 1986; Prentice & Miller, 1993), which may lead to increased alcohol use, as in a self-fulfilling prophecy (see Perkins & Wechsler, 1996, p. 962). The results of the current study

suggest that creative college students' use of addictive substances is also influenced by peer norms, but that alcohol use decreases in response to negative-value norms whereas marijuana and tobacco use increase in response to positive-value norms. Future investigations should focus directly on the expectancy effect, specifically the perceived norms of students within certain peer groups (e.g., music, art, architecture students) to determine if the social expectations within these groups differ with respect to the perceived effect of addictive substances on creativity. Gender differences in these perceptions should also be analyzed.

However, the possibility exists that the risk-taking behaviors usually associated with creative individuals (Davis, 1992) are the driving force behind experimentation with drugs that are less socially accepted than tobacco and alcohol. Given the limitations of the current data set and the difficulties in inferring causation, hypothesizing about whether creative individuals experiment with drugs due to their propensity for risk taking is not possible. For example, drug use and teenage pregnancy are positively correlated, but determining whether drug use causes pregnancy or whether risk taking is a common cause for both behaviors is difficult (cf. Flanigan, McLean, & Hall, 1990). If risk taking were to be identified in future research as the thread connecting creative achievement and subsequent drug use, intervention efforts could focus on educating students about the complexities of risk-taking (i.e., the importance of managing risk).

The results provided little evidence of an alcohol-creativity relationship for women, but males' creativity scores were negatively correlated with the average number of alcoholic drinks consumed per week. Perhaps the social expectations (or rationalizations) for marijuana use are reversed with respect to alcohol use: Creative students neither feel required to drink nor do they rationalize their drinking with claims of creativity enhancement. To the contrary, male alcohol consumption appeared to decrease with creative achievement in this study.

Comparisons between the creativity of binge and nonbinge drinkers produced evidence that the amount of alcohol consumed was negatively

related to creative achievement, but as was the case for many of the relationships in the correlational analyses, the difference between the two groups was very small. The implications with respect to social expectancies are that creative achievers were less likely to engage in binge drinking, but almost negligibly so.

Explanations for the significant and relatively large correlations between female creativity scores and tobacco use are difficult to identify. Although young women nationally are becoming smokers at an alarming rate, this trend would not have any apparent bearing on the tendency for creative achievement to be linked with recent tobacco use. This potentially spurious finding and the implications for social expectancy theories should be pursued in additional investigations.

The results of this study regarding the negligible effect of past drug use (i.e., age of first use, frequency of use in past 12 months) on creativity confirmed previous research that showed little cognitive benefit of such use with respect to creativity. Indeed, the collected research provides evidence that while personality characteristics associated with creativity may be affected by drug use (e.g., reduced inhibitions), creative processes and creative achievement are negligibly or negatively affected. As a result, the net longitudinal impact on creativity is negligible or possibly negative.

With respect to creativity leading to substance use, the results of the present study do not provide definitive evidence either supporting or refuting this hypothesis. Past creative achievement was negatively related to recent alcohol consumption for males and insignificantly related for females, yet recent marijuana use and recent female tobacco use were positively correlated with past creativity. These results provide limited evidence that undergraduates who have accomplished creative tasks in the past are slightly more likely to report recent use of marijuana and tobacco (if female) and less likely to report recent use of alcohol (if male).

Overall, the reader should note that a majority of correlations in this study were statistically insignificant and very small. In addition, correlations between creativity and past use were

smaller in magnitude than correlations between creativity and recent use—which presumably occurred after the creative activities occurred. Taken collectively, the current study and previous research provide almost no support for the belief that drug use has either a short-term or long-term beneficial effect on creativity. To the contrary, the effect may be quite negative.

The healthy worker effect (i.e., only students who are healthy enough to attend college had the opportunity to be included in the sample) was certainly a limiting factor in this study, but the “healthy student effect” would not have significantly changed our conclusions. If a student were dealing with substance abuse issues that necessitated removal from school, the impact on that student’s creative achievements would be significant and negative. Given the generally negative or neutral relationships found in this study, the presence of a healthy student effect would not appreciably change the conclusions.

CONCLUSION

Educators working with college students should actively debunk the myth of a positive drug–creativity relationship. Student rationalizations that drug use is fostering creativity should be seen for what they probably are: rationalization of behaviors that students know to be socially undesirable (Mäkelä, 1997). Although this study only began to investigate truly long-term effects of drug use on creative achievement (the students were relatively young and frequency of use was only assessed for the previous 12 months), students should also be made aware that addictive behaviors tend to overwhelm an individual’s psychological, sociological, and physiological space. As these behaviors advance and develop, they may fully occupy a lifespan while narrowing a person’s ability to function adaptively in his or her environment. These behaviors frequently become a chief coping response and can therefore appear to be intractable despite the complex interaction that results in harm to self and others (Lewis, Dana, & Blevins, 1994). The use of these substances can become all-consuming, allowing little time for creative activity.

Future Directions

Researchers in this area may take several related paths in the future. First and foremost, any multivariate analysis of drug-creativity relationships will necessitate a very large sample size. We expected our initial pool of 176 subjects to be sufficient, but after removal of students who had never used specific drugs, it was not. Given the evidence gathered in this study on gender effects, separate analyses should be conducted for male and female subjects (further reducing sample sizes and statistical power). Second, in addition to replicating the trends observed in the current study, the relationship between creativity and other drugs—especially hallucinogens such as LSD—should be examined. Preliminary research indicates a detrimental effect (Cohen, 1964), but once again conventional wisdom would indicate otherwise. Third, in order to facilitate research with college and other young adult populations, techniques should be developed to measure past drug use in more detail and over a longer period of time. For example, detailed information on creative achievement and frequency and amount of use over a 4-year period would allow the construction and testing of various causal models of drug-creativity relationships. A person who was highly creative until drugs took over his of

her life would be easier to identify than with the techniques presently available to researchers. An interesting test of these new techniques would be to conduct a retrospective study of drug use and creativity among college professors. Because this population has a tendency to document past creative achievement for tenure and promotion purposes, trends in creative achievement may be easier to identify.

Finally, we did not investigate the impact of an individual's drug use on other people's perceptions of that individual's creativity (see Brunke & Gilbert, 1992). Although many of the creative achievements measured by the CBI involve recognition in the form of recitals, awards, and other public recognition, the impact of substance use on audience perception of creativity was not directly studied. Creative individuals who begin to use drugs as a result of perceived social expectations may be less likely to do so if they are aware that their addictive behaviors diminish their creativity in the eyes of others.

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