



On the relationship between substance use and personality traits: Abstainers are not maladjusted^{☆,☆☆}

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Abstract

Two studies were conducted to test the relationship between substance use and personality. Participants in Study 1 ($N = 118$) completed measures of the Big Five and additional personality inventories and were classified as alcohol and drug abstainers, moderate users, or heavy users based on self-reports of substance use. In Study 2, observer ratings of personality ($N = 172$) were gathered in addition to self-reports ($N = 545$). Across both studies and self and observer ratings, heavy users consistently scored lower than the other groups on measures of conscientiousness, impulse control, and agreeableness. Abstainers scored lower than moderate and heavy users on extraversion. Contrary to some previous research (e.g., Shedler & Block, 1990), moderate users were not more emotionally stable than abstainers.

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1. Introduction

The research to date on the personality correlates of substance use paints a grim picture of the drug and alcohol abuser. A host of negative characteristics have been associated with substance use, from neuroticism to impulsivity. Findings indicate that heavy alcohol or illicit drug (e.g., marijuana, cocaine, barbiturate, heroin, etc.) use is often related to depression (Dorus & Senay, 1980; Holland, 1977; Skinner &

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Allen, 1982; Steer & Schut, 1979; Sutker, Brantley, & Allain, 1980) and a tendency to be overly anxious (Kilpatrick, Sutker, Roitzsch, & Miller, 1976; Skinner & Allen, 1982), both of which are related to the Big Five factor of neuroticism. In addition to suffering from depression and anxiety, it has been noted that heavy substance users often appear to be impulsive (Labouvie & McGee, 1986; Skinner & Allen, 1982), which is indicative of low conscientiousness in the Five Factor Model. Elevated psychopathic deviate scores, which further suggest a propensity towards being impulsive, as well as rebellious, have also been observed in heavy users (Holland, 1977; Sutker et al., 1980).

Comprehensive models of personality, such as the Big Three or the Five Factor Model of personality have been utilized to succinctly characterize the personality profiles of heavy substance users. In terms of Big Three models, heavy users appear to score high on measures of psychoticism and neuroticism (Kilpatrick et al., 1976; Rankin, Stockwell, & Hodgson, 1982; Sher, Bartholow, & Wood, 2000). The findings concerning the third dimension, extraversion, have been somewhat discrepant, as Rankin et al. (1982) observed low extraversion in heavy users, while Jackson and Matthews (1988) observed high scores for heavy users on extraversion and its subcomponents, sociability and impulsivity. Similarly, in terms of the Five Factor Model of personality, individuals prone to abuse intoxicating substances have been characterized by low extraversion (Trull & Sher, 1994), agreeableness (Flory, Lynam, Milich, Leukefeld, & Clayton, 2002; Martin & Sher, 1994; Trull & Sher, 1994), and conscientiousness (Flory et al., 2002; Martin & Sher, 1994; Trull & Sher, 1994; Tucker et al., 1995), as well as high neuroticism (Martin & Sher, 1994; Sher et al., 2000; Trull & Sher, 1994) and openness (Flory et al., 2002; Sher et al., 2000; Trull & Sher, 1994).

These individuals' negative psychological characteristics are undeniably a precursor to the behavior of alcohol and drug overindulgence. In lieu of more adaptive ways of coping with negative emotions, such as depression and anxiety, some may rely on alcohol or drug use as a coping strategy. It is a widely accepted notion that some people drink alcohol (or use drugs) to relieve their negative affect or to enhance positive affect (Cooper, 1994; Cooper, Frone, Russell, & Mudar, 1995; Cooper, Russell, Skinner, & Windle, 1992; Kassel, Jackson, & Unrod, 2000). Wills and Shiffman (1985) suggested that being anxious or overaroused may lead people to use alcohol with the desire to reduce negative affect. Furthermore, being fatigued or underaroused may lead people to use alcohol with the desire to increase positive affect. Given the evidence to support the theory of affect regulation, it is not surprising to find relationships between heavy substance use and negative psychological characteristics such as neuroticism.

Taken as a whole, the findings of these studies suggest that the drug or alcohol user is subjectively distressed and is inclined to be socially nonconforming and impulsive. In terms of the Big Five personality taxonomy, these individuals would be low on emotional stability, agreeableness, and conscientiousness. As it appears that the more one exhibits such negative traits, the more likely he or she is to engage in substance use, one might infer that complete abstinence from substance use is associated with comparatively extraordinary psychological health. Furthermore, if this proposed linear relationship between substance use and overall psychological health

were to hold, it would seem reasonable to expect that moderate users would fall somewhere between the abusers and the abstainers in terms of psychological health.

Interestingly, however, there is evidence to suggest otherwise. In fact, several researchers have demonstrated that abstinence from substance use is actually indicative of impaired psychological well-being and that moderate use is associated with more positive adjustment. Jones (1971) found problem drinkers and abstainers to be more similar than other moderate drinking groups on 38 out of the 100 Q-Sort items. Vaillant (1983) also noted that abstainers are just as psychologically impaired as alcohol abusers. For example, Jones (1971) noted that abstainers and heavy users display similar negative tendencies such as being withdrawn, pessimistic, and feel guilty, and both groups also display mutual emotional inadequacies (e.g., they are irritable, moody, anxious, and unable to relax), both of which are related to the Big Five factor of neuroticism. Shedler and Block (1990) also observed that abstainers are generally anxious, a trait also common for heavy users. Moreover, according to Jones, abstainers also have difficulty with interpersonal relationships (e.g., they are hostile, distrustful, inexpressive, and judgmental), which corresponds to being disagreeable in the Five Factor Model. Abstainers lack interpersonal skills and seem to avoid close personal relationships altogether (Shedler & Block, 1990). They give the impression of being unsociable, they lack social presence (i.e., they are introverted) and empathy, and they have a low tolerance for criticism (Cook, Young, Taylor, & Bedford, 1998; Hogan, Mankin, Conway, & Fox, 1970; Jones, 1971). Abstainers are also described as being emotionally bland (Jones, 1968), submissive, and lacking self-confidence (Cook et al., 1998). In sum, a second body of research proposed that there is a curvilinear relationship between substance use and subjective distress, as well as interpersonal skills. In Big Five terms, this translates into a curvilinear, inverted U-shaped relationship between substance use and extraversion, agreeableness, and emotional stability, with abstainers, as well as heavy users, scoring lower than moderate users on these three dimensions.

Extremely high levels of conscientiousness, often seen as maladaptive, is another negative trait associated with abstaining from substance use. In comparison with moderate or heavy users, abstainers have consistently been shown to be highly conscientious, as they outscore moderate or heavy users on measures of responsibility (Hogan et al., 1970), rationality, and fastidiousness (Hogan et al., 1970; Jones, 1968; Shedler & Block, 1990). They also appear to be comparatively highly conservative and moralistic (Shedler & Block, 1990). Several researchers have noted, however, that abstainers' tendencies towards being highly conscientious and moralistic may become problematic. It appears that abstainers reach a stage of being overcontrolled. For example, Shedler and Block noted that abstainers have a tendency to unnecessarily delay gratification, and others have observed abstainers to be inflexible and intolerant (Cook et al., 1998; Hogan et al., 1970). There seems to be a linear relationship between substance use and both conscientiousness and openness, as abstainers score comparatively high on conscientiousness and low on openness, unlike heavy users.

The thought that overcontrol is symptomatic of poor psychological health is not novel. Block and Block (1980) outlined two psychological constructs, ego-control and ego-resiliency. The former deals with controlling impulses, while the latter deals

with maintaining a tolerable level of anxiety and impulse expression, in addition to cohesion with environmental circumstances. Ego-overcontrol is associated with outcomes such as delay of gratification, containment of impulse, and inhibition of affect. However, according to Block and Block, when ego-overcontrol is paired with a tendency to be “brittle” (i.e., not ego-resilient), there is evidence of psychopathology, as indicated by “behavioral mannerisms, inappropriate affect, and immobilization when confronted by stress” (p. 89). Some individuals, because of their propensity to be overcontrolled and their lack of resiliency in handling the novelty of the experience, might therefore avoid drugs and alcohol because of fear of losing control if they consumed these substances. In light of this theory and evidence, it is reasonable to hypothesize that abstainers may be overcontrolled and therefore maladjusted.

While abstainers seem to be overcontrolled, anxious, and socially ill at ease, moderate substance users, in contrast, manifest psychological health. Shedler and Block (1990) observed them to be gregarious and expressive, to arouse acceptance from others, and to be able to enjoy sensuous experiences, unlike the constricted abstainers. Wolff and Wolff (2002) also reported that moderate users, in comparison to abstainers and heavy users, are able to fit in easily with others. Vaillant (1983) even noted that current abstainers have a higher mortality rate than current moderate drinkers, perhaps as a result of their impaired mental health and interpersonal relations. In short, there appears to be ample evidence that contradicts the notion that because heavy substance use leads to negative consequences, abstinence must lead to positive outcomes.

Interestingly, recent attempts to test the hypothesis that abstainers are maladjusted have failed to replicate this finding. Using measures of psychological adjustment, Milich et al. (2000) found that abstainers were in no way more psychologically impaired than moderate users or frequent users. In fact, in light of the few instances of significant differences, abstainers actually appeared healthier. For example, moderate marijuana users appeared to be more paranoid than abstainers, and moderate alcohol users appeared to be more hostile. Wills, McNamara, Vaccaro, and Hirky (1996) also failed to replicate findings indicating that moderate users are psychologically healthier than abstainers. In fact, they showed that moderate users have higher levels of stress, maladaptive coping, and deviance-prone attitudes than abstainers. In addition to Wills et al. and Milich et al., other researchers have failed to support Shedler and Block’s hypothesis (e.g., Chassin, Pitts, & Prost, 2002; Rohde, Lewinsohn, & Seeley, 1996).

Unfortunately, it is difficult to draw firm conclusions concerning the failures to replicate because the original studies supporting the hypothesis that abstainers are maladjusted used different measures and methods than the studies that did not show this effect. For example, the studies supporting the maladjusted nature of abstainers used broad measures of personality, such as the California Adult Q-sort, which covers the entire spectrum of the Big Five personality trait taxonomy (McCrae, Costa, & Busch, 1986). In contrast, the studies failing to replicate these findings focused almost exclusively on psychological adjustment rather than personality broadly conceived. It may be that pathological forms of overcontrol are assessed better within a broader measure of personality than the typical measures of psychological adjustment, which

tend to focus on dimensions of distress. Moreover, the two streams of research use different methods. The studies supporting the maladjusted nature of abstainers primarily used observer ratings of personality, whereas the studies that failed to replicate this finding used self-reports. Finally, no study has examined both alcohol and drug consumption patterns in conjunction with a broad personality measure and multiple methods.

With these discrepancies in mind, we designed two studies to test the relationship between personality and substance abuse that rectify several of the methodological inconsistencies of previous research. In the first study, we employed a comprehensive measure of the Big Five personality traits (Goldberg, 1993). In addition, we administered personality inventories to more directly measure a tendency toward overcontrol, such as the Frost Multidimensional Perfectionism Scale (Frost, Marten, Lahart, & Rosenblate, 1990) and impulsivity (Barrett Impulsivity Scale; Patton, Stanford, & Barratt, 1995). In the second study, we used two measures of the Big Five and gathered observer ratings of personality from friends and acquaintances from a subgroup of participants. Lastly, many researchers have considered only one form of substance use. For instance, Kohn, Barnes, Fishlinsky, Segal, and Hoffman (1979) sampled clients of a methadone clinic, and Jones (1968, 1971) focused solely on users and nonusers of alcohol. In the present study, we considered both alcohol and illicit drug use.

2. Study 1

2.1. Method

2.1.1. Participants

Participants were undergraduate students at a large Midwestern university enrolled in an introductory psychology course who participated to partially fulfill the course requirements. The sample was comprised of 52 men and 66 women ($N = 118$). Participants' ages ranged from 17 to 23 years ($M = 18.6$). Slightly more than 75% of the sample were white, 8.5% were Hispanic, 5.9% were Asian, 4.2% were black, and the remaining participants were Native American or of another unlisted ethnic category.

2.1.2. Measures

2.1.2.1. Substance use. Several items from the Behavioral Risk Factor Surveillance System (BRFSS; National Center for Chronic Disease Prevention & Health Promotion, 2000) and the Youth Risk Behavior Survey (YRBS; National Center for Chronic Disease Prevention & Health Promotion, 1999) were used to assess substance use. These two surveys are used nationally to track health risk factors in adolescents and adults. These questions were used to both categorize individuals into heavy, moderate, and abstaining groups and to create continuous measures of alcohol and drug consumption.

Alcohol use was assessed with open-ended items in which participants indicated how many drinks they had consumed, on average, each day per week in the past year.

We summed across the 7 days to come up with one continuous measure of how many drinks participants consumed each week, on average. This continuous measure was later used for regression analyses to test Shedler and Block's (1990) hypothesis of curvilinear relationships between certain personality traits and substance use. Furthermore, we sought to categorize participants into one of three groups—abstainers, moderate users, and heavy users. This was primarily done in an attempt to directly replicate the work of previous researchers (e.g., Shedler & Block) who drew conclusions concerning precisely how abstainers differ from moderate and heavy users of alcohol and drugs. Differentiating among (i.e., categorizing) individuals with distinct drinking patterns is common practice (e.g., Cook et al., 1998; Hogan et al., 1970; Jones, 1968, 1971; Labouvie & McGee, 1986; Milich et al., 2000; Shedler & Block, 1990). Therefore, participants were classified as alcohol abstainers if they indicated that they had not consumed any alcohol in the past year. Based on the recommendations of Sanchez-Craig, Wilkinson, and Davila (1995), participants were considered moderate users if they indicated consuming no more than 12 or 16 drinks per week, for women and men, respectively. If they indicated alcohol use in excess of these amounts, they were considered heavy users.¹ As a result of this classification system, 37.3% were classified as abstainers, 36.4% were classified as moderate users, and 26.3% were classified as heavy users.

In order to assess drug use, participants indicated how many times in the past year, from 1 (never) to 7 (several times a day), they had used a variety of drugs—marijuana, inhalants, cocaine, heroin, methamphetamines, and hallucinogens. Participants were classified as drug abstainers if they indicated that they had not used any of these drugs at all in the past year. They were classified as moderate users if they indicated that they had used only one drug a few times in the past year, and they were classified as heavy users if they admitted to using one drug at least a few times per month or more than one drug at least a few times in the past year. This was determined based on the distribution of reported drug use. Moreover, previous researchers have used similar guidelines for categorizing participants (e.g., Wolff & Wolff, 2002). This resulted in 65.3% of the sample being classified as abstainers, 22.0% as moderate users, and 12.7% as heavy users.

There was some degree of overlap between the alcohol and drug use categories. The correlation between the drug and alcohol use reached $r = .52, p < .001$. While this correlation appears to be quite high, a closer look reveals that a large number of participants were actually not categorized in the same group across substances. Nearly 36% of the sample abstained from both alcohol and drug use, 10.2% were moderate users of both, and 7.6% were heavy users of both. However, the remaining 46.6% of the sample were not categorized in the same group across types of substance use.

¹ We also categorized participants based on frequency of drinking, rather than quantity. Based on Sanchez-Craig et al.'s (1995) guidelines indicating that more than three drinks per sitting for women, and more than four for men, is problematic, we categorized moderate users as those who consume alcohol but never exceed these limits and heavy users as those who exceed these limits at least once per week. This led to a greater number of people being categorized as heavy users (45.8 vs .26.3% when categorized based on quantity of drinks per week), however, the subsequent analyses yielded virtually identical results as those based on quantity of drinks per week in Studies 1 and 2.

2.1.2.2. Personality traits. Goldberg's (1999) IPIP-AB5C Inventory was used to assess and score the Big Five dimensions of extraversion, agreeableness, conscientiousness, emotional stability, and intellect (AB5C). The IPIP-AB5C Inventory contains 45 subscales with nine for each domain of the Big Five. According to Goldberg, each of the Big Five domains consists of one scale that is a pure indicator of Big Five trait as well as eight additional facets that are blends of that trait and the remaining Big Five traits. This results in nine subscales for each domain of the Big Five. For the purposes of this study, participants completed the core markers of the Big Five and the eight additional subscales of conscientiousness. We assessed the full complement of conscientiousness facets in order to test more specific hypotheses concerning overcontrol and to include measures shown to have strong relationships to drug and alcohol consumption in previous research, such as cautiousness and dutifulness (e.g., Caspi et al., 1997; Tucker et al., 1995). Respondents rated each item of the AB5C on a five-point scale from 1 (very uncharacteristic of me) to 5 (very characteristic of me). The reliabilities of AB5C were quite good, ranging from .77 to .87 ($M = .81$).

Finally, in order to replicate previous research (e.g., Shedler & Block, 1990) and to test the hypothesis that abstainers suffered from more pathological forms of overcontrol and impulse control, participants also completed the Barratt Impulsiveness Scale (BIS-11; Patton et al., 1995) and the Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990). The reliabilities of these scales were quite high. The reliability coefficients for the BIS and FMPS were .81 and .88, respectively.

It should be noted that no items on any of these personality measures refer to substance use.

2.1.3. Analyses

We first examined mean-level differences on the personality measures across the heavy, moderate, and abstaining groups using analysis of variance followed by multiple comparison tests (i.e., least significant differences). Because dividing continuous measures into categorical indices can result in a loss of statistical power, we also tested the relationship between substance use and personality traits with multiple regression. In these analyses, we used the continuous versions of the alcohol and drug consumption variables. We tested the curvilinear hypotheses by predicting continuous substance use variables from linear and quadratic versions of the personality traits.

In addition, to test the consistency of the profile of scores across alcohol and drug use, we utilized an "alerting coefficient" (Westen & Rosenthal, 2003). Westen and Rosenthal describe the alerting coefficient as "the simple correlation between (a) the pattern of correlations *predicted* between the measure being validated and the k variables correlated with that measure and (b) the pattern of correlations actually *obtained*" (p. 610). This coefficient is typically used as an index of construct validity. In this particular case, however, we used it to test the consistency of profile scores across the two forms of substance use. Specifically, we correlated the mean scores on the personality scales of the alcohol abstainers with those of the drug abstainers, the mean personality scores of the moderate alcohol users with those of the moderate drug users, and the personality scores of the heavy alcohol users with those of the heavy drug users.

2.2. Results

First we compared abstainers to moderate and heavy users and found no support for Shedler and Block's (1990) hypothesis (see Table 1). Abstainers outscored heavy users on agreeableness, $t(73)=2.03$, $p < .05$. They scored lower than both heavy users, $t(73)=5.44$, $p < .001$, and moderate users, $t(85)=4.41$, $p < .001$, on extraversion. Based largely on Shedler and Block's study, one would expect abstainers to score higher than the other groups on measures of overcontrol, such as perfectionism and lower than moderate users on emotional stability. Contrary to Shedler and Block's findings, abstainers did not score higher than moderate users on normal personality measures of perfectionism nor on measures of pathological overcontrol as measured with the FMPS. Furthermore, they actually scored higher than moderate users on emotional stability, $t(85)=2.06$, $p < .05$.

Next, we directly compared heavy users to the abstainers and moderate users. The findings were consistent with the argument that there is a linear relationship between substance use and psychological distress. Heavy users scored lower than abstainers on measures of conscientiousness $t(72)=4.18$, $p < .001$, and its constituent facets of cautiousness, $t(72)=4.52$, $p < .001$, dutifulness, $t(72)=4.53$, $p < .001$, and perfectionism, $t(71)=2.47$, $p < .05$. Compared to moderate users, heavy users also scored lower on conscientiousness, $t(72)=2.57$, $p < .05$, cautiousness, $t(72)=2.96$, $p < .01$, dutifulness, $t(72)=2.49$, $p < .05$, and perfectionism, $t(72)=2.15$, $p < .05$. Not surprisingly, heavy users also scored higher than the abstainers on Barratt's Impulsivity Scale, $t(70)=3.46$, $p < .01$.

Although fewer in number, the overall pattern of results were largely replicated when the groups were organized in terms of drug use (see Table 2). Most notably, abstainers scored considerably lower on extraversion than both moderate users, $t(101)=4.11$, $p < .01$, and heavy users, $t(90)=2.36$, $p < .05$. Once again, the abstain-

Table 1
Descriptive statistics, *F* tests, and regression coefficients for categories of alcohol use

Trait	Abstainers	Moderate users	Heavy users	<i>F</i>	β_{linear}	$\beta_{\text{curvilinear}}$
Extraversion	2.70 (.80)	3.39 (.70) ^a	3.63 (.68) ^a	17.21	.22	-.12
Agreeableness	4.34 (.54)	4.09 (.55)	4.06 (.69) ^a	2.72	-.25	.11
Conscientiousness	3.80 (.58)	3.59 (.45)	3.26 (.62) ^{a,b}	8.77	-.32	.04
Dutifulness	4.08 (.57)	3.83 (.44) ^a	3.52 (.57) ^{a,b}	10.30	-.39	.08
Perfectionism	3.48 (.54)	3.43 (.62)	3.11 (.76) ^{a,b}	3.44	-.34	.18
Cautiousness	2.84 (.59)	2.64 (.55)	2.27 (.45) ^{a,b}	10.31	-.26	-.08
Emotional Stability	3.37 (.64)	3.08 (.63) ^a	3.12 (.65)	2.40	-.04	-.05
Intellect	3.85 (.58)	3.90 (.57)	3.73 (.58)	.77	-.14	-.02
Barratt Impulsivity Scale	2.46 (.42)	2.64 (.40)	2.83 (.54) ^a	6.03	.26	.13
FMPS	3.05 (.47)	3.00 (.52)	3.06 (.50)	.18	.01	-.06

Values in bold indicate $p < .05$. $N=118$ for the AB5C, 114 for the FMPS, and 115 for the BIS. β_{linear} , regression coefficient for linear term; $\beta_{\text{curvilinear}}$, regression coefficient for quadratic term; and FMPS, Frost Multidimensional Perfectionism Scale.

^a Differs significantly from abstainers.

^b Differs significantly from moderate users.

Table 2
Descriptive statistics, *F* tests, and regression coefficients for categories of drug use

Trait	Abstainers	Moderate users	Heavy users	<i>F</i>	β_{linear}	$\beta_{\text{curvilinear}}$
Extraversion	2.97 (.80)	3.69 (.61) ^a	3.49 (.84) ^a	9.67	.20	.03
Agreeableness	4.21 (.56)	4.21 (.65)	3.96 (.67)	1.16	-.13	.16
Conscientiousness	3.67 (.59)	3.35 (.50) ^a	3.53 (.58)	3.06	-.21	.03
Dutifulness	3.94 (.56)	3.67 (.53) ^a	3.64 (.57)	3.57	-.26	-.02
Perfectionism	3.45 (.60)	3.18 (.73)	3.24 (.70)	1.95	-.17	.07
Cautiousness	2.76 (.56)	2.29 (.53) ^a	2.44 (.50) ^a	7.94	-.24	.04
Emotional Stability	3.26 (.66)	3.15 (.61)	2.96 (.64)	1.49	-.16	-.05
Intellect	3.80 (.59)	3.94 (.45)	3.84 (.69)	.53	.02	-.03
Barratt Impulsivity Scale	2.54 (.43)	2.78 (.51) ^a	2.80 (.49) ^a	3.88	.20	.03
FMPS	3.05 (.46)	2.99 (.57)	3.03 (.54)	.13	.24	.07

Values in bold indicate $p < .05$. $N = 118$ for the AB5C, 114 for the FMPS, and 115 for the BIS. β_{linear} , regression coefficient for linear term; $\beta_{\text{curvilinear}}$, regression coefficient for quadratic term; and FMPS, Frost Multidimensional Perfectionism Scale.

^a Differs significantly from abstainers.

ers did not score significantly higher on measures of perfectionism, nor did they score lower on emotional stability.

As described above, to test the consistency of the profile of scores across alcohol and drug use, we utilized Westen and Rosenthal's (2003) alerting coefficient. This entailed correlating the mean scores on the personality scales of the alcohol abstainers with those of the drug abstainers, the mean personality scores of the moderate alcohol users with those of the moderate drug users, and the personality scores of the heavy alcohol users with those of the heavy drug users. The similarity of the personality profiles for abstainers, moderate users, and heavy users across alcohol and drug consumption was very high, with a mean alerting coefficient of .96, indicating a very consistent pattern of effects across different types of substance use.

Despite the fact that many of the mean-level patterns contradicted the hypothesis that abstainers would be pathologically overcontrolled and less emotionally stable, the association may still be curvilinear if the relationship is tested using continuous markers of alcohol and drug consumption. In order to formally test the idea that the relationship between particular personality traits and substance use is curvilinear, we used a hierarchical multiple regression analysis. Using the personality variables as the predictors of the continuous variables of substance use, both a linear and a quadratic term were included in each regression equation. The quadratic term was included to test for curvilinear relationships between personality traits and substance use. There were no curvilinear effects across both alcohol and drug consumption (see Tables 1 and 2). Most importantly, we found no curvilinear effects for measures of emotional stability and agreeableness, disconfirming the notion that abstainers are maladjusted in comparison to moderate users.²

² Both continuous alcohol and drug variables were slightly skewed. To address this issue, we have used the inverse of the alcohol and drug variables as an outcome in the regression analyses in order to compensate for the skewed distribution of the variables. The results for Studies 1 and 2 were virtually identical to those reported here when the inverse versions of these variables were used.

2.3. Discussion for Study 1

Consistent with previous research, heavy users of alcohol and drugs appear to be less conscientious than either abstainers or moderate users. They scored lower than the other two groups on conscientiousness itself, in addition to the lower order facets of conscientiousness, including cautiousness, dutifulness, and perfectionism and the related construct of impulsiveness. Also as expected, abstainers scored consistently higher than the other two groups on measures of conscientiousness and lower on extraversion. However, they did not score higher on measures of neurotic overcontrol. Nor did they score lower than moderate users on emotional stability.

Like many previous studies examining the relationship between substance use and personality, Study 1 relied entirely on one method of assessment, self-reports. Past research that has demonstrated a curvilinear relationship between substance use and personality has primarily used observer ratings. Also, the sample size, though consistent with most past research, may not have provided enough power to test curvilinear effects. In an effort to rectify these issues, we conducted a second study that included larger sample sizes and observer ratings of personality in addition to self-reports to better test curvilinear effects.

3. Study 2

3.1. Method

3.1.1. Participants

Participants were undergraduate students at a large Midwestern university enrolled in one of two psychology courses who participated to partially fulfill course requirements. The sample was comprised of 248 men and 297 women ($N = 545$).³ Participants' ages ranged from 17 to 27 years ($M = 19.3$). Slightly more than 76% of the sample were white, 10.2% were Asian, 6.3% were black, and the remaining participants were Native American, Hispanic, or of another unlisted ethnic category.

In addition, observer ratings of the participants' personalities were sought. One hundred seventy-two of the participants had one or more close associates (i.e., friends and/or family members) rate their personalities as well as their drug and alcohol use.

To test for selection effects, we compared the personalities of those who successfully recruited close associates to make observer ratings with the personalities of those who did not. As might be expected, the two groups differed in terms of extraversion, $t(449) = 2.82, p < .01$, as those who recruited close associates outscored those

³ We tested to determine whether sex would moderate the relationship between substance use and the personality variables. In Study 1, we found no sex differences. In Study 2, we found sex differences in the relationship between substance use and both extraversion and intellect. For women, there is a positive relationship between extraversion and alcohol use, but this relationship is nonexistent for men. For men, there is an inverse relationship between intellect and both drug and alcohol use, whereas the relationship between intellect and substance use is negligible for women.

who did not ($M = 3.54$, $SD = .71$ and $M = 3.32$, $SD = .74$, respectively). Otherwise, these two groups did not differ on measures of agreeableness, conscientiousness, emotional stability, intellect, or drug and alcohol consumption.

3.1.2. Measures

3.1.2.1. Alcohol and drug consumption. We administered the same items from the BRFSS (National Center for Chronic Disease Prevention & Health Promotion, 2000) and the YRBS (National Center for Chronic Disease Prevention & Health Promotion, 1999) to assess participants' alcohol and drug use as in Study 1. We also used the same classification system as was described in Study 1. As a result of this system, 28.2% of the participants were classified as alcohol abstainers, 43.9% were classified as moderate users, and 27.9% were classified as heavy users. Nearly 64% of the participants were classified as drug abstainers, 19.5% were classified as moderate users, and 16.9% were classified as heavy users.

Once again, many who were classified as alcohol abstainers were also classified as drug abstainers, etc. ($r = .44$, $p < .001$). Slightly more than 25% of the participants were classified as abstainers from both alcohol and drugs, 11.0% were moderate users of both, and 10.1% were heavy users of both. However, the categories across alcohol and drug use were inconsistent for the majority (53.6%) of the sample.

3.1.2.2. Personality measures. In the present study, we focused solely on the Big Five. For the self-report condition, participants completed two measures of the Big Five, including the version of the IPIP-AB5C (Goldberg, 1999) described in Study 1. Once again the reliabilities for the IPIP-AB5C were quite good, ranging from .72 to .88 ($M = .82$). In addition to the IPIP-AB5C Inventory (Goldberg, 1999), participants rated themselves on an adjective-based checklist (ABC) intended to assess the Big Five. The latter was included for the purpose of observer ratings. We included it in the self-report condition in order to replicate results across method and measure. Fifty of the adjectives were drawn from the 100 unipolar adjective markers of the Big Five factor structure developed by Goldberg (1992) and constituted the top five indicative and contra-indicative adjectives for each of the Big Five. The participants also rated themselves on an additional set of unipolar adjectives intended to assess the full domain of conscientiousness. Research on these adjectives has shown that they can be summarized with an 8-factor structure with factor scales labeled reliability, orderliness, impulse control, decisiveness, punctuality, formalness, conventionality, and industriousness (Roberts, Bogg, Walton, Chernyshenko, & Stark, 2004). We used the impulse control and reliability scales as these were scales most consistent with previous measures known to have strong relationships to drug and alcohol consumption (e.g., Caspi et al., 1997; Tucker et al., 1995). The impulse control scale is comprised of adjectives such as careful, cautious, and reckless (reverse scored), and the reliability scale is comprised of adjectives such as responsible, dependable, and reliable. Participants rated how descriptive each adjective was of their personality on a five-point scale from 1 (strongly disagree) to 5 (strongly agree). The reliabilities of the ABC scales ranged from .75 to .86 ($M = .80$).

As previously mentioned, a subset of the participants ($N=55$) had multiple observers rate their personalities on the ABC scales. Prior to averaging these three ratings, we computed the level of inter-judge agreement, as indicated by correlations about the observers' ratings, as well as their α reliability. The correlations among the observers' ratings for the intellect dimension was especially low (e.g., $r = -.25$), however, the remaining scales showed more typical levels of inter-judge correlations, ranging from .15 to .55 ($M = .30$). We also tested the α reliability of these observers' ratings to ascertain how similar they were. Reliability for the intellect scale was extremely poor ($-.03$), however, the reliability coefficients on the remaining scales ranged from .37 to .79 ($M = .53$). The particularly poor results for the intellect scale lead to the decision to drop it from the observer condition for both those individuals with multiple observers and those with only one observer. For the remaining Big Five dimensions, we averaged the ratings of the multiple observers.

Across the entire sample of individuals with both self-report and observer ratings ($N = 172$), the correlations between the self-reports and the observer ratings of the participants' personalities ranged from .20 to .66 ($M = .36$). We also tested for mean-level differences between self-reports and observer ratings. Observers' ratings were significantly higher than self-reports on extraversion ($d = .35$), agreeableness ($d = .18$), and emotional stability ($d = .22$). The effect sizes, however, were fairly small.

In addition to assessing the level of agreement between self and observer ratings of personality, we assessed the level of agreement between the self and observer reports of alcohol consumption and drug use. The level of agreement was quite high for reported drug use, $r = .56$, $p < .001$, and for reported alcohol consumption, $r = .55$, $p < .001$. However, in light of the fact that self-reports have been shown to be more valid and reliable than alternative measures of delinquent activities (see Krueger et al., 1994), only self-reported consumption behavior will be used for the remainder of the analyses.

3.2. Results

As in Study 1, ANOVAs and multiple comparisons were carried out to test for group differences. First we examined self-reported personality differences for the alcohol groups (Table 3). Consistent with our findings in Study 1, abstainers scored lower than moderate users, $t(292) = 4.64$, $p < .001$, and heavy users, $t(233) = 6.28$, $p < .001$, on extraversion (based on AB5C scores). Once again contradicting the notion that abstainers are suffering from maladjustment, abstainers did not score differently than moderate users on emotional stability. They did, however, score higher than heavy alcohol users on emotional stability, $t(233) = 2.36$, $p < .05$ (based on AB5C scores). Overall, the pattern of findings replicated across the ABC and the AB5C and bolstered the findings presented in Study 1.

Also consistent with the hypothesized linear relationship between substance use and distress, heavy users of alcohol scored lower than abstainers and moderate users on conscientiousness, $t(230) = 3.82$, $p < .001$, cautiousness, $t(230) = 6.73$, $p < .001$, dutifulness, $t(230) = 4.71$, $p < .001$, and perfectionism, $t(229) = 2.25$, $p < .05$ (all values reflect differences on the AB5C for heavy users vs abstainers). Heavy users also scored lower than both abstainers, $t(296) = 4.98$, $p < .001$, and moderate users,

Table 3
Self-reported personality differences for categories of alcohol use

Trait	Abstainers	Moderate users	Heavy users	<i>F</i>	β_{linear}	$\beta_{\text{curvilinear}}$
Extraversion						
AB5C	2.74 (.79)	3.14 (.72) ^a	3.33 (.68) ^{a,b}	20.58	.05	-.06
ABC	3.16 (.81)	3.43 (.73) ^a	3.49 (.70) ^a	8.77	-.02	-.10
Agreeableness						
AB5C	4.17 (.61)	4.12 (.61)	3.96 (.62) ^{a,b}	3.96	-.18	.04
ABC	4.20 (.55)	4.23 (.52)	4.03 (.54) ^{a,b}	7.05	-.16	.17
Conscientiousness						
AB5C	3.75 (.59)	3.65 (.58)	3.46 (.59) ^{a,b}	7.69	-.23	.02
ABC	3.76 (.63)	3.76 (.61)	3.58 (.62) ^{a,b}	4.53	-.14	-.03
Dutifulness						
AB5C	3.95 (.55)	3.83 (.53)	3.62 (.52) ^{a,b}	11.58	-.29	.11
Reliability						
ABC	4.38 (.50)	4.31 (.54)	4.15 (.61) ^{a,b}	6.77	-.14	.14
Perfectionism						
AB5C	3.46 (.65)	3.44 (.62)	3.28 (.56) ^{a,b}	3.34	-.17	-.03
Cautiousness						
AB5C	3.02 (.51)	2.83 (.54) ^a	2.56 (.48) ^{a,b}	22.98	-.05	.02
Impulse Control						
ABC	3.72 (.47)	3.61 (.48) ^a	3.44 (.46) ^{a,b}	12.59	-.20	.08
Emotional Stability						
AB5C	3.24 (.74)	3.08 (.70)	3.02 (.73) ^a	2.93	.03	-.03
ABC	3.32 (.75)	3.18 (.69)	3.07 (.69) ^a	4.62	-.02	-.09
Intellect						
AB5C	3.78 (.62)	3.76 (.57)	3.67 (.56)	1.29	-.11	.02
ABC	4.11 (.56)	4.11 (.52)	3.97 (.62) ^{a,b}	3.27	-.08	.15

Values in bold indicate $p < .05$. $N = 417$ for the AB5C and 540 for the ABC. β_{linear} , regression coefficient for linear term; $\beta_{\text{curvilinear}}$, regression coefficient for quadratic term.

^a Differs significantly from abstainers.

^b Differs significantly from moderate users.

$t(387) = 3.29$, $p < .01$, on impulse control (ABC). Furthermore, heavy users scored lower than abstainers, $t(233) = 2.67$, $p < .01$, and moderate users, $t(303) = 2.17$, $p < .05$, on agreeableness (again, values reflect differences on the AB5C).

The pattern of findings for drug consumption was very similar to that found on alcohol consumption (see Table 4). Once again, drug abstainers scored lower than heavy users on AB5C extraversion, $t(334) = 2.94$, $p < .01$. As demonstrated in Study 1, drug abstainers did not differ from moderate users on emotional stability. Also consistent with the patterns found for alcohol use and in Study 1, heavy drug users scored lower than moderate users, $t(191) = 4.00$, $p < .001$, and abstainers, $t(426) = 4.29$, $p < .001$, on agreeableness (based on ABC scores). They also scored lower than moderate users, $t(138) = 2.06$, $p < .05$, and abstainers, $t(327) = 5.71$, $p < .001$, on conscientiousness (AB5C reflected here), as well as its sub-facets.

Table 4
Self-reported personality differences for categories of drug use

Trait	Abstainers	Moderate users	Heavy users	<i>F</i>	β_{linear}	$\beta_{\text{curvilinear}}$
Extraversion						
AB5C	3.00 (.77)	3.22 (.74)	3.30 (.74) ^{a,b}	5.61	.13	-.10
ABC	3.31 (.78)	3.46 (.75)	3.46 (.67)	2.58	.03	-.06
Agreeableness						
AB5C	4.16 (.58)	4.04 (.60)	3.85 (.70) ^a	7.76	-.21	-.03
ABC	4.20 (.51)	4.24 (.51)	3.93 (.63) ^{a,b}	10.44	-.16	-.05
Conscientiousness						
AB5C	3.74 (.57)	3.50 (.53) ^a	3.30 (.59) ^{a,b}	18.63	-.26	.03
ABC	3.79 (.62)	3.69 (.58)	3.46 (.64) ^{a,b}	9.66	-.12	-.04
Dutifulness						
AB5C	3.94 (.56)	3.69 (.54) ^a	3.40 (.53) ^{a,b}	35.24	-.25	-.02
Reliability						
ABC	4.36 (.50)	4.24 (.54)	4.04 (.69) ^{a,b}	11.71	-.16	.01
Perfectionism						
AB5C	3.49 (.61)	3.33 (.59) ^a	3.09(.58) ^{a,b}	12.78	-.15	-.01
Cautiousness						
AB5C	2.89 (.53)	2.66 (.55)	2.58 (.51) ^{a,b}	12.36	-.26	-.01
Impulse Control						
ABC	3.69 (.46)	3.51 (.44) ^a	3.32 (.50) ^{a,b}	24.96	-.21	-.08
Emotional Stability						
AB5C	3.10 (.72)	3.14 (.65)	3.10 (.83)	.07	-.04	-.02
ABC	3.22 (.72)	3.13 (.75)	3.17 (.66)	.59	-.06	-.03
Intellect						
AB5C	3.77 (.56)	3.68 (.61)	3.70 (.61)	.98	-.10	.01
ABC	4.07 (.55)	4.10 (.56)	4.04 (.62)	.35	-.07	.09

Values in bold indicate $p < .05$. $N = 409$ for the AB5C and 533 for the ABC. β_{linear} , regression coefficient for linear term; $\beta_{\text{curvilinear}}$, regression coefficient for quadratic term.

^a Differs significantly from abstainers.

^b Differs significantly from moderate users.

As in Study 1, to quantify the similarity in profile scores across substance use, we utilized the alerting coefficient (Westen & Rosenthal, 2003). We correlated the alcohol abstainers' scores with the drug abstainers' scores on the personality measures, etc. The profile correlations across alcohol and drug groups averaged .98, indicating a strong replication of the personality profiles across substance abuse behaviors.

Next, we tested whether the personality differences would replicate in the observer condition (see Table 5). Consistent with the self-report findings, abstainers were rated by their friends as less extraverted than heavy users of alcohol, $t(95) = 2.61$, $p < .05$. Consistent with all previous findings, abstainers again were not seen by their friends as less emotionally stable than either the moderate or heavy users of alcohol. Also consistent with the self-report findings, heavy users of alcohol were rated by their friends as less agreeable than heavy users, $t(95) = 2.01$, $p < .05$, and moderate users, $t(120) = 2.61$, $p < .05$. They were also seen as comparatively low on dutifulness,

Table 5
Observer-rated personality differences for categories of alcohol use

Trait	Abstainers	Moderate users	Heavy users	<i>F</i>	β_{linear}	$\beta_{\text{curvilinear}}$
Extraversion	3.42 (.94)	3.64 (.77)	3.85 (.70) ^a	3.40	.02	-.10
Agreeableness	4.32 (.57)	4.36 (.51)	4.09 (.65) ^{a,b}	3.68	-.16	-.05
Conscientiousness	3.90 (.60)	3.74 (.66)	3.55 (.66) ^a	3.75	-.15	-.05
Reliability	4.43 (.55)	4.43 (.49)	4.10 (.65) ^{a,b}	6.36	-.13	.10
Impulse Control	3.72 (.46)	3.67 (.47)	3.35 (.55) ^{a,b}	8.59	-.16	-.09
Emotional Stability	3.41 (.82)	3.45 (.71)	3.16 (.69) ^b	2.51	-.09	-.08

Values in bold indicate $p < .05$. $N = 168$. β_{linear} , regression coefficient for linear term; $\beta_{\text{curvilinear}}$, regression coefficient for quadratic term.

^a Differs significantly from abstainers.

^b Differs significantly from moderate users.

$t(95) = 2.94$, $t < .01$, and impulse control, $t(95) = 3.70$, $p < .001$ (reflect differences between abstainers and heavy users).

The analysis of the groupings based on drug use resulted again in a similar pattern of findings (see Table 6). Participants' friends rated heavy users of drugs lower than abstainers and moderate users on agreeableness, $t(133) = 3.08$, $p < .01$, dutifulness, $t(133) = 4.65$, $p < .001$, and impulse control, $t(133) = 3.89$, $p < .001$ (values reflect differences between abstainers and heavy users). In this case, there were no group differences on extraversion, and once again, drug abstainers were not seen as less emotionally stable than moderate or heavy users.

The observer ratings clearly replicated the self-reports, however, to actually quantify the degree of similarity between the two methods, we again employed the alerting coefficient (Westen & Rosenthal, 2003) and correlated the profile of mean scores on the personality scales of the self-reported abstainers, moderate users, and heavy users of alcohol with the mean scores of the observer-reported abstainers, moderate users, and heavy users of alcohol, respectively. Likewise, we correlated the mean scores on the personality scales of the self-reported abstainers, moderate users, and heavy users of drugs with the mean scores of the observer-reported abstainers, moderate users, and heavy users of drugs, respectively. The personality profiles were very similar, ranging from .89 to .99 ($M = .95$).

Table 6
Observer-rated personality differences for categories of drug use

Trait	Abstainers	Moderate users	Heavy users	<i>F</i>	β_{linear}	$\beta_{\text{curvilinear}}$
Extraversion	3.54 (.85)	3.79 (.70)	3.79 (.72)	1.81	.09	-.06
Agreeableness	4.33 (.53)	4.27 (.53)	3.96 (.74) ^{a,b}	4.74	-.23	-.08
Conscientiousness	3.85 (.61)	3.64 (.65)	3.36 (.69) ^a	7.15	-.17	-.04
Reliability	4.46 (.47)	4.27 (.54)	3.92 (.78) ^{a,b}	11.09	-.25	-.03
Impulse Control	3.69 (.47)	3.54 (.56)	3.28 (.51) ^{a,b}	7.77	-.26	-.06
Emotional Stability	3.37 (.74)	3.45 (.77)	3.16 (.71)	1.24	-.11	-.10

Values in bold indicate $p < .05$. $N = 168$. β_{linear} , regression coefficient for linear term; $\beta_{\text{curvilinear}}$, regression coefficient for quadratic term.

^a Differs significantly from abstainers.

^b Differs significantly from moderate users.

Next we used hierarchical multiple regression analysis to test the hypothesis that the relationship between particular personality traits and substance use would be curvilinear. According to Shedler and Block's (1990) hypothesis, we would expect to find U-shaped (or inverted U-shaped) relationships between substance use and such traits as emotional stability. There were only a few curvilinear effects observed in the self-report, alcohol use condition (see Table 3), but none of these were in the direction suggested by Shedler and Block. Furthermore, only one of these (extraversion) was replicated in the self-report, drug use condition (see Table 4), and there were absolutely no curvilinear relationships found in the observer-report conditions (see Tables 5 and 6). Given that the observed effects were neither in line with Shedler and Block's hypothesis nor replicated across conditions, we opted against interpreting them further.

3.3. Discussion for Study 2

Study 2 was designed to improve upon some of the limitations of Study 1. In particular, the sample size was considerably larger, and self-reports were complemented with observer ratings of the participants' personalities. In large part, the results of Study 2 replicated those of Study 1. Heavy users of alcohol and drugs scored consistently lower on measures of agreeableness and conscientiousness. On the contrary, abstainers consistently scored the highest of the three groups on measures of conscientiousness. Abstainers also scored the lowest on extraversion across three conditions. Contrary to the findings of Shedler and Block (1990) and others, however, we found no evidence for a curvilinear relationship between substance use and certain personality traits, specifically emotional stability, which might suggest that moderate users are more well-adjusted than abstainers. Most impressively, these patterns replicated across self-reports and observer ratings.

4. General discussion

Much like the findings reported by Milich et al. (2000), the results from the current studies disconfirm the primary conclusion drawn by Cook et al. (1998), Shedler and Block (1990), and others. Abstainers did not appear to be any more maladjusted than moderate users of drugs or alcohol. They did indeed outscore both moderate and heavy users on each and every measure of conscientiousness and its sub-facets across studies and methods, but there is little evidence to suggest that this level of conscientiousness is maladaptive. The abstainers did not outscore the other groups on neuroticism or a direct test of perfectionism (FMPS). They did, however, appear to be more introverted than either moderate or heavy users, which does support previous findings indicating that abstinence is associated with appearing reserved and standoffish (e.g., Jones, 1971; Shedler & Block, 1990).

In contrast, our data offer additional support to the body of literature demonstrating the link between negative dispositions and heavy substance use. Heavy users were indeed found to score lower than abstainers and moderate users on various measures of conscientiousness, such as cautiousness, dutifulness, and impulse control. They

were also observed to be comparatively disagreeable, replicating previous findings (Martin & Sher, 1994; Trull & Sher, 1994).

In short, our findings further corroborate existing research portraying the abuser of drugs and alcohol as more disagreeable, irresponsible (low conscientiousness), and neurotic than abstainers and moderate users. It should be noted that in terms of the scale that respondents used to rate themselves (i.e., a 1 to 5 scale) none of these groups would be characterized as disagreeable, unconscientious, and neurotic in absolute terms, as each group rated themselves above the mean (i.e., greater than 3.0) on agreeableness, conscientiousness, and emotional stability. Our findings also confirm the notion that those who abstain from drug and alcohol use are highly conscientious and are possibly somewhat inhibited in social settings (low extraversion). However, they appear to be neither neurotic nor neurotically overcontrolled, as was suggested by Shedler and Block (1990), among others. Unlike previous research, these findings were replicated in two studies across two types of substance use, and across self-report and observer methods.

Our findings concerning the relationship between personality traits and substance use are clear. Again, however, our results directly contradict those of some previous researchers, namely Shedler and Block (1990), and some attention ought to be paid to explain the discrepancy between these findings. This discrepancy could perhaps be explained by the environment and manner in which the participants of previous research were assessed. First and foremost, in the studies showing that abstainers were not as psychologically healthy as their counterparts, participants' personalities were rated by psychologists, which raises two possibilities. The first is that psychologists have a privileged perspective on psychopathology and, therefore, can judge whether individuals suffer from various forms of psychological distress better than lay people. The second possibility is that psychologists may have the tendency to label what lay people might perceive to be normal behavior, as pathological. In the present study, it appears that friends and family do not perceive abstaining from substance use to be problematic. Of course, future research should attempt to get both psychologists and lay judgments of personality in order to test the perspective of psychologists vs lay people.

The second circumstance that may explain the discrepancies across studies is the historical context in which the samples were embedded, as was also suggested by others who also failed to replicate Shedler and Block's (1990) findings, such as Milich et al. (2000). Wolff and Wolff (2002), for example, suggested that their lack of overwhelming support for the hypothesis that moderate users are psychologically healthier than abstainers may have resulted from the rural setting in which their study was carried out. Shedler and Block, on the other hand, performed their study on members of a tolerant Northern California urban community in which drug consumption was more normative. For example, the percentage of individuals in Shedler and Block's study who admitted to smoking marijuana was 68%, whereas in our sample, only 36% admitted to smoking marijuana. Therefore, the meaning of being an abstainer was different in the late 1970s and early 1980s in that environment. It was much less normative, and therefore, potentially more problematic. Thus, the most consistent and replicable pattern across methods and historical periods is that concerning the

heavy user being less agreeable, conscientious, and emotionally stable. It should be noted that the percentage of substance use found in the current study is closer to the national average both historically and currently (National Institute of Alcohol Abuse & Alcoholism, 2004a, 2004b; National Institute of Drug Abuse, 2004).

Finally, the inconsistency of findings across studies could possibly be explained by differences within the groups of abstainers. That is, there are two types of abstainers, those who have never consumed alcohol or used drugs, and those who currently refrain from using intoxicating substances because they are recovering from an abuse problem or addiction. It is certainly conceivable that the various proportions of these two types of abstainers across studies could lead to contradictory findings. Our indicator of abstinence, however, does not allow us to distinguish between the two types of abstainers.

Indeed, the current studies are themselves not without limitations. The samples, although quite large, consisted solely of undergraduate students. Binge drinking on college campuses is a widespread problem, which makes the study of college students' substance use patterns highly relevant; however, this in turn compromises the external validity of the results. Specifically, the drinking patterns observed in college students may be unique to that group, and we are unable to conclude whether these results would replicate with a sample of older adults (though it should again be noted that the levels of substance use in the present sample were roughly equal to those of more representative samples). For example, while binge drinking is certainly over-represented among college students, most likely, the majority of these students will eventually disengage in such behavior. Likewise, there are some motives for abstinence that are perhaps specific to college students. Refraining from alcohol and drug use is promoted heavily in many high schools, and some college students may still be acting under these influences. Moreover, pressure to abstain may result from residing in dorms in which alcohol is forbidden or studying on "dry" campuses. Finally, studying alcohol use in a college sample is obviously problematic because the behavior is actually illegal for most study participants as the participants' mean age usually falls below 21, the legal drinking age.

Many of the concerns associated with using a college sample could not be addressed in our studies due to the cross-sectional nature of their design. For example, we were unable to address the concern that some of the observed drinking patterns (e.g., binge drinking) are unique to college samples. Moreover, the design of these studies made it impossible to draw causal inferences regarding the relationship between substance use and personality. Previous longitudinal research has shown that childhood personality can predict adult substance use (e.g., Tucker et al., 1995), suggesting that personality essentially causes certain health behaviors, such as consuming alcohol. However, it could be the case that individuals may become less conscientious or agreeable, for example, as a result of heavy alcohol or drug use. They may also appear to have less impulse control as a result of alcohol's disinhibiting effects. However, based on the present studies, we are incapable of testing such hypotheses.

Finally, we could have made a more concerted effort to collect observer ratings. Perhaps we could have been more systematic in recruiting acquaintances of the

participants from various realms of their lives. For example, it may have been insightful to survey family members, co-workers, friends, and roommates, all of whom would presumably have a slightly different perspective of the target individual. Finally, we could have coupled the assessment with more measures of psychopathology. Of course, this is of minor concern, given that recent research (e.g., Reynolds & Clark, 2001) indicates that the Big Five can account for much of the relevant variance in measures of personality disorders.

Future research should do more to explore the mechanisms that mediate the relationship between personality and substance use. For instance, it would be insightful to incorporate a test of various motivational models intended to explain the path to substance use (e.g., Cooper, 1994; Cooper et al., 1992; Cox & Klinger, 1988). Further, one could examine the role that identity plays in mediating the relationship. For example, the identity of being a nonconformist may contribute to drug consumption and may account for the low agreeableness and conscientiousness scores for heavy drug users.

Despite our studies' limitations, it seems reasonable to surmise that the results presented here support the argument that abstaining from drugs and alcohol is in no way associated with psychopathology (Milich et al., 2000). While individuals who abstain from substance use do indeed appear to be highly conscientious and a bit inhibited, they do not appear to be emotionally maladjusted or overcontrolled.

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