Influences on Destructive College Drinking: The Role of Psychopathic Traits and Gender

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A Thesis Submitted in Partial Fulfillment of the

Requirements for the Degree of Bachelor of Arts

With Honors in Psychology from the

University of Michigan

2014

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Abstract

Alcohol abuse is a widespread problem throughout college campuses that can set young adults on increasingly destructive and costly trajectories. Previous findings have linked broad constructs, such as impulsivity, to increased alcohol consumption. Nevertheless, there is a need for clarification regarding associations between alcohol use and specific personality traits previously linked to more severe antisocial behavior. The purpose of the current study was to examine the relationship between psychopathic traits, gender, and alcohol consumption among a sample of 243 college students   Using a traditional measure of psychopathy, results indicated unique associations between lifestyle and antisocial facets of psychopathy and alcohol consumption. Contrary to our hypothesis, gender did not have a moderating effect on these associations. Finally, as the measure of psychopathy used is a recently created self-report measure (SRP-SF), we examined the factor structure of the measure to examine if this structure would affect our results. A novel four bifactor model was tested and found to fit the data better than previous models of self-reported psychopathic traits. Similar associations between the four psychopathy facets and alcohol consumption were found when using the bifactor model. These findings further demonstrate the existence of unique associations between differential aspects of psychopathy and externalizing behavior, such as alcohol abuse.

keywords: psychopathy, gender, alcohol, college, self report

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Excessive alcohol consumption is a fairly ubiquitous occurrence on college campuses but can prove particularly problematic for some students, as alcohol abuse is associated with numerous harmful outcomes, including deteriorating mental health and criminality (Hingson, Zha, & Weitzman, 2009; Wechsler, Kuo, Lee, & Dowdall, 2002). Thus, to inform prevention and intervention efforts, researchers have focused on developing a better understanding of various aspects of personality associated with drinking among college students. Though broad impulsivity has been linked to drinking behaviors, fewer studies have examined impulsivity within the context of personality disorder traits, especially those that involve concurrent high levels of antisocial behaviors, such as psychopathy. Psychopathy is composed of several personality traits including callousness, irresponsibility, impulsivity and rule breaking that result in dangerous behaviors, such as destructive drinking. Moreover, though psychopathy is often studied in forensic populations, evidence supports notions that these personality characteristics are present dimensionally in normative samples (Babiak, Neumann, & Hare, 2010; Skeem, Polaschek, Patrick & Lilienfeld, 2011) and thus, at moderate levels, could help identify undergraduates likely to be at most risk for poor outcomes.

Psychopathy has been typically divided into two factors, with the second factor, which is focused on social deviance and impulsivity, being strongly positively correlated with alcohol use. Though this work has emphasized that the more impulsive and behaviorally deviant components of psychopathy may drive the positive correlation between psychopathic traits and substance use, more recent measures of psychopathy have emphasized a four *facet* solution which breaks apart the two main factors into two additional narrower facets, allowing for further precision in understanding which components of psychopathy are most strongly related to substance use.

Beyond understanding psychopathy at its extremes, such as in clinical and forensic samples, understanding how psychopathic traits are linked to alcohol use dimensionally in college samples with lower levels (but still significant variability) of psychopathic traits can help clarify these relationships across the spectrum of psychopathy scores. This question is particularly relevant to ask within college students in light of their high levels of alcohol use and the important developmental transitions occurring during the undergraduate years (Arnett, 2000). Finally, given that there are gender differences in rates of psychopathy and alcohol use, males and females may differ in associations between alcohol use and psychopathy facets. Therefore, the current study seeks to explore the relationships between alcohol use and each of four facets of psychopathy, as well as the influence of gender on these correlations.

The Role of Personality Traits in College Drinking

Alcohol-related incidents are among the most common causes of death in college students aged 18 – 24 years (Hingson et al., 2009). Further, alcohol abuse is often a factor in sexual abuse, assault, poor academic performance, police involvement, health problems and later alcohol dependence (Hingson et al., 2009; Wechsler et al., 2002). Despite the negative consequences of heavy drinking, 45% of college students reported drinking 5 or more drinks on a single occasion in the past month (Hingson et al., 2009). While some individuals eventually desist from such dangerous drinking patterns, others continue on destructive trajectories, characterized by chronic substance use and criminality well past the college years (Brown, et al., 2009; Ham & Hope, 2003). To address troubling pathways of abuse, researchers have examined a variety of risk factors for the initiation and maintenance of problems with alcohol use.

In particular, impulsivity, also characterized as low constraint, sensation seeking and disinhibition, has been a major focus of alcohol abuse research due to its consistently high

correlation with alcohol consumption (Borsari, Murphy, & Barnett, 2007; Hopwood, et al., 2011; Lejuez, Magidson, Mitchell, Sinha, Stevens, & de Wit, 2010). However, while it has been shown to be a robust correlate of drinking, previous research suggests that impulsivity, as a single construct, does not entirely predict harmful outcomes (Lejuez et al., 2010). Thus, one way to better understand the role of personality in drinking is to look beyond traditional conceptualizations of impulsivity and examine more expansive dimensions of personality disorders that include these and other related behaviors. In tandem, researchers have suggested looking at such broader constructs with constellations of basic personality dimensions to develop a more nuanced understanding of college drinking patterns and their relationship to extremes of these dimensions, as seen in personality disorders (Ham & Hope, 2003; Krueger, 1999; Whiteside & Lynam, 2009). One personality disorder particularly germane to studies of alcohol abuse is psychopathy because it includes high levels of impulsivity, is related to other traits correlated with harmful outcomes, and is defined by elevated levels of destructive and antisocial behaviors including substance use.

Psychopathy is characterized by interpersonal and affective deficits as well as highly impulsive behavior and a disregard for the rights of others and societal laws. Research has suggested that psychopathy can be measured dimensionally across a range of populations from forensic and clinical extremes to normative community populations such as our college sample (Neumann & Hare, 2008). Psychopathy has typically been conceptualized within a two-factor structure, with Factor 1 capturing the superficially charming, cold, and manipulative aspects of psychopathy (Hare & Neumann, 2006), and Factor 2 representing reckless criminality and accounting for the high proportion of incarceration. In addition, Factor 2 contains the construct of impulsivity and related traits such as proneness to boredom and poor behavioral control (Hare

& Neumann, 2006). Psychopathy, particularly as conceptualized within a two factor and/or four facet structure, has been measured most often using the Psychopathy Checklist-Revised (PCL-R) or its abbreviated Psychopathy Checklist-Screening Version (PCL-SV), both structured clinical interviews. Alcohol abuse generally has been studied in relation to a two factor structure of psychopathy. In studies that have used the PCL-R, Factor 1 psychopathy is not typically related to alcohol use while Factor 2 psychopathy, on the other hand, appears to be consistently correlated with alcohol dependence and abuse. Such findings indicate that psychopathic traits, at least Factor 2, are a robust predictor of alcohol use across multiple types of populations (Patrick, 2007; Taylor & Woodworth, 2006).

The Four Facets of Psychopathy

Though psychopathy is often characterized via two meta-factors, more recent research has examined a four facet structure using the PCL-R (a three factor solution has also been proposed; see Cooke & Michie, 2001), which divides the original two factors into four facets. Factor 1 is split into interpersonal and affective facets and Factor 2 is split into lifestyle and antisocial facets (Hare & Neumann, 2008). There are several advantages to examining psychopathic traits at the facet level. First, by splitting up the original two factors, the four factor structure better isolates traits within those original factors. For instance, Factor 2 confounds both antisocial behavior and erratic lifestyle (Hare and Neumann, 2006). Thus, despite results from many studies linking alcohol use and psychopathy, it remains unknown which component of Factor 2 is more strongly related to alcohol outcomes. Although it might be predicted that the lifestyle factor (representing impulsivity) would drive associations with alcohol use, little empirical work has tested this notion.

In addition to the limits of a two factor structure, the PCL-R and other clinical interview

measures can be inconvenient due to their costly and time-consuming nature. Thus, self-report measures are often a more practical option for larger, non-clinical samples. Such measures are also helpful in identifying lower, and often subclinical, levels of psychopathic traits that may show greater representation in a general college population (Williams, Paulhus, & Hare, 2007). Thus, a self-report measure using a four facet structure of psychopathy may prove a better option for determining the relationships between these lower levels of psychopathic traits and alcohol abuse, particularly within college students who engage in higher levels of drinking. The Self-Report of Psychopathy-Short Form (SRP-SF; Paulhus, Hare, & Neumann, in press), was developed to examine the four facet structure in a brief self-report instrument, and has been proven to be valid and invariant across gender (Neumann & Hare, 2008; Neumann & Pardini, 2012). However, the four facet structure as specified by the SRP has yet to be examined in a college sample in relation to drinking patterns. Thus the primary goal of the current study was to examine associations between the four facets of the SRP-SF to alcohol use in an undergraduate sample. Though linking facets within the SRP-SF to alcohol use would be helpful, there are two important issues to consider.

The Influence of Gender

The first issue to consider is whether gender might moderate relationships between psychopathy dimensions and alcohol use. Researchers have theorized that behavioral manifestations of psychopathy may vary between the sexes, including in terms of the link between psychopathy dimensions and substance use patterns (Cale & Lilienfeld, 2002). Furthermore, in general college samples, men are consistently shown to have higher levels of alcohol consumption and problematic drinking than women (Ham & Hope, 2003; Borsari et al., 2007). Though the factor structure of psychopathy appears to be similar across genders, the mean

levels of psychopathic traits vary (Cale & Lilienfeld, 2002). In addition, the relationship

between each factor and alcohol abuse may be moderated by gender, given the difference in

overall levels of both psychopathy and alcohol abuse (Hemphala & Tengstrom, 2010; Neumann,

Schmitt, Carter, Embley, & Hare, 2012; Sylvers, Landfield, & Lilienfeld, 2011; Williams et al.,

2007). For example, in a community sample assessed with the PCL-SV, Neumann & Hare

(2008) found that in women, alcohol use was positively correlated with only the lifestyle and

antisocial facets, whereas in men alcohol use was positively correlated with all four facets,

including interpersonal and affective (Neumann & Hare, 2008). Thus it is important to explore

gender differences in the context of psychopathy-drinking relationships and to determine if a

self-report measure, such as the SRP-SF, would replicate and extend these findings to a large

college sample, which is likely to contain more extreme levels of drinking (Hingson et al., 2009).

Structural Models of Psychopathy

The second issue to consider is whether a traditional correlated factor structure is the

ideal way to model the SRP-SF data. The SRP-SF is a relatively new measure and previous

studies have typically relied on higher-order models, or correlated models, which conceptualize

psychopathy as a singular, unitary construct or as two correlated but distinct factors (Hare &

Neumann, 2008). In this traditional structure, the factors (or facets) are strongly correlated with

each other, and, as a result, facet overlap considerably influences associations with other

constructs. Thus, given the heterogeneity of psychopathy, demonstrated by evidence of distinct

underlying mechanisms of the factors as well as differential (e.g. alcohol abuse), and some cases

opposing (e.g. anxiety) relationships with external correlates, studies need to account for the

overlapping nature of the factors/facets. One way to examine the unique aspects of each facet,

while modeling the shared variance across all items is a bifactor model (Patrick, Hicks, Nichol,

& Krueger, 2007; Skeem et al., 2011). Such models can be used to examine the variance of specific items accounted for by facets (e.g. interpersonal, affective, lifestyle and antisocial) independent from one another, by separating out variance accounted for by a general factor 'g' (Patrick et al., 2007). Despite findings indicating that psychopathy encompasses a variety of unique constructs, a four bifactor model has not yet been modeled for the SRP-SF. Thus, a secondary aim of the current study was to examine whether a bifactor model would fit the SRP-SF better, and, if so, to examine if alcohol use maps to only the unique variance in the facets contained within Factor 2 or whether a meta-psychopathy factor would also predict alcohol use.

The Current Study

The current study aimed to examine the relationship between dimensions of psychopathic traits and alcohol consumption using the SRP-SF (Paulhus et al., in press) and explore gender as a moderator of associations. These relationships were examined with both the traditional four correlated factor structure of the SRP-SF, as well as a four bifactor model. It was hypothesized that, using the traditional correlated facet structure, all facets would be highly positively correlated with alcohol consumption, though lifestyle and antisocial facets would have greater effect sizes. Furthermore, it was expected that, when accounting for the overlap between the facets, only the lifestyle and antisocial traits would have unique associations with alcohol consumption. Additionally, it was hypothesized that males would have a stronger relationship overall between the four factors and alcohol use, while females would only have correlations with the lifestyle and antisocial facets. When using the four bifactor model, it was further hypothesized that, in addition to the antisocial and lifestyle traits, a general psychopathy factor 'g' would be highly positively correlated with alcohol consumption, as it would represent broader deviancy or "externalizing" behavior.

Method

Participants

Participants were 254 students from a large, public Midwestern university. Of the included sample, 93 (36.6%) participants were male, and 161 (63.4%) were female. The sample consisted primarily of European American students ($n = 187$; 72.8%), but also included 36 (14.2%) Asian American, 6 (2.4%) African American, and 13 (5.1%) biracial or multiracial students. Additionally, 11 (4.3%) students identified their race as "other" and 13 (5.1%) reported their ethnicity to be Hispanic American. Given small numbers across racial groups, race was recoded as a dichotomous variable: European American versus non-European American. Ethnicity was also recoded as a dichotomous variable: Hispanic American versus non-Hispanic American. The mean age in the sample was 19.33 years ($SD = 1.67$), ranging from 18 to 34 years old. Participants gave written informed consent for participating in the study and voluntarily completed questionnaire measures. Students who were recruited through the university subject pool were compensated with course credit. This study was approved by the institutional review board at the University of Michigan.

Procedures

Participants completed the study from home using an online survey tool. Sessions took approximately 30 minutes. Participants completed a basic demographics questionnaire (assessing age, gender, race), the Self-Report Psychopathy Short-Form (SRP-4-SF; Paulhus et al., in press) and the Alcohol Use Identification Test (AUDIT; Fleming, Barry & MacDonald, 1991).

Measures

Measures used in the protocol are described below. The measures were selected based on their demonstrated ability to reliably assess psychopathic traits and alcohol use in college

students.

Assessment of Psychopathic Traits. Psychopathic traits were assessed using the Self-Report Psychopathy Short-Form (SRP-SF; Paulhus et al., in press; Neumann & Pardini, 2012), a self-report measure of psychopathy derived from the Psychopathy Checklist-Revised (Hare, 2003) and highly correlated with the PCL-R (Paulhus et al., in press). The SRP-SF is an abbreviated measure, using 29 out of the 64 items from the original SRP. The items are grouped into the four facets of psychopathy: affective callousness (e.g., 'I never feel guilty over hurting others'), interpersonal manipulation (e.g., 'I think I can beat a lie detector'), overt antisociality (e.g., 'I have tried to hit someone with a vehicle'), and erratic lifestyle (e.g., 'I've often done dangerous things just for the thrill of it') (Neumann & Hare, 2008).   Participants rated these items based on the extent to which they thought the statements reflected their own beliefs using a 5-point Likert scale (1= *disagree strongly* to 5 = *agree strongly*). The SRP has also shown high construct validity and reliability in normative populations (Williams et al., 2007). The SRP-SF has demonstrated good factor structure as well as good internal consistency of each factor (Cronbach's α = .77, .75, .77, .71, and .90 for the interpersonal, affective, antisociality, lifestyle, and total scores) (Neumann & Pardini, 2012; Neal & Sellbom, 2012).

Assessment of Alcohol Use. Alcohol use was assessed using the Alcohol Use Disorders Identification Test (AUDIT; Fleming et al., 1991), commonly used to screen for at-risk drinking, alcohol abuse, and alcohol dependence (Kokotailo et al., 2004). The AUDIT consists of 10 items that measure alcohol consumption (e.g., 'How often do you have a drink containing alcohol?'), alcohol behavior/dependence (e.g., 'How often during the last year have you found that you were unable to stop drinking once you started?'), and problems resulting from drinking (e.g., 'Have you or someone else been injured as a result of your drinking?') (Fleming et al.,

1991). The AUDIT is scored by summing the values for each response, including quantity of alcohol consumed (0= 1 or 2 drinks, 1 = 3 or 4 drinks, 2 = 5 or 6 drinks, 3 = 7 or 9 drinks, 4 = 10 or more drinks) and frequency of both consumption and alcohol problems (0 = never, 1 = monthly or less, 2 = 2 to 4 times a month, 3 = 2 to 3 times a week, 4 = daily or almost daily). Scores range from 0 to 40, resulting in a continuous variable of alcohol use and related problems (Reinert & Allen, 2002). The AUDIT has been demonstrated to have adequate validity and reliability, with the median Cronbach's alpha in the .80s (Reinert & Allen, 2002).

Analytic Strategy

Study aims 1-3 were analyzed in SPSS (version 20.0, SPSS Inc., Chicago, IL, USA), while aims 4-5 were analyzed using Mplus 5.2.1 (Mplus; Muthén & Muthén, 2009). There was no missing data in the present study. Preliminary analyses included an examination of study variable descriptive statistics.

Aim 1: Test bivariate correlations between psychopathy facets and alcohol consumption. To test the first hypothesis that all facets of psychopathy would be positively correlated with alcohol consumption, bivariate correlations were computed. *T*-tests were performed to test the additional expectation that males would have higher scores than females for each study variable (i.e. psychopathic traits, alcohol consumption). Additionally, Fisher's transformations (Raghunathan, Rosenthal, & Rubin, 1996) were used to test the differences between the size of the correlation of each facet to alcohol consumption.

Aim 2: Test unique associations between psychopathy facets and alcohol consumption, controlling for gender, age, race, ethnicity, and facet overlap. To test the second hypothesis that lifestyle and antisocial facets alone would be positively associated with alcohol consumption, after controlling for covariates, multiple regressions were used. A

regression model that examined total psychopathy score as a unique predictor of alcohol consumption was investigated. A separate regression model examining the four facets as unique predictors of alcohol consumption was also investigated.

Aim 3: Test whether gender moderates the relationship between psychopathy facets and alcohol consumption. To test the third hypothesis that gender would moderate associations between psychopathy scores and alcohol consumption, further regression analyses were conducted. To avoid collinearity, separate models were tested that examined total psychopathy score, interpersonal score, affective score, lifestyle score, and antisocial score in predicting alcohol consumption. A model that examined all four facets and interaction terms in predicting alcohol consumption was also computed. In step 1 of all models, the following covariates were entered: gender, age, race, and ethnicity. In step 2, the main effects were entered: either total psychopathy score, affective score, lifestyle score, interpersonal score, or antisocial score. Finally in step 3, the product terms of either 'gender × total psychopathy', 'gender x interpersonal', 'gender x affective', 'gender x lifestyle', or 'gender x antisocial' was entered. All predictor variables were centered prior to creation of interaction terms and entry into models.

Aim 4: Test a four bifactor structure of the SRP-SF. The SRP-SF is a recent version of the SRP and has been used in very few studies to date, none of which have employed a college sample. Compared to clinical or forensic samples, levels of psychopathic traits are relatively low in college populations (Sylvers, et al., 2011), which could influence the factor structure of the SRP-SF, potentially affecting relationships between the facets and alcohol consumption. Furthermore, the meaning of the four facets, and their relationships with alcohol consumption, may be different when partialling out their shared variance, such as when modeling this variance in a general 'g' factor. No studies to date have examined unique associations between the four

facets and external correlates like alcohol consumption, controlling for variance explained by a general factor.

Thus, to test the fourth hypothesis that a four bifactor structure would fit the data better than a four correlated structure, a series of Confirmatory Factor Analyses (CFA) were conducted using Mplus 5.2.1 (Mplus; Muthén & Muthén, 2009). In the four bifactor model, items of the SRP were specified to load on the four facets as specified previously (Paulhus et al., in press): interpersonal (items 7, 9, 10, 15, 19, 23 and 26), affective (items 3, 8, 13, 16, 18, 24 and 28), lifestyle (items 1, 4, 11, 14, 17, 21, 27), and antisocial (items 29, 25, 20, 2, 5, 6, 12 and 22). The general factor and facets were specified to not correlate. Models were estimated with mean and variance adjusted weighted least squares estimation (WLSMV), appropriate for use with ordinal items (Flora & Curran, 2004). Model fit was evaluated using the Chi-square statistic, the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Similar to previous factor analyses of the SRP-SF (Neumann & Pardini, 2012), RMSEA values less than or equal to .08, CFI values greater than .95 and TLI values greater than or equal to .90 were used to indicate a good fit to the data.

Aim 5: Examine associations between the SRP-SF four bifactor model and alcohol consumption. To test the final hypothesis that the psychopathy 'g' factor, antisocial, and lifestyle facets would be positively correlated with alcohol consumption, the outcome was regressed onto the full SRP-SF four bifactor model using Mplus 5.2.1. In particular, this enabled comparison of the pattern of findings from the summed scores of total psychopathy or facets to those from the four bifactor model.

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Results

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Descriptive statistics

Table 1 presents descriptive statistics for study variables. All of the summed scores for

each psychopathy facet were highly correlated (e.g., rs = .71 - .43, ps < .01). Specifically, having

high levels of one psychopathic trait (e.g., interpersonal) was related to having higher levels of

other traits (e.g., lifestyle). As expected, males had significantly higher total and facet

psychopathy summed scores than females (all ps < .001; see Table 1, final row). There were no

differences in SRP scores according to race or ethnicity. Also consistent with previous literature,

males had significantly higher levels of alcohol consumption than females (p < .003).

Additionally, European American students had higher levels of alcohol consumption than non-

European American students (p < .004). Thus, males had the highest levels of alcohol

consumption and the highest psychopathy scores, while European Americans had the highest

levels of alcohol consumption.

Aim 1: Relationships Between Four Facets of Psychopathy and Alcohol Use

To assess relationships between psychopathic traits and alcohol consumption, bivariate

correlations between all study variables were computed and presented in Table 1. Consistent

with the first hypothesis, higher total psychopathy scores were significantly associated with

higher levels of alcohol consumption (r = .47, p < .01). Additionally, higher scores on each of

the facet summed scores were associated with higher levels of alcohol consumption, and had

moderate effect sizes (range, rs= .50 - .34, ps < .01). Fisher's transformations (Raghunathan et

al., 1996) revealed that the correlation between the lifestyle facet and alcohol consumption had a

significantly greater magnitude than the relationship between the interpersonal (Z= -2.14, p <

.05) and affective facets (Z= -2.01, p < .05) and alcohol consumption. However, there were no

significant differences between the correlations with the antisocial facet. Thus, consistent with

our first hypothesis, the summed scores of total psychopathy and each of the four facets were

related to higher levels of alcohol consumption. Furthermore the lifestyle facet had a significantly stronger correlation with alcohol consumption than the interpersonal and affective facets. However, in contrast to the first hypothesis, the antisocial facet did not have a significantly stronger correlation with alcohol consumption than other facets.

Aim 2: Relationships Between Four Facets of Psychopathy and Alcohol Use, Controlling for Gender, Age, Race, Ethnicity and Facet Overlap

Consistent with the second hypothesis, higher summed scores of the antisocial and lifestyle facets were related to higher alcohol consumption, controlling for the overlap between facets and relevant covariates[i] (see Table 3). Thus, in line with the second hypothesis, only the lifestyle and antisocial facets were related to alcohol consumption, after controlling for the overlap between facets.

Aim 3: Gender as a Moderator of the Relationships between Psychopathy and Alcohol Use

In contrast to the third hypothesis that only lifestyle and antisocial traits would be associated with alcohol consumption in females, gender did not moderate the relationships between psychopathic traits and alcohol consumption. In a regression examining total summed psychopathy score and covariates as predictors of alcohol consumption, the interaction between gender and total psychopathy score did not explain additional variance in alcohol consumption (Table 2). In other words, males and females did not have differential relationships between total psychopathy score and alcohol consumption. In additional regressions testing each psychopathy factor sum score separately, along with previous covariates, as predictors of alcohol consumption, the interaction terms between gender and each of the facets did not explain additional variance in alcohol consumption[ii]. Males and females did not have differential relationships between the individual facets and alcohol consumption. Thus, in contrast to the

third hypothesis, gender did not moderate the relationships between psychopathic traits and alcohol consumption.

Aim 4: CFA of Four Bifactor Structure of the SRP-SF

Consistent with the fourth hypothesis that a bifactor model of the SRP-SF would fit the data better than correlated models, CFA results indicated that a four bifactor model provided adequate fit to the data (Figure 1). The two correlated factor model showed poor fit to the data ($\chi^2 = 337.59$, $df = 74$, $p < .001$; CFI = .83; TLI= .91; RMSEA = .12). The four correlated factor model fit the data better than the two correlated factor model ($\Delta\chi^2 = 84.38$, $df = 4$, $p < .001$) but still showed poor fit ($\chi^2 = 288.01$, $df = 74$, $p < .001$; CFI = .86; TLI= .92; RMSEA = .11). In contrast, the four bifactor model showed good fit to the data ($\chi^2 = 199.98$, $df = 73$, $p < .001$; CFI = .92, TLI = .95; RMSEA = .08). Within the bifactor model there were moderate to high and significant loadings of all SRP items on the general 'g' factor (βs = .39 - .78). For the most part, items also showed moderate loadings on respective specific facets, with the exception of items 7, 15, 3, 17 and 20. Interestingly, some items loaded negatively on specific facets (e.g. affective). Thus, consistent with the fourth hypothesis, the four bifactor model showed acceptable fit for the SRP-SF applied in this college population, and was a better fit than either a four or two correlated factor model.

Aim 5: Associations between Four Bifactor SRP Model and Alcohol Use

Consistent with the final hypothesis that a general factor of psychopathy and the lifestyle factor would be associated with increased alcohol consumption, the general factor, as well as the specific lifestyle factor, was positively correlated with alcohol consumption. Surprisingly, however, the affective facet was *negatively* correlated with alcohol consumption.

Discussion

The aims of current study were to examine the relationship between four facets of psychopathy and alcohol consumption among college students, and to test whether these associations differed between genders. Specifically, the study sought to examine associations using both summed scores based on the traditional four correlated factor structure of the SRP-SF, as well as within a four bifactor model framework. Consistent with the preliminary hypothesis, bivariate analyses showed that all facets of psychopathy were related to higher alcohol consumption. Additionally, in line with the second hypothesis, when controlling for covariates and the overlap between the facets, only the lifestyle and antisocial facets were uniquely associated with increased alcohol consumption. In contrast to our moderation hypothesis, gender did not influence findings. We also examined these same questions using a bifactor approach to the SRP-SF and found that a four bifactor model fit the data better than a four correlated facet or two correlated factor model. Further, when alcohol consumption was regressed onto this model, the general factor and the specific lifestyle factor were associated with increased alcohol consumption. Surprisingly, when modeling the general factor, the affective facet of psychopathy was associated with decreased alcohol consumption.

Relationships between Psychopathy and Alcohol Consumption

Results from the current study confirmed previous research that has found that psychopathic traits are related to externalizing behaviors such as alcohol use. Further, when controlling for the overlap between the four facets, lifestyle and antisocial facets were uniquely associated with alcohol consumption. This is in line with previous research that has found Factor 2 (lifestyle and antisocial) psychopathy is more strongly related to substance abuse compared to Factor 1 (interpersonal and affective) (Patrick, 2007; Sylvers, et al., 2011). Interestingly, as we examined these relationships at the facet level, we were able to examine the differential

contribution between the two Factor 2 facets. In these analyses, the magnitude of the correlation between the lifestyle facet and alcohol consumption was significantly greater than that of the interpersonal and affective facets. However, the correlation between the antisocial facet and alcohol consumption was not significantly different from those of the other facets. This finding highlights the utility of differentiating between the antisocial and lifestyle facets and demonstrates that, among college populations, impulsivity and general irresponsibility may be more accurate predictors of higher alcohol consumption than high levels of criminality per se. Indeed, previous studies have found that the antisocial facet may capture more aggressive disinhibition, which may not necessarily be related to increased alcohol use, whereas the lifestyle facet encompasses disinhibition in the form of sensation seeking, which is more closely related to alcohol use phenotypes (Patrick et al., 2007). As such, future studies examining alcohol use among college students should continue to investigate unique associations for each of the four facets of psychopathy.

Gender as a Moderator of Psychopathy and Alcohol Consumption

In this sample, gender did not moderate the relationships between psychopathy and alcohol consumption. To our knowledge this is the first investigation of gender as a moderator using the SRP-SF. Previous research using alternative measures of psychopathy has found differing relationships between psychopathy and alcohol consumption according to gender. For example, as noted in the introduction, in a community sample using the PCL: SV Neumann and Hare (2008) found that among females, the lifestyle and antisocial facets of psychopathy specifically were associated with alcohol use. Additionally, Sylvers and colleagues (2011), using the Psychopathy Personality Inventory (PPI-R; Lilienfeld, Widows & Straff, 2005) in a college sample, found that that the correlation between Factor 2 score and alcohol use had a significantly

greater magnitude than Factor 1 score in men, but not women. In contrast, the current study

found that, while men had significantly higher psychopathy and alcohol consumption scores,

gender did not moderate their associations. It should be noted that females represented a majority

of the sample in this study (63.4%). As such, the results may have been affected by sampling

bias, where it is possible that gender differences did not appear due to the limited number of

male responses. Studies in which both genders are more equally represented would better be able

to examine differential associations for males versus females. Additionally, the use of a college

sample may have limited the variability in psychopathic traits, resulting in a lack of extreme

levels. Thus, it is possible that gender differences in antisocial behavior and alcohol use, may

become more evident among individuals with higher levels of psychopathic traits, compared to

the relatively low levels present in this sample.

A Four Bifactor Model of Psychopathy

The four bifactor model of psychopathy fit the data better than a four correlated or two

correlated factor model. This finding supports the use of a general psychopathy factor and four

facets, as opposed to two factors or correlated facet structures. In this model, the SRP items

loaded most strongly on the general psychopathy factor. This is the first study to examine a four

bifactor model of psychopathy, specifically using the SRP-SF, and, to our knowledge, the second

study to utilize a bifactor model. Patrick and colleagues (2007) tested a two bifactor model of the

PCL-R in a criminal population, but found that a three bifactor model fit the data best. Given the

use of a college sample in the current study, the findings do not include representations of the

extreme levels of psychopathy such as those that would be seen in forensic samples. As such, the

four facets may not represent unique aspects of psychopathy to the same extent as those reported

in previous studies. For this reason, a general 'g' factor may simply be an index of the large

overlap or shared variance between the four facets that may represent a general tendency towards disinhibition rather than psychopathy specifically. Thus, the factor structure of the SRP-SF using all four facets in a college sample appears to differ from previously confirmed structures of the SRP-SF and the more extensive SRP-III, which showed acceptable to good fit using higher-order models (Carré, Hyde, Neumann, Viding & Hariri, 2012; Mahmut et al., 2011; Neumann & Pardini, 2012; Williams et al., 2007). In future studies, the bifactor model could be used to more successfully isolate unique relationships between external correlates and the four facets, outside of their relationship to general psychopathy.

Relationships between the Four Bifactor Model of Psychopathy and Alcohol Consumption

Differential relationships between the facets of psychopathy and alcohol consumption were found when utilizing the four bifactor model compared to summed scores. As expected, the general psychopathy factor was significantly related to increased alcohol consumption; this is consistent with the previous literature linking psychopathy to substance abuse (Patrick, 2007). However, after accounting for the g factor, only the lifestyle facet remained significantly associated with increased alcohol consumption. In contrast, the antisocial facet, which was related to alcohol use in the bivariate correlations and regression analyses, was not related to alcohol use when isolated from the general psychopathy factor. It is possible that the antisocial facet may best be captured in the g factor, and therefore did not have any predictive power on alcohol consumption once the g factor was taken out. Thus, in this sample, psychopathic traits may be best indexed by high scores on antisocial items within psychopathy measures.

Even more surprising, the affective facet was significantly negatively associated with alcohol consumption, such that individuals high in affective traits consumed less alcohol. This unexpected finding could be a result of the problematic factor loadings previously mentioned on

the affective facet. However, it could be that, after removing the general factor of psychopathy, the affective facet represents individuals who are emotionally regulated. Therefore such individuals may be less likely to use alcohol as a coping mechanism. Within a three bifactor model of the PCL-R, Patrick and colleagues (2007) also found that the affective facet was negatively, though not significantly, correlated with externalizing behaviors. The findings of the present study further suggest that individuals who are less emotionally reactive, as captured by the affective facet, are not particularly heavy drinkers. The novel nature of these analyses suggest that future work testing unique associations between the four facets of psychopathy and external correlates is needed in the field to better delineate pathways from risky alcohol related behaviors in college to persisting habitual patterns of antisocial behavior that extend into later adulthood.

Limitations

The current study investigated novel conceptualizations of psychopathy, including the use of the SRP-SF, and the modeling of a four bifactor structure of psychopathy. However, the study has several limitations. First, although levels of alcohol consumption are generally high in college populations the range of psychopathy was somewhat limited in the current sample. For example, many of the more extreme antisocial items (i.e. attempting to hit a person while driving) were rarely endorsed. As a result, extreme levels of psychopathy are likely not represented, making it difficult to generalize the relationships found in this study to other populations. Therefore, future studies using clinical and forensic populations are needed to assess whether relationships between the facets and alcohol consumption found in this study are similar among samples with a greater range in psychopathic traits. Additionally, future studies of more diverse samples are needed, as the present sample was primarily European American and female, both of which could affect the generalizability of results.

Finally, although this study sought to examine the validity of a self-report measure of psychopathy, the sole use of self-report may have influenced the findings. Some researchers have argued that utilizing self-report to measure psychopathy could be especially problematic, given that deceit and grandiosity are inherent to the construct (Lilienfeld & Fowler, 2006). However, a recent study showed that individuals high in psychopathic traits were unlikely to provide false information when there were no risks of criminal sanction (Miller, Jones. & Lynam, 2011). Given that the study was completed over the Internet, and thereby completely anonymous, it is less likely that response bias would occur. Furthermore, Jones and Miller (2012) found that self-report measures were actually slightly more useful than other reports in assessing psychopathy and its relations with alcohol use. However, future studies would benefit from the use of multiple informants as well as the collection of multiple ratings of behavior.

Clinical Implications and Future Directions

The study of psychopathy in normative populations offers significant promise for understanding the constellation of personality traits underlying the development of antisocial behavior, and potentially its prevention. Given the demonstrated utility of a four facet structure of psychopathy in understanding alcohol abuse found in the present study, future studies should continue to examine the validity the SRP-SF in a range of different populations. This focus on psychopathic traits and alcohol consumption could lead to a better understanding of the mechanisms of personality underlie that substance abuse, which could better inform future prevention and intervention efforts.

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Table 1

Descriptive Statistics, Bivariate Correlations Between Study Variables, and Gender Differences for Study Variables

	Age	Total psychopathy	Interpersonal	Affective	Lifestyle	Antisocial	Alcohol use
Age							
Total psychopathy	-.06						
Interpersonal	-.07	.86**					
Affective	-.08	.87**	.71**				
Lifestyle	-.07	.82**	.57**	.59**			
Antisocial	-.02	.69**	.48**	.56**	.43**		
Alcohol use	-.02	.47**	.34**	.35**	.50**	.41**	
Total sample, *M (SD)*	19.46 (2.10)	53.19 (14.06)	14.88 (4.86)	13.10 (4.40)	15.18 (4.76)	10.42 (3.25)	7.61 (5.39)
Male *(n = 93), M (SD)*	19.07 (1.87)	61.42 (14.50)	17.34 (5.60)	15.62 (4.61)	17.10 (4.46)	11.70 (4.01)	8.84 (5.23)
Female (*n* = 161), *M (SD)*	19.48 (1.52)	48.80 (11.61)	13.48 (4.13)	11.65 (3.88)	14.11 (4.60)	9.69 (2.47)	6.85 (5.35)
t-test: gender differences	-1.90[†]	-7.41***	6.54***	7.58***	4.95***	4.85***	2.79**

Note. [†]*p* < .10, *p* <.05; **p* <.01; ***p* <.001. Correlations were computed for whole sample. Final row presents test statistic from t-test to determine whether there were significant differences between male and female scores for each study variable.

Table 2

Regression Analysis Resting of Cross-Sectional Association Between Gender, Psychopathic Traits and Alcohol Use, Separately Analyzing Each Facet

Step 1	B (SE)	β	R^2 *(ΔR^2)*
Interpersonal	.37 (.08)***	.34	.16 (.09)***
Affective	.45 (.08)***	.37	.17 (.11)***
Lifestyle	.53 (.07)***	.49	.28 (.21)***
Antisocial	.69 (.10)***	.43	.22 (.16) ***
Total psychopathy	.19 (.03)***	.51	.27 (.20)***
Step 2			
Interpersonal x Gender	.06 (.15)	.04	.16(.00)
Affective x Gender	.20 (.18)	.11	.18(.01)
Lifestyle x Gender	.06(.14)	.03	.28 (.00)
Antisocial x Gender	-.23 (.22)	-.11	.23 (.00)
Total psychopathy x Gender	-.04 (.05)	-.07	.27 (.00)

Note. †p < .10, *p <.05; **p <.01; ***p <.001. Step 1 depicts the unique effects of each facet, controlling for gender, race, age and ethnicity. Step 2 depicts interactions between each facet and gender, controlling for covariates. Total psychopathy scores were analyzed in regression models separate from the facets.

Table 3

Regression Analysis Testing of Cross-Sectional Association between Gender, Psychopathic Traits and Alcohol Use, Simultaneously Controlling for Facet Overlap

Step 1	B (SE)	β	R^2 (ΔR^2)
Interpersonal	.02 (.10)	.02	
Affective	-.05 (.11)	-.04	
Lifestyle	.46 (.09)***	.42	.33 (.26)***
Antisocial	.40(.12)**	.24	
Step 2			
Interpersonal x Gender	.03 (.21)	.02	
Affective x Gender	.13 (.27)	.07	
Lifestyle x Gender	-.02(.20)	-.01	.34 (.01)
Antisocial x Gender	-.45(.25)†	-.20	

Note. †$p < .10$, *$p < .05$; **$p < .01$; ***$p < .001$. Step 1 depicts the unique effects of each facet controlling for gender, race, age and ethnicity as well as facet overlap. Step 2 depicts interactions between each facet and gender, controlling for covariates as well as facet overlap.

Table 4

Factor Loadings and Model Fit Statistics: Four Bifactor Model

Item	g	Interpersonal	Affective	Lifestyle	Antisocial
#7 (false identity)	.57***	.065			
#9 (enjoy scamming people)	.78***	-.16**			
#10 (enjoy pushing people)	.66***	.14*			
#15 (take advantage of others)	.77***	-.021			
#19 (pretend to like people)	.56***	.42***			
#23 (flattery)	.40***	.81***			
#26 (people are easily fooled)	.58***	.41***			
#3 (people are weak)	.52***		.12		
#8 (enjoy watching fights)	.71***		.44***		
#13 (do not keep in touch with family)	.62***		-.28**		
#16 (cold-hearted)	.72***		-.16*		
#18 (enjoy violent movies and sports)	.60***		.52***		
#24 (do not feel bad about hurting others)	.74***		-.14*		
#28 (dump friends when not useful)	.58***		-.25**		
#1 (rebellious)	.39***			.50***	
#4 (thrilled by danger)	.46***			.67***	
#11 (like doing wild things)	.44***			.72***	
#14 (do not follow rules)	.64***			.34***	
#17 (like to have sex with strangers)	.58***			.08	
#21 (do not learn from mistakes)	.59***			.16*	
#27 (say mean things without thinking)	.60***			.22***	
#20 (have been convicted of serious crime)	.45***				.83***
#2 (no gang involvement)	.40***				.45***
#5 (have gotten money through trickery)	.67***				.08
#6 (have assaulted an officer or social worker)	.56***				.54***
#12 (have broken in to steal or vandalize)	.60***				.53***
#22 (carry weapon sometimes for protection)	.63***				.47***
#25 (have used threats)	.75***				.44***
#29 (have attacked someone intentionally)	.70***				.54***
Chi-Square Test of Model Fit	199.98, *df* = 73, *p* < .001				
CFI, TLI, RMSEA	.92, .95, .08				

Note. *p < .05; **p<.01; ***p<.001. The full items could not be reproduced here, because they are copyrighted by Multi-Health Systems, Inc. Instead, we refer to item numbers and provide a paraphrased indication of the item content within parentheses.
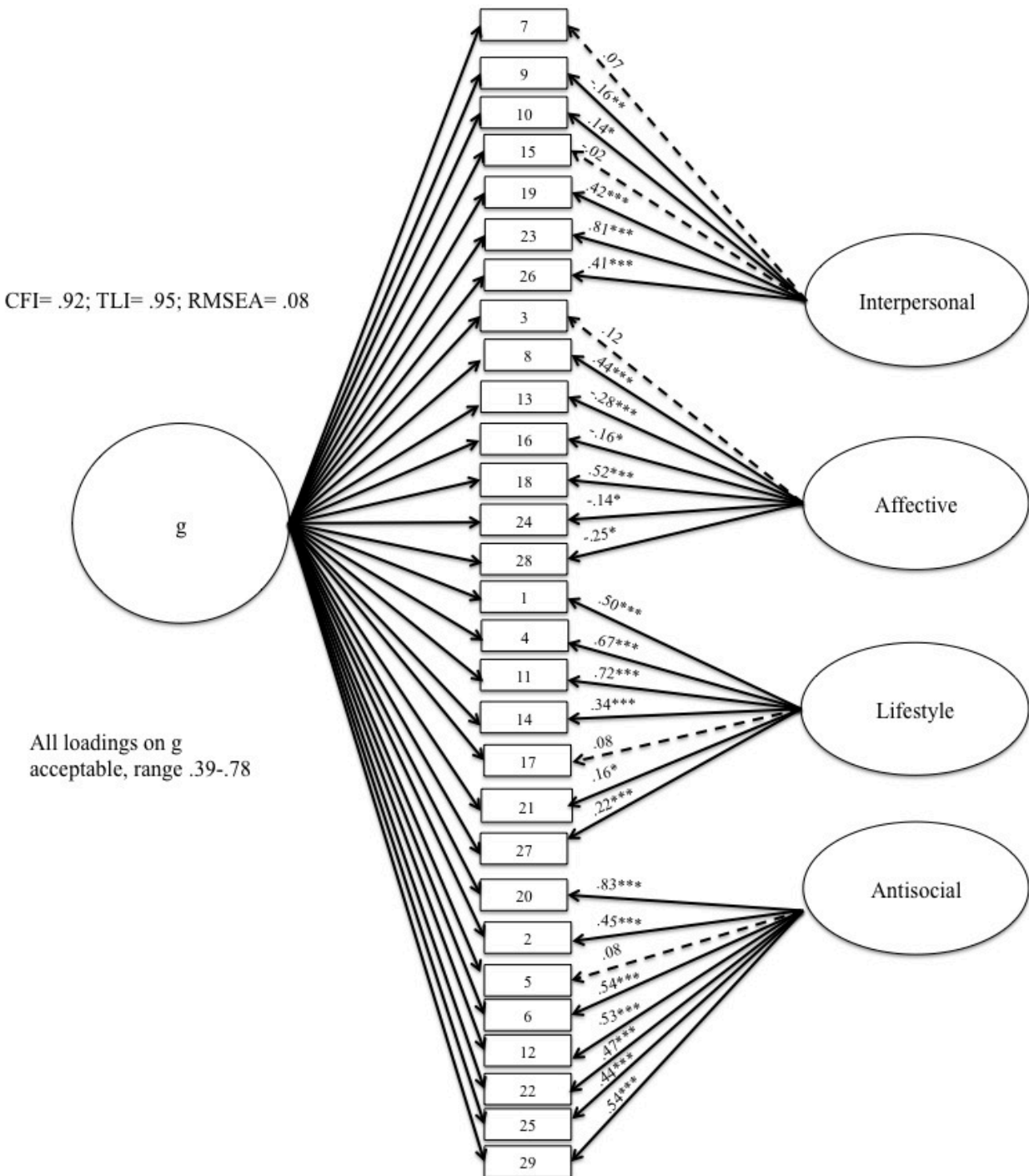
Figure 1. Factor loadings and model fit statistics: Four bifactor model. Note. *p < .05; **p< .01; ***p< .001. The full items could not be reproduced here, because they are copyrighted by Multi-Health Systems, Inc. Instead, we refer to item numbers and provide a paraphrased indication of the item content within parentheses. Item Key: **7)** (false identity); **9)** (enjoy scamming people); **10)** (enjoy pushing people); **15)** (take advantage of others); **19)** (pretend to like people); **23)** (flattery); **26)** (people are easily fooled); **3)** (people are weak); **8)** (enjoy watching fights); **13)** (do not keep in touch with family); **16)** (cold-hearted); **18)** (enjoy violent movies and sports); **24)**

(do not feel bad about hurting others); **28)** (dump friends when not useful); **1)** (rebellious); **4)** (thrilled by danger); **11)** (like doing wild things); **14)** (do not follow rules); **17)** (like to have sex with strangers); **21)** (do not learn from mistakes); **27)** (say mean things without thinking); **20)** (have been convicted of serious crime); **2)** (no gang involvement); **5)** (have gotten money through trickery); **6)** (have assaulted an officer or social worker); **12)** (have broken in to steal or vandalize); **22)** (carry weapon sometimes for protection); **25)** (have used threats); **29)** (have attacked someone intentionally).
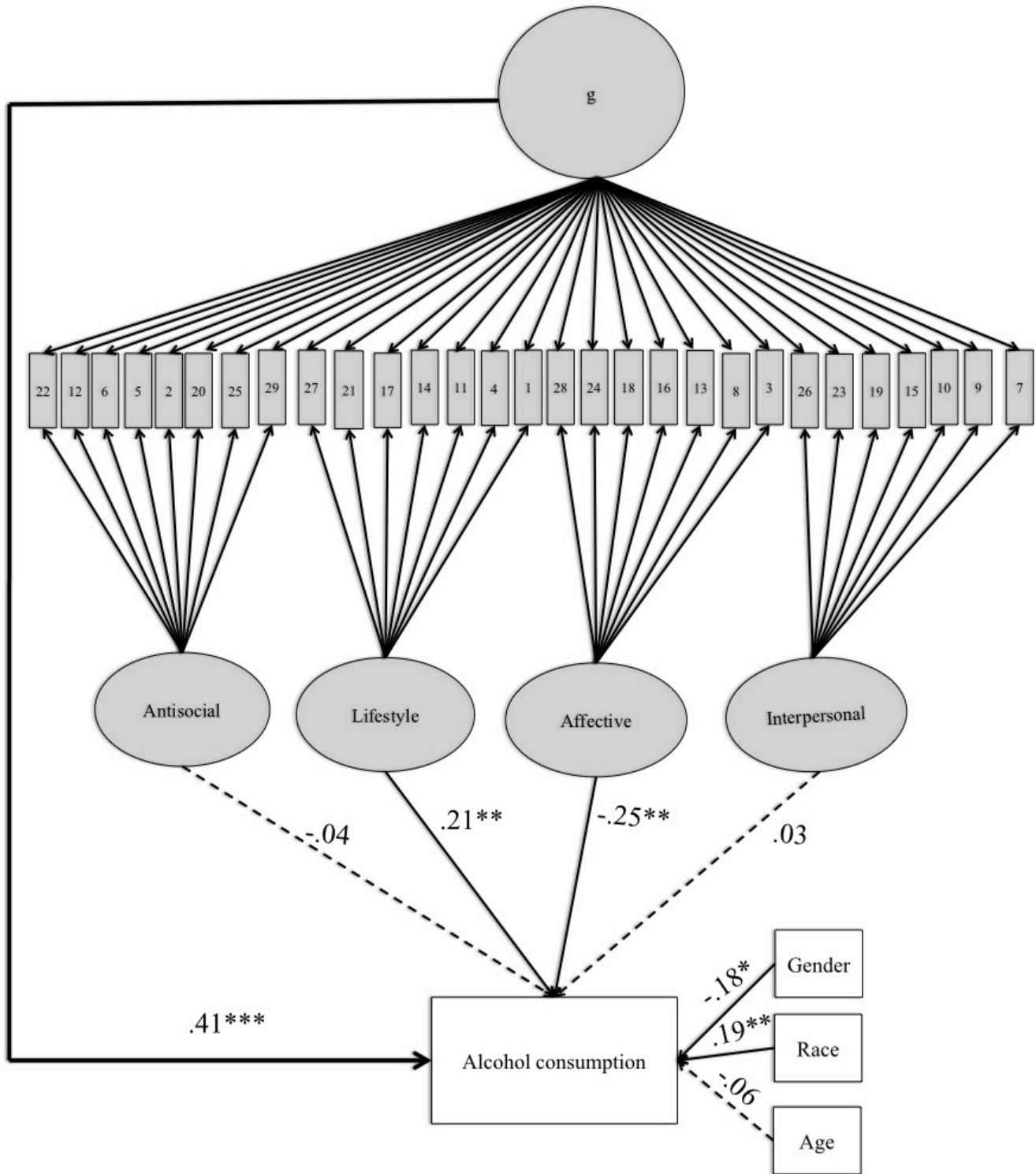
Figure 2. Alcohol consumption regressed onto four bifactor model. Note. *p <.05; **p<.01; ***p<.001. Alcohol consumption regressed onto the four bifactor model with gender, race, and age as covariates. For original factor analysis loadings depicted in grey, see Figure 1. Dashed lines represent nonsignificant pathways.

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[i] In the individual regressions of the facets, not controlling for facet overlap, each had a significant main effect on alcohol consumption (Table 2). However, in a regression with all four facets entered simultaneously, only lifestyle and antisocial factors had significant main effects (Table 3).

[ii] A model with all facets and interaction entered simultaneously was also analyzed, but yielded similar results (Table 3).