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Personality and Alcohol Use: The Role of Impulsivity

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Abstract

Research has shown that personality traits associated with impulsivity influence alcohol use during emerging adulthood, yet relatively few studies have examined how distinct facets of impulsivity are associated with alcohol use and abuse. We examine the influence of impulsivity traits on four patterns of alcohol use including frequency of alcohol use, alcohol-related problems, binge drinking, and alcohol use disorders (AUDs) in a community sample of young individuals ($N = 190$). In multivariate regression analyses that controlled for peer and parental alcohol use, psychological distress, and developmental correlates (i.e., college, marriage, employment) in emerging adulthood, we found that urgency and sensation seeking were consistently related to all four constructs of alcohol use. The present study suggests that distinct impulsivity traits may play different roles in escalation of alcohol use and development of AUDs during emerging adulthood.

Keywords

Impulsivity; Alcohol use; Binge drinking; Alcohol-related problems; Alcohol use disorders; Urgency

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Contributors

Shin designed the overall study and oversaw manuscript preparation. Hong wrote portions of the method and results sections whereas Jeon assisted in data analysis and wrote portions of the analysis and results sections. All authors contributed to and have approved the final manuscript.

Conflict of interest

No conflict declared.

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1. Introduction

Alcohol use during emerging adulthood, a separate period of the life course covering approximately ages 18 to 25, is highly prevalent, even normative (Arnett, 2000; Chen, Dufour, & Yi, 2004/2005). According to the 2009 National Survey on Drug Use and Health, rates of current alcohol use were 49.7 percent for those aged 18 to 20 and 70.2 percent for 21- to 25-year-olds, and prevalence of past-month binge drinking peaks during emerging adulthood (46.5%; (Substance Abuse and Mental Health Services Administration, 2008). Alcohol use during emerging adulthood is particularly concerning because it can interfere with the achievement of key developmental tasks such as forming an identity, building mature relationships, and preparing for a career during this critical developmental period (Arnett, 2005; Hamilton & Hamilton, 2005; Schulenberg & Maggs, 2002). Research investigating the etiology of alcohol use in emerging adulthood has suggested a variety of determinants, ranging from genetic, neurobiological, psychological, environmental, and cultural factors (Agrawal & Lynskey, 2008; Auerbach & Collins, 2006; Chassin, Pitts, & Prost, 2002; Masten, Obradovic, & Burt, 2005; White & Jackson, 2004/2005). Specifically, etiological research examining the role of personality on alcohol use has frequently focused on impulsivity, which is often defined as a tendency to react rapidly or in unplanned ways to internal or external stimuli without proper regard for negative consequences or inherent risks (Lejuez, et al., 2010).

Research has consistently demonstrated an association between impulsivity and alcohol use in emerging adulthood (James & Taylor, 2007; MacKillop, Mattson, & MacKillop, 2007; Magid & Colder, 2007; J.S. Simons, Carey, & Gaher, 2004). Impulsivity is also related to a variety of maladaptive behaviors typically linked to alcohol use and problematic drinking, including risky sexual behaviors (Lejuez, et al., 2010; Zapsolski, Cyders, & Smith, 2009), aggression (Derefinko, DeWall, Metze, Walsh, & Lynam, 2011; Tangney, Baumeister, & Boone, 2004), and polydrug use (Semple, Zians, Grant, & Patterson, 2005; Travers & Lyvers, 2005). Although numerous studies have found a positive relationship between impulsivity and alcohol use, it is less clear how different impulsivity traits (e.g., non-planning, deliberation, urgency, sensation seeking) are associated with different alcohol use outcomes such as alcohol use initiation, escalation, and development of alcohol use disorders (AUDs). Many studies examining the effects of impulsivity on alcohol use have considered impulsivity a unitary construct, which may eventuate difficulties in making distinctions among different impulsivity-related personality traits and their relative associations to alcohol use. While a few studies have examined the relationship between multiple dimensions of impulsivity and alcohol use in emerging adulthood, from an intervention perspective, it is important to know which of these impulsivity traits exert the greatest behavioral impact on alcohol consumption and related behaviors. Given the significant roles that impulsivity plays in developing and maintaining alcohol use during emerging adulthood, an understanding of distinct aspects of impulsivity and their relation to different levels of alcohol consumption may inform prevention and treatment initiatives, particularly personality-targeted interventions (Conrod, Castellanos, & Mackie, 2008). For example, we may find urgency is related to increase alcohol use in emerging adulthood. Urgency, a subtrait of impulsivity, is the tendency to act rashly to regulate negative emotion. In this case, preventive interventions to decrease urgency and regulate emotional negativity may have beneficial preventive effects among emerging adults.

The present study examined how four distinct facets of impulsivity such as urgency, lack of premeditation, lack of perseverance, and sensation seeking related to a wide range of alcohol use outcomes including frequency of alcohol use, binge drinking, alcohol-related problems, and AUDs. The four subtraits of impulsivity were originally drawn from the Five Factor Model of personality, which proposed four different facets of personality capturing various

aspects of impulsivity (McCrae & Costa, 1990). Within this model, impulsivity consists of four lower-order personality traits related but distinct to each other. Sensation seeking is the tendency to seek out novel or thrilling experiences (Cyders & Smith, 2008; Hittner & Swickert, 2006; Whiteside & Lynam, 2001; Zuckerman, 1994). Furthermore, lack of premeditation and perseverance are based on deficits in conscientiousness. Lack of perseverance reflects poorer concentration on boring or difficult tasks, and increased distraction, mainly due to lack of interest or fatigue, whereas lack of premeditation is non-planning impulsiveness, which represents impulsivity accompanied by selecting immediate reward without regarding potential consequences of the action (Eysenck, Easting, & Pearson, 1984; Lejuez, et al., 2010; Patton, Stanford, & Barratt, 1995; Whiteside & Lynam, 2001). Previous studies have found that among the four subtraits of impulsivity, urgency was related to AUDs whereas sensation seeking was associated with frequency of alcohol use (Fischer & Smith, 2008; Grau & Ortet, 1999; Whiteside & Lynam, 2009; Whiteside, Lynam, Miller, & Reynolds, 2005).

For more stringent evaluation of the role of distinct aspects of impulsivity in alcohol use during emerging adulthood, we included rigorous controls not only for individual-level risk factors such as age, gender, family socio-economic status, and psychological distress, but also for contextual-level confounders including parental alcoholism. In addition, adopting “adult” roles (e.g., marriage, job) may influence alcohol use during emerging adulthood (Bachman, Wadsworth, O’Malley, & AL., 1997; White & Jackson, 2004/2005). For example, married young people showed greater decreases in drinking behaviors than their counterparts who were not married, lived with partners, or were divorced (Bachman, et al., 1997; Flora & Chassin, 2005). The present study included developmental correlates of alcohol use during emerging adulthood, including college, marriage, parenthood, and employment status in the model testing.

2. Materials and methods

2.1. Participants

Participants in the study were recruited from the local community through advertisements (i.e., on- and off-line bulletin board postings) looking for healthy individuals aged 18 to 25. Eligible participants who have no major medical conditions (e.g., cancer, diabetes, other chronic/life-threatening illness), were invited for a 50-minute face-to-face interview. Detailed ratings of impulsivity and alcohol use were collected from 190 young people. They were 21.9 years old on average ($SD = 2.1$ years); 61% were women; 56% were current college students; and 48 had less than enough, 95 had enough, and 47 had more than enough money for family needs during childhood measured by perceived financial sufficiency. Most of the participants (65.8%) were white, 10% were black, 5.8% were Hispanic, 8.9% were Asian, and 9.5% were from other ethnic groups (Table 1). After complete description of the study to the subjects, written informed consent was obtained. The Institutional Review Board at the Boston University approved all procedures.

2.2. Assessments

Impulsivity. Impulsivity was assessed using the Urgency, Premeditation, Perseverance, and Sensation Seeking (UPPS) Impulsive Behavior scale (Whiteside & Lynam, 2001). The UPPS defines impulsivity as a personality trait that has four multiple dimensions such as urgency (e.g., when I feel bad, I will often do things I later regret in order to make myself feel better now), lack of premeditation (e.g., I am one of those people who blurt out things without thinking), lack of perseverance (e.g., I tend to give up easily), and sensation seeking (e.g., I quite enjoy taking risks). Psychometric studies confirmed four-factor structure of the UPPS, and an increasing number of studies reported its utility and validity in alcohol

research (Fischer & Smith, 2008; Lynam & Miller, 2004; Magid & Colder, 2007; Martens, Pedersen, Smith, Stewart, & O'Brien, 2011; Verdejo-Garc, Bechara, Recknor, & Perez-Garc, 2007; Whiteside & Lynam, 2009; Whiteside, et al., 2005). Internal consistencies of the four UPPS scales for the current sample ranged from .88 to .92.

Alcohol use. Frequency of alcohol use was measured by a question: "in the past 12 months, on how many days did you drink alcohol per month?" whereas frequency of past-year binge drinking was assessed with another question: "over the past 12 months, on how many days did you drink five (for males) or more drinks in a row?" (1=every day, 2=3–5 days a week, 3=1 or 2 days a week, 4=2 or 3 days a month, 5=once a month or less, 6=1 or 2 days in the past year, 7=never). Binge drinking was defined as drinking five or more drinks in a row for males and four or more drinks in a row for females at least 2–3 days per month in the past year (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). Alcohol-related problems in the past 12 months were indexed using the Rutgers Alcohol Problem Index (RAPI; 23 items; $\alpha = 0.90$; (Johnson & White, 1989; White & Labouvie, 1989). Internal consistency of the RAPI for the current sample was .90. Finally, Diagnostic and Statistical Manual (DSM-IV) AUDs were measured by the Composite International Diagnostic Interview (CIDI; $\alpha = .70 - .94$) alcohol section (Cottler, et al., 1991; Kessler, 1994; Ustun, et al., 1997).

Peer alcohol use, parental alcoholism, and psychological distress. Peer alcohol use was measured via items which ask how many of the subject's friends presently drink. Parental alcoholism is assessed by the 6-item Children of Alcoholics Screening Test (CAST-6)(Hodgins, Maticka-Tyndale, el-Guebaly, & West, 1993, 1995). Finally, psychological distress was measured by the Brief Symptom Inventory 18 (BSI-18), which assessed overall psychological distress levels (Derogatis, 1993). Internal consistencies of the CAST-6 and BSI 18 for the current sample was .91 and .92, respectively.

2.3. Data Analysis

Poisson regressions for count (i.e., frequency of alcohol use, alcohol-related problems) and logistic regressions for dichotomous (i.e., binge drinking, AUDs) variables were used by the software package, R (R Development Core Team, 2006). Frequency of alcohol use and alcohol-related problems are often treated as continuous in alcohol research, yet those variables are count data having an absolute zero and no upper limit (theoretically). In addition, distribution of frequency of alcohol and alcohol-related problems for the current sample (not shown) suggested an apparent violation of the Gaussian distribution. Furthermore, our preliminary analysis showed that gender, college status, family income, and peer alcohol use were not significant in some or all models examining the relationship between impulsivity and alcohol use outcomes, and dropped from further analysis. Finally, three race/ethnicity categories such as Hispanic, Asian, and other ethnic groups were collapsed into one category (i.e., Other) because of the small sample size.

3. Results

In two separate models (see Table 2), frequency of alcohol use and alcohol-related problems were regressed on the four impulsivity scores, respectively, controlling for sociodemographic characteristics, parental alcohol use, psychological distress, and developmental correlates (i.e., marriage, employment) in emerging adulthood. The Poisson regression model of frequency of alcohol use was statistically significant (chi-squared = 28.0, $df = 8$, $p < .001$). Among the four facets of impulsivity, urgency and sensation seeking was positively associated with alcohol frequency whereas higher scores on premeditation were related to decreased numbers of alcohol use in the past 12 months. Furthermore, the Poisson regression model predicting alcohol-related problems from impulsivity factors and

given covariates was statistically significant ($\chi^2 = 99.8$, $df = 9$, $p < .001$). Higher scores on urgency and sensation seeking were associated with increased numbers of alcohol-related problems.

The logistic regression models (see Table 3) showed that urgency and sensation seeking were positively associated with binge drinking and AUDs during emerging adulthood, controlling for sociodemographic characteristics, parental alcohol use, psychological distress, and the developmental correlates. Specifically, a one unit increase in urgency and sensation seeking was associated with 1.09-fold (Odds Ratio (OR) 95% CI: 1.03–1.15) and 1.04-fold (OR 95% CI: 1.00–1.08) increases in risks for binge drinking, respectively. Furthermore, for a one unit increase in urgency and sensation seeking, the odds of experiencing AUDs increase by a factor of 1.11 (OR 95% CI: 1.05–1.17) and 1.04 (OR 95% CI: 1.00–1.08), respectively. Given that urgency in the UPPS model is defined as the tendency to act impulsively to eliminate negative emotion, we conducted post-hoc analyses to examine the interaction effect between urgency and psychological distress in predicting four types of alcohol use outcomes, but there was no interaction effect for the alcohol use constructs.

4. Discussion

Alcohol use during emerging adulthood may relate to an individual's impulsive tendency to use alcohol for the immediate reward associated with drinking at the expense of severe negative future consequences. The present study investigated the role of four impulsivity traits in the development of an array of alcohol use behaviors including alcohol use, binge drinking, alcohol-related problems, and AUDs. Differential relations between the impulsivity constructs with four distinct alcohol use constructs were found. Urgency and sensation seeking were consistently related to all alcohol use variables. In contrast, lack of premeditation related only to alcohol use whereas lack of perseverance was not associated with any alcohol use construct. We also found that parental alcoholism were associated with alcohol use and alcohol-related problems in emerging adulthood.

We found that urgency and sensation seeking may influence numerous characteristics of one's drinking career. Individuals high on urgency and sensation seeking engaged in higher levels of alcohol use and alcohol-related problems, and were more likely to develop binge drinking and AUDs in emerging adulthood than those with lower levels of urgency and sensation seeking, controlling for parental alcohol use and overall psychological distress. This result is in keeping with similar studies examining the association between impulsivity and alcohol use and alcohol-related problems during emerging adulthood (Fischer & Smith, 2008; Magid & Colder, 2007; Martens, et al., 2011). In the UPPS model of impulsivity, urgency represents a tendency to act impulsively in order to alleviate negative emotional states (Whiteside & Lynam, 2001). Individuals high on urgency may initially increase drinking levels to alleviate negative emotions, and continue to engage in binge drinking for self-medication, which becomes negatively reinforcing over time, and ultimately develop dependence on alcohol. Impulsivity and emotional lability, a trait of excessive emotional reactions and frequent mood changes, interact with each other to increase the risk for alcohol-related problems and abuse (J.S. Simons, et al., 2004; J. S. Simons, Gaher, Correia, Hansen, & Christopher, 2005; Jeffrey. S. Simons, Wills, & Carey, 2009). Thus, pathological drinking behaviors including binge drinking and AUDs may be construed as the behavioral results of an urgent tendency to engage in drinking behaviors, which might relieve negative emotionality in the short term, but have detrimental long-term consequences. Recent studies using the UPPS model also confirmed that urgency is most strongly associated with AUDs among four impulsivity traits (Whiteside & Lynam, 2009; Whiteside, et al., 2005). From an

intervention perspective, it might be useful to simultaneously target negative emotionality and urgency to prevent or care for the pathological drinking behaviors.

Sensation seeking, a tendency to prefer exciting and risky behaviors, has been frequently cited in the literature as a risk factor for a wide range of drinking behaviors (Whiteside & Lynam, 2001). Although some studies have found that sensation seeking is associated more with drinking frequencies (Fischer & Smith, 2008; Grau & Ortet, 1999), the present study found that sensation seeking was also relevant to binge drinking, alcohol-related problems, and AUDs. These findings are consistent with previous findings, showing that sensation seeking was related to binge drinking (Carlson, Johnson, & Jacobs, 2010; Conrod, et al., 2008), alcohol-related problems (Finn, Sharkansky, Brandt, & Turcotte, 2000; Read, Wood, Kahler, Maddock, & Palfai, 2003), and AUDs during emerging adulthood (Lejuez, et al., 2010; Sher, Bartholow, & Wood, 2000). Identity development continues in emerging adulthood (Arnett, 2000). Alcohol misuse in emerging adulthood may be related in particular to sensation seeking, which is an ordinary part of identity exploration. Individuals high in sensation seeking may engage in alcohol use as part of their identity exploration. Furthermore, exploring an adult identity can be confusing and difficult during emerging adulthood (Arnett, 2005). Elevated levels of identity confusion might lead high sensation seekers to become heavier consumers of alcohol and eventually dependent on alcohol. A recent study has found a prospective effect of heavy drinking on increases in sensation seeking during emerging adulthood, suggesting a bi-directional relationship between sensation seeking and alcohol use (Quinn, Stappenbeck, & Fromme, in press). Sensation seeking in adolescence may increase drinking frequency and quantity in emerging adulthood, and elevated levels of drinking, in turn, lead to increase in sensation seeking during young adulthood. Further longitudinal research is necessary to examine the causal relationships and temporal directionality between sensation seeking and alcohol use and misuse during the transition from adolescence into young adulthood.

Although both urgency and sensation seeking were related to four distinct alcohol use constructs, psychological mechanisms that link the impulsivity traits to drinking behaviors in emerging adulthood may differ. While urgency appears to be related to pathological drinking outcomes through a motivational need to regulate negative affective states, sensation seeking may relate to alcohol misuse through a drive for increased stimulation and positive affective states. These findings suggest that sensation seeking is a general inability to inhibit behaviors whereas urgency is a motivationally-driven, adverse response to negative emotionality (Castellanos Ryan, Rubia, & Conrod, 2011; Finn, et al., 2000).

Lack of premeditation, a non-planning trait of impulsivity, was related only to alcohol use. These findings are consistent with two recent studies using the UPPS model (Fischer & Smith, 2008; Magid & Colder, 2007). For example, Magid and Colder (Magid & Colder, 2007) found that lack of premeditation was associated with frequency of alcohol use, but not with alcohol-related problems among 267 college students. Premeditation traits stem from the broader domain of conscientiousness of the Five Factor Model of personality (McCrae & Costa, 1990). Individuals low on premeditation may neglect to consider negative consequences of alcohol use before engaging in drinking and are more likely to engage in high levels of alcohol use. The current findings suggest that frequency of alcohol use is specifically related to urgency, sensation seeking, and lack of perseverance in emerging adulthood.

4.1. Limitation

The present study benefits from a number of strengths, including the utilization of a community sample, comprehensive assessment of multiple domains of both impulsivity and alcohol use, and inclusion of both individual- and contextual-level influences on alcohol use

during emerging adulthood. It is also important to highlight some of the limitations of this study. First, the present study is cross-sectional, and issues of temporal directionality between impulsivity and alcohol use in emerging adulthood need to be further established in longitudinal research. Different facets of impulsivity are likely present before alcohol use is engaged in during emerging adulthood. In addition, the UPPS asserts to measure impulsivity traits that are stable across time (Whiteside & Lynam, 2001). However, addictive behaviors such as alcohol use may influence changes in impulsivity over time (Anestis, Selby, & Joiner, 2007; Quinn, et al., in press). Therefore, four impulsive traits used in this study might be the developmental consequences of alcohol use as well as the causes of it. Second, no neuropsychological tests of impulsivity such as cognitive tasks and computer-based assessment were used. Other lab-based methods such as cognitive tasks (e.g., Stroop task) and computer-based assessment (e.g., stop signal reaction time task) were considered, yet such measures are often limited to assessing one aspect of impulsivity. Consistent with our multidimensional conception of impulsivity, the UPPS was chosen over other methods, which assesses the social aspect of impulsivity that is often missed in neuropsychological measures. Finally, we used self-report measures for alcohol use, yet the tools are subject to certain limitations including recall bias, social desirability, and response acquiescence.

5. Conclusions

Although little consensus exists regarding how impulsivity should be defined and measured (Dick, et al., 2010; Lejuez, et al., 2010; Semple, et al., 2005), impulsivity has been regarded as having multidimensional lower-order traits including urgency, sensation seeking, lack of perseverance, and lack premeditation in recent studies (Whiteside & Lynam, 2001; Whiteside & Lynam, 2009; Whiteside, et al., 2005). The present study found that different impulsivity traits are associated with different alcohol use constructs. This suggests the possibility that different dimensions of impulsivity are different facets of personality, which might have distinct effects on different types of alcoholism.

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Highlights

- We examined the relationships between impulsivity and alcohol use.
- Urgency and sensation seeking were positively related to alcohol use.
- Distinct impulsivity traits may play different roles in alcohol use.

Table 1

Sample Characteristics (N = 190)

	N	% ^a
<i>Demographics</i>		
Age *	21.9	2.11
Gender		
Male	75	39.5
Female	115	60.5
Race/Ethnicity		
White	125	65.8
Black	19	10.0
Hispanic	11	5.8
Asian	17	8.9
Other	18	9.5
Family Income		
Much less than enough money for our needs	5	2.6
Less than enough money for our needs	43	22.6
Enough money for our needs	95	50.0
More than enough money for our needs	44	23.2
Much more than enough money for our needs	3	1.6
<i>UPPS Impulsivity Scale *</i>		
Urgency	26.9	9.05
Premeditation	38.4	8.73
Perseverance	37.1	7.47
Sensation Seeking	39.6	11.67
<i>Alcohol Use</i>		
Frequency *	8.1	5.918
Alcohol-related problems *	9.3	11.07
Binge drinking		
No	93	48.9
Yes	81	42.6
Alcohol use disorders		
No	137	72.1
Yes	53	27.9
<i>Developmental Correlates</i>		
Marriage/cohabitation		
No	164	86.3
Married/Not married but with a partner	26	13.7
Employment		
No	47	24.7
Yes (full- or part-time)	143	75.3

	N	% ^a
College enrollment		
No	83	43.7
Yes (full- or part-time)	107	56.3
Education		
Some High School (no diploma)	4	2.1
High School Graduate (or equivalent)	20	10.5
Some college but no degree	77	40.5
Associate Degree	6	3.2
Bachelor's Degree	83	43.7
Peer alcohol use		
None	81	24.6
One	24	12.6
Less than half	39	20.5
More than half	30	15.8
Almost all	16	8.4
Psychological distress*	44.3	10.5
Parental alcoholism*	1.2	1.9

* Mean values (standard deviations). All other measures reported in frequency (%).

^aValid percentages are reported.

Table 2

Poisson multiple regression analyses with four traits of impulsivity predicting frequency of alcohol use and alcohol-related problems

	Frequency of alcohol use			Alcohol-related problems		
	β	SE	<i>p</i>	β	SE	<i>p</i>
Age	0.05	0.01	0.00	-0.02	0.01	0.04
Race ^a						
Black	-0.24	0.11	0.03	0.14	0.10	0.15
Other	-0.29	0.07	0.00	0.00	0.07	0.97
Urgency	0.01	0.00	0.01	0.04	0.00	0.00
Premeditation	-0.01	0.00	0.00	0.00	0.00	0.71
Perseverance	0.00	0.00	0.49	-0.01	0.00	0.06
Sensation seeking	0.01	0.00	0.00	0.02	0.00	0.00
Parental alcoholism	0.21	0.06	0.00	0.30	0.06	0.00
Psychological distress	-0.08	0.07	0.24	0.43	0.08	0.00
Frequency of alcohol use				0.03	0.00	0.00

^aReference category is white.

β = standardized estimate; SE = standard error.

Table 3

Multivariable adjusted odds ratios (OR) and 95% confidence intervals (CI) for binge drinking and alcohol use disorders

	Binge drinking		Alcohol use disorders	
	OR	CI	OR	CI
Age	0.84***	0.70 – 0.99	0.90	0.76 – 1.07
Race ^a				
Black	0.90	0.25 – 2.97	1.90	0.53 – 6.38
Other	0.58	0.22 – 1.52	0.73	0.25 – 1.97
Urgency	1.09***	1.03 – 1.15	1.11***	1.05 – 1.17
Premeditation	1.01	0.96 – 1.07	1.00	0.94 – 1.06
Perseverance	1.04	0.98 – 1.10	0.99	0.93 – 1.05
Sensation seeking	1.04*	1.01 – 1.08	1.04*	1.00 – 1.08
Parental alcoholism	1.16	0.50 – 2.63	1.84	0.80 – 4.26
Psychological distress	0.54	0.22 – 1.33	1.18	0.44 – 3.40
Frequency of alcohol use	1.22***	1.12 – 1.34	1.09*	1.01 – 1.17

Reference category is white.

* $p < .05$

** $p < .01$

*** $p < .001$