Risk for alcohol use/misuse among entering college students: The role of personality and stress

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ABSTRACT

Introduction: Excessive alcohol use amongst college students is associated with low grades, poor mental health, and risks to physical safety. Neuroticism, characterized by emotional instability and anxiety, and self-reported stress have both been shown to be strong predictors of alcohol use and misuse, however, previous studies have shown that measures of stress and Neuroticism are frequently confounded. This study tests the hypothesis that personality traits, and Neuroticism in particular, predict alcohol use/misuse in matriculating freshmen above and beyond reported levels of stress.

Methods: Data were collected as part of an IRB-approved longitudinal study, MAPme, examining behavioral health in college. Participants were 303 first-year college students (70% female) with an average age of 18.58 (SD = 0.39). Data were collected during the first eight weeks of the first semester at college.

Results: Overall, domain-level Neuroticism was not associated with alcohol use/misuse above and beyond perceived levels of stress and other Big Five domains ($\beta = 0.14$, $p = 0.088$). Notably, the depression facet of Neuroticism (Neuroticism—Depression), was positively associated with alcohol use/misuse when accounting for the shared effects of stress. Results demonstrated that the Neuroticism—Depression facet moderated the relationship between stress and alcohol use/misuse ($\beta = 0.18$, $p = 0.020$).

Conclusions: The Neuroticism—Depression facet is a better predictor of alcohol use/misuse than the Neuroticism domain, even when accounting for stress and other personality domains.

At low levels of the Depression facet, stress was negatively associated with alcohol use/misuse, but at high levels of the Depression facet, stress was positively associated with alcohol use/misuse. Taken together, our results shed new light into the combined and independent effects of Neuroticism and stress on alcohol use/misuse.

1. Introduction

Excessive alcohol use amongst college students is associated with low grades, poor mental health, and risks to physical safety (Arria et al., 2013, 2017; Arria et al., 2013; Hingson, Zha, & Weitzman, 2009). Young adults remain at high risk of developing alcohol use disorders, despite mounting administrative pressure for universities to minimize irresponsible alcohol use and binge drinking behavior (Brown-Rice, Furr, & Hardy, 2017; Wechsler, Kelley, Weitzman, San Giovanni, & Seibring, 2000; Wechsler & Nelson, 2001). Increased alcohol use and misuse during college years can be accounted for by preexisting personality traits in conjunction with a number of novel environmental influences, often including increased workload, novel independence, and easy access to alcohol. Neuroticism, characterized by emotional instability and anxiety, has shown to be a strong predictor of alcohol use/misuse. However, the relationship between stress and alcohol use/misuse is not as clear (Allen, Vella, & Laborde, 2015; Cooper, Agocha, & Sheldon, 2000; Cooper, Russell, Skinner, Frone, & Mudar, 1992). Previous studies have demonstrated that measures of stress and Neuroticism are frequently confounded, measuring overlapping constructs (Carney, Armeli, Tennen, Affleck, & O'Neil, 2000; Hills & Norvell, 1991). The present study examines the unique and interactive effects of both stress and Neuroticism in undergraduate alcohol use/misuse, while accounting for undue influence of other personality domains.

1.1. Trends in college alcohol use

Alcohol use increases drastically between 15 and 25 years of age,

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then starts to slowly decrease (Schulenberg et al., 2019). Approximately 45% of surveyed individuals between the ages of 19 and 20 report ongoing alcohol use, compared to about 70% of individuals ages 21–25 (Schulenberg et al., 2019). Amongst college students, The National Institute on Alcohol Abuse and Alcoholism (NIAAA) reports 59.9% of surveyed undergraduates report drinking alcohol within the last month, compared to 50.2% of other individuals of the same age (Schulenberg et al., 2019). Full-time college students are also more likely than non-full-time college students to report being drunk (Schulenberg et al., 2019). However, college-bound high school students report drinking alcohol at lower rates than their non-college bound peers, demonstrating a significant increase in alcohol use during the college years (Schulenberg et al., 2019). As a consequence, identifying risk factors for both hazardous drinking and high alcohol consumption that are associated with transitioning to and attending college remains a high priority.

1.2. College and stress

Stress is a well-documented risk factor for alcohol both alcohol use and misuse in undergraduates. A study by Kerr, Johnson, Gans, and Krumrine (2004) reported that self-described stress levels increased between high school and college, eventually decreasing in the first spring semester. Indeed, the transition period between high school and college is marked by increases in alcohol use and high stress levels, alongside new social circles and increases in school workload (Misra, McKean, West, & Russo, 2000; Ross, Neibling, & Heckert, 1999). Previous studies support a link between adolescent and college student stress and alcohol use/misuse. For example, adolescents who report high levels of stress tend to report more substance abuse (Galaif, Sussman, Chou, & Wills, 2003). Stress and alcohol also appear to be linked; Park, Armeli, and Tennen (2004) tracked college student's daily stress levels and alcohol consumption, showing that on days when students reported more stress, they also reported consuming more alcohol.

1.3. Personality and alcohol use

In addition to stress, personality is another robust predictor of both hazardous alcohol use and alcohol consumption in college students, with existing literature describing correlates of alcohol use behaviors across diverse measures of personality traits (Littlefield & Sher, 2010; Martin, 2011). The Big Five Inventory is widely used across psychology literature, with Conscientiousness, Neuroticism, and Openness to Experience often strongly associated with alcohol use/misuse (Goldstein & Flett, 2009; Luchetti, Terracciano, Stephan, & Sutin, 2018). A longitudinal study by Luchetti et al. (2018) found that low levels of Conscientiousness predicted more symptoms of alcohol dependence. Other longitudinal examinations have found that Neuroticism positively predicts alcohol consumption (Allen et al., 2015; Cooper et al., 2000; Loukas, Krull, Chassin, & Carle, 2000). While Neuroticism is frequently reported as the most robust personality predictor of alcohol use (Goldstein & Flett, 2009), other studies have reported a negative correlation between Conscientiousness and Agreeableness and alcohol use/misuse (Raynor & Levine, 2009).

Advancements in personality taxonomy have also led to the utilization of lower-order facets, intended to increase fidelity of the Big Five domains (Soto & John, 2009). The Revised NEO Personality Inventory (NEO-PI-R) is a measure of Big Five Personality Traits (Costa & McCrae, 2008) that assesses 30 total personality facets—6 facets for each of the Big Five domains. Using the NEO-PI-R, Hopwood et al. (2007) demonstrated that high impulsivity (Neuroticism), high excitement seeking (Extraversion), low trust (Agreeableness), and low deliberation (Conscientiousness) and dutifulness (Conscientiousness) were predictive of elevated alcohol use. Other studies have suggested a role of Extraversion and Neuroticism facets in stress and alcohol use/misuse. For example, Stewart, Loughlin, and Rhyno (2001) found that

Neuroticism—Depression was related to drinking in response to a stressful life event, or drinking to cope, even after controlling for the other five Neuroticism facets. Other literature suggests that gregariousness and excitement seeking, facets that load on the Extraversion domain, are also related to drinking behaviors (Stewart & Devine, 2000).

Few studies have examined how facets relate to alcohol use specifically within undergraduates. Within a sample of 200 college students, Ruiz, Pincus, and Dickinson (2003) reported that high Neuroticism and low Conscientiousness predicted more alcohol use and alcohol-related problems. At the facet level, high impulsiveness (Neuroticism facet), and low competence, dutifulness, and deliberation (Conscientiousness facets), were related to greater alcohol use and misuse. Altogether, it appears that more research is required to fully understand the role of personality, and Neuroticism specifically, as it relates to college students, given the unique requirements and pressures on undergraduates.

1.4. Personality and stress

Personality factors have also been linked to stress levels, with previous studies identifying a strong positive correlation between stress and Neuroticism (Gunthert, Cohen, & Armeli, 1999; Schneider, 2004). Contrastingly, studies have demonstrated negative correlations between Conscientiousness (Martens et al., 2009) and Agreeableness (Bibbey, Carroll, Roseboom, Phillips, & de Rooij, 2013; Chu, Ma, Li, & Han, 2015) with stress. Neuroticism, as measured by the Big Five Inventory (BFI), describes an individual's emotional instability and propensity to experience negative emotions (John & Srivastava, 1999). Models of stress within psychology describe stress as difficult external events to which individuals vary in their emotional reactivity and response (Armeli, Carney, Tennen, Affleck, & O'Neil, 2000; Cohen, Kessler, & Gordon, 1997; Dyson & Renk, 2006).

Researchers have proposed that individuals high in Neuroticism might perceive the world as generally threatening and stressful, suggesting some confounding between these two constructs (Müller et al., 2013). Additionally, given that individuals vary in their level of stress reactivity, and affective variables such as Neuroticism can contribute to how individuals perceive threat, it is possible that Neuroticism moderates the association between stress and alcohol use/misuse. However, to date research has been limited. Evidence for intercorrelations between the BFI domains further suggest that examining the unique effects of personality and stress might elucidate the demonstrated associations between stress, Neuroticism, and alcohol misuse (Van der Linden, te Nijenhuis, & Bakker, 2010).

The present study examines several hypotheses in the context of matriculating freshmen: 1. Stress is not associated with alcohol use/misuse when accounting for personality domains, and Neuroticism in particular; 2. Negative affect facets of Neuroticism, namely Depression and Anxiety, are more strongly associated with alcohol use/misuse than stress, when accounting for other personality domains; and 3. Negative affect facets of Neuroticism moderate the relationship between stress and alcohol use/misuse. The present study will expand on previous literature that examines the personality and perceived stress as predictors of alcohol use/misuse and will elucidate their unique effects in matriculating freshmen.

2. Methods

2.1. Sample and procedure

Participants were recruited from two campuses of a private university in the Southeastern United States (urban campus, n = 193; rural campus, n = 110). Data are from Wave I of the MAPme Project, a longitudinal study of biobehavioral health and substance use during college. Participants were recruited at the start of the first semester through fliers posted around campus and during frequent in-person

undergraduate events. Eligibility criteria included being a first-year student and of at least 18 years of age (M_{age} = 18.58; SD = 0.39). Participants were administered an online survey of behavioral and health questionnaires, in addition to several cognitive assessments. The overall sample (n = 303) consisted of 211 females and 90 males (two participants chose "prefer not to answer"). Most surveys were completed within three weeks of the study start ($M_{enrollment\ week}$ = 3.17; SD = 1.78). Participants received a $15 gift card for completion of the survey. All study components were approved by the Institutional Review Board.

2.2. Measures

The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) (WHO ASSIST Working Group, 2002) and The Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, De la Fuente, & Grant, 1993) were used to assess alcohol use and misuse. Individuals who endorsed using alcohol one or more times on the ASSIST were administered the AUDIT. The AUDIT was normed to a diverse population of individuals recruited from primary care settings, and consists of 10 questions with a maximum possible score of 40, where higher scores indicate more alcohol use/misuse. Analyses focus on the total AUDIT (AUDIT-T) score which reflects hazardous, harmful, and excessive alcohol use, as previous literature supports a role of stress and personality within both alcohol use and misuse constructs.

Stress was assessed using the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983), a 14-item self-report measure of stress. The PSS was normed to a population of college students and each stress symptom was scored on a 4-point Likert scale, where 0 = Never and 4 = Very often (maximum possible score = 56). Items in the PSS showed strong internal consistency (Cronbach's α = 0.85).

Personality was assessed using the 44-item version of the Big Five Inventory (BFI) (John & Srivastava, 1999). The BFI measures five dimensions of personality (Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism) and has shown to have good reliability. Ten facet traits were also calculated to assess more specific personality characterization within the Big Five domains (Openness: Aesthetics and Ideas; Conscientiousness: Order and Self-Discipline; Extraversion: Assertiveness and Activity; Agreeableness: Altruism and Compliance; Neuroticism: Anxiety and Depression) (Soto & John, 2009). Subjects were asked to report how strongly they agree that a listed characteristic describes them well (5 = Agree strongly, 4 = Agree a little, 3 = Neither agree nor disagree, 2 = Disagree a little, 1 = Disagree strongly). Cronbach's α for all dimensions were acceptable, with values between 0.72 to 0.89. Cronbach's α for the facet traits were not assessed because some facets consisted of only two items.

2.3. Data analysis

All analyses controlled for campus site (rural versus urban), sex, and individual week of study enrollment, as school obligations and potential stressors fluctuated between study weeks. We examined partial correlations between predictors while controlling for covariates (Table 2). Multiple regression was used to examine the conditional and joint effect of personality and stress on alcohol use/misuse. All data were centered prior to performing regression analyses. All analyses were performed using R Studio (Version 1.2.5033) and missing values were dropped from analyses.

3. Results

Of the overall sample, 164 individuals (54% of overall sample) reported using alcohol at least once in their lifetime. Descriptive statistics of the study variables (Table 1) suggested that skew and kurtosis levels were acceptable (≤3.0), with the exception of AUDIT-T (skew = 1.96; kurtosis = 5.75; Shapiro-Wilk test W = 0.809, p = 2.365 × 10^{-13}). To create a more normal distribution, data were transformed by taking the

Table 1
Descriptive statistics.

Variable	n	M (SD)	Skewness	Kurtosis	Min	Max
Covariates						
Age	303	18.58 (0.39)	1.17	2.50	18.01	20.39
Week	303	3.17 (1.78)	0.47	−0.69	1.00	8.00
Independent variables						
Perceived Stress Scale (PSS) total	293	25.88 (5.39)	0.07	−0.31	12.00	39.00
Openness	301	3.66 (0.57)	−0.22	−0.45	2.20	4.90
Conscientiousness	303	3.62 (0.63)	−0.22	−0.48	1.78	5.00
Extraversion	303	3.18 (0.90)	0.03	−0.79	1.25	5.00
Agreeableness	302	3.86 (0.67)	−0.55	−0.01	1.44	5.00
Neuroticism	303	3.17 (0.80)	−0.24	−0.31	1.00	5.00
Dependent variables						
AUDIT-T, untransformed	164	4.81 (4.26)	1.96	5.75	1.00	28.00
AUDIT-T, natural log	164	1.54 (0.66)	0.25	−0.84	0.69	3.37

natural log of AUDIT-T, with the resulting distribution becoming less skewed and kurtotic with the correction (skew = 0.25; kurtosis = −0.80; Shapiro-Wilk test W = 0.929, p = 3.147 × 10^{-07}). Frequency statistics of all AUDIT items are reported in Table 2. Across our covariates, sex and week of study enrollment were modestly associated with AUDIT-T, while campus site was not. While sex was correlated with AUDIT-T, a *t*-test indicated that there were no significant gender differences between alcohol use/misuse ($t(161)$ = −1.89, p = 0.060). Nonetheless, as previous research suggests that men report consuming more alcohol than women (Johnston et al., 2018), all results controled for the effects of gender.

Partial correlations among the independent variables and AUDIT-T indicated moderate covariances (Table 2). Personality domains were significantly intercorrelated with two exceptions: Openness to Experience was not significantly correlated with Conscientiousness (r = 0.06, p = 0.303) or Neuroticism (r = −0.07, p = 0.227; see Table 3 for the direction and magnitude of these correlations along with facet-level correlations). AUDIT-T score was positively correlated with PSS (r = 0.17, p = 0.003) and Neuroticism (r = 0.31, p < 0.001), and negatively correlated with Agreeableness (r = −0.12, p = 0.031). Stress was significantly correlated with all of the personality domain scores except for Openness to Experience.

The multiple regression analysis that looked at unique associations of personality domains and perceived stress on AUDIT-T explained 15% of the trait variance (Adjusted R^2 = 0.10, $F(9, 147)$ = 2.97, p = 0.003; Table 3). Regression analyses provided less biased estimates of personality and stress on AUDIT-T. Indeed, prior associations between Neuroticism and AUDIT-T, and PSS and AUDIT-T did not survive the correction for confounding (β = 0.14, p = 0.088 and β = 0.12, p = 0.196, respectively).

To further elucidate the relationship between Neuroticism, stress, and alcohol use/misuse, given the discrepancy between the partial correlation results and the multiple regression model, the Neuroticism facets were explored as outcome measures. Analyses that used the Neuroticism facets (Depression and Anxiety) in place of the Neuroticism domain found that Neuroticism—Depression was positively associated with AUDIT-T when accounting for PSS and domain-level Big Five personality traits (β = 0.23, p = 0.028; Adjusted R^2 = 0.11, $F(10, 146)$ = 2.90, p = 0.002; Table 4). Exclusion of all personality traits except for Neuroticism—Depression did not explain more variance in AUDIT-T (Adjusted R^2 = 0.10, $F(5, 152)$ = 4.56, p < 0.001). We tested for

Table 2
Partial correlations.

	1.	2.	2a.	2b.	3.	3a.	3b.
1. PSS	–						
2. Openness	−0.08	–					
2a. Aesthetics	−0.02	0.78***	–				
2b. Ideas	−0.16**	0.79***	0.31***	–			
3. Conscientiousness	−0.30***	0.06	0.04	0.07	–		
3a. Order	−0.22***	−0.02	0.01	−0.04	0.78***	–	
3b. Self-Discipline	−0.30***	0.07	0.04	0.11	0.92***	0.56***	–
4. Extraversion	−0.15**	0.19***	0.05	0.26***	0.19**	0.06	0.20***
4a. Assertiveness	−0.10	0.14	0.02	0.23***	0.78*	0.01	0.15**
4b. Activity	−0.20***	0.24***	0.07	0.27***	0.92***	0.15**	0.22***
5. Agreeableness	−0.25***	0.13*	0.06	0.12*	0.28***	0.20***	0.24***
5a. Altruism	−0.25***	0.08	0.02	0.09	0.29***	0.20***	0.24***
5b. Compliance	−0.17**	0.11*	0.05	0.09	0.14*	0.10	0.12*
6. Neuroticism	0.52***	−0.07	−0.02	−0.08	−0.32***	−0.27***	−0.27***
6a. Anxiety	0.43***	−0.15	−0.08	−0.15*	−0.27***	−0.20***	−0.24***
6b. Depression	0.50***	0.04**	0.08	−0.02	−0.30***	−0.29***	−0.26***
7. AUDIT Total	0.17**	0.02	−0.04	0.08	−0.02	−0.02	−0.01

	...	4.	4a.	4b.	5.	5a.	5b.	6.	6a.	6b.
1. PSS										
2. Openness										
2a. Aesthetics										
2b. Ideas										
3. Conscientiousness										
3a. Order										
3b. Self-Discipline										
4. Extraversion		–								
4a. Assertiveness		0.95***	–							
4b. Activity		0.77***	0.55***	–						
5. Agreeableness		0.19**	0.06	0.34***	–					
5a. Altruism		0.28***	0.16	0.38***	0.89***	–				
5b. Compliance		0.02	−0.10	0.22***	0.84***	0.58***	–			
6. Neuroticism		−0.24***	−0.18**	−0.25***	−0.38***	−0.33***	−0.33***	–		
6a. Anxiety		−0.24***	−0.20***	−0.21***	−0.22***	−0.18**	−0.21***	0.89***	–	
6b. Depression		−0.20***	−0.13*	−0.28***	−0.43***	−0.43***	−0.34***	0.78***	0.89***	–
7. AUDIT Total		0.10	0.11	0.04	−0.12*	−0.10	0.12*	0.24***	0.11	0.28***

All analyses control for sex, campus site, and week of study entry; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3
AUDIT total regressed on PSS total and BFI factors.

Dependent Variable	Independent Variable	B	SE B	β	p-value	VIF
	Intercept	−0.02	0.05	0.00	.707	–
AUDIT total ($n = 157$)[a]	Perceived Stress	0.01	0.01	0.12	.196	1.52
	BFI – Openness	−0.06	0.09	−0.06	.554	1.13
	BFI – Conscientiousness	0.04	0.09	0.04	.672	1.20
	BFI – Extraversion	0.10	0.06	0.10	.079	1.31
	BFI – Agreeableness	−0.09	0.08	−0.09	.296	1.25
	BFI – Neuroticism	0.14	0.08	0.14	.088	1.73

[a] Relationship between perceived stress, personality, and alcohol use; All analyses control for sex, campus site, and week of study enrollment; B is unstandardized regression coefficient, β is standardized regression coefficient; * $p < 0.05$, ** $p < 0.01$, **** $p < 0.001$

interaction effects and found that Neuroticism moderated the relationship between PSS and AUDIT-T ($β = 0.16$, $p = 0.040$; Adjusted $R^2 = 0.12$, $F(10, 146) = 3.16$, $p = 0.001$; Table 5). This finding prompted us to test if this interaction was unique to any one Neuroticism fact. Indeed, Neuroticism—Depression score moderated the relationship between PSS and AUDIT-T ($β = 0.18$, $p = 0.020$; Adjusted $R^2 = 0.14$, $F(11, 145) = 3.22$, $p < 0.001$; Table 6; Fig. 1). At low levels of the Depression facet, stress was negatively associated with alcohol use/misuse, but at high levels of the Depression facet, stress was positively associated with alcohol use/misuse.

Table 4
AUDIT total regressed on PSS total and BFI personality factors and Neuroticism facets.

Dependent Variable	Independent Variable	B	SE B	β	p-value	VIF
	Intercept	−0.03	0.05	0.00	.602	–
AUDIT total ($n = 156$)[a]	Perceived Stress	0.01	0.01	0.10	.311	1.62
	BFI – Openness	−0.08	0.10	−0.07	.385	1.17
	BFI – Conscientiousness	0.03	0.09	0.03	.723	1.20
	BFI – Extraversion	0.10	0.06	0.14	.106	1.33
	BFI – Agreeableness	−0.07	0.08	−0.07	.419	1.28
	BFI – Neuroticism, Dep	0.15	0.07	0.23*	.028	1.86
	BFI – Neuroticism, Anx	−0.02	0.07	−0.03	.749	1.64

[a] Relationship between perceived stress, personality, and alcohol use; All analyses control for sex, campus site, and week of study enrollment; B is unstandardized regression coefficient, β is standardized regression coefficient; * $p < 0.05$, ** $p < 0.01$, **** $p < 0.001$

4. Discussion

The present study showed that personality characteristics and stress play a significant role in the severity of problematic alcohol use/misuse, but that certain traits are more significantly associated with alcohol involvement than others. The Neuroticism—Depression facet was a better predictor of alcohol use/misuse than the Neuroticism domain, and accounted for unique variance even when controlling for stress and other personality facets and domains. Stress did not account for unique

Table 5
AUDIT total regressed on PSS total and BFI factors, including Neuroticism domain and interaction.

Dependent Variable	Independent Variable	B	SE B	β	p-value	VIF
AUDIT total (*n* = 156)[a]	Intercept	−0.07	0.06	0.00	.235	–
	Perceived Stress	0.01	0.01	0.12	.183	1.52
	BFI – Openness	−0.06	0.09	−0.05	.532	1.13
	BFI – Conscientiousness	0.06	0.09	0.05	.508	1.21
	BFI – Extraversion	0.10	0.06	0.14	.104	1.32
	BFI – Agreeableness	−0.08	0.08	−0.08	.314	1.25
	BFI – Neuroticism	0.14	0.08	0.17	.096	1.73
	BFI – Neuroticism × PSS	0.02	0.01	0.16*	.040	1.03

[a] Relationship between perceived stress, personality, and alcohol use; All analyses control for sex, campus site, and week of study enrollment; *B* is unstandardized regression coefficient, *β* is standardized regression coefficient; * *p* < 0.05, ** *p* < 0.01, **** *p* < 0.001.

Table 6
AUDIT total regressed on PSS total and BFI factors, including Neuroticism facets and interaction.

Dependent Variable	Independent Variable	B	SE B	β	p-value	VIF
AUDIT total (*n* = 156)[a]	Intercept	−0.09	0.06	0.00	.131	–
	Perceived Stress	0.01	0.01	0.09	.328	1.63
	BFI – Openness	−0.08	0.09	−0.07	.406	1.17
	BFI – Conscientiousness	0.04	0.09	0.04	.625	1.20
	BFI – Extraversion	0.09	0.06	0.14	.118	1.33
	BFI – Agreeableness	−0.09	0.08	−0.09	.306	1.29
	BFI – Neuroticism, Anx	−0.04	0.07	−0.06	.558	1.66
	BFI – Neuroticism, Dep	0.14	0.07	0.22*	.034	1.86
	BFI – Neuroticism, Dep × PSS	0.02	0.01	0.18*	.020	1.05

[a] Relationship between perceived stress, personality, and alcohol use; All analyses control for sex, campus site, and week of study enrollment; *B* is unstandardized regression coefficient, *β* is standardized regression coefficient; * *p* < 0.05, ** *p* < 0.01, **** *p* < 0.001.

variance in harmful and hazardous alcohol use/misuse beyond personality traits. Our results demonstrate that while Neuroticism and stress are both correlated with alcohol use/misuse, when accounting for their shared variance and in the presence of other personality domains, stress is modestly confounded by personality. However, analyses of the negative facets of Neuroticism identified an interaction between Neuroticism and stress, specifically the Neuroticism—Depression facet, when predicting alcohol use/misuse.

While previous work has not examined the unique contribution of stress or individual personality domains or facets towards alcohol use/misuse in undergraduates, current literature supports some overlap between Neuroticism and stress (Carney et al., 2000; Müller et al., 2013). The Depression facet of Neuroticism consists of two questions about an individual's moodiness or tendency to feel "depressed" or "blue", compared to the Anxiety facet that include questions about an individual's tendency towards worry or stress. The results of interaction analyses demonstrate the construct overlap between Neuroticism and stress, with most redundancy arising from the Anxiety facet. Most notably, when accounting for this shared variance, we found that the Depression facet of Neuroticism moderated the relationship between PSS and AUDIT-T; as Depression levels increased, the relationship between stress and alcohol use/misuse also increased.

Our results indicate that when presented with highly stressful circumstances, high Neuroticism—Depression predicts a person's propensity to use and misuse alcohol. Individuals with high

Neuroticism—Depression are likely to drink more when stressed, but for individuals with low Neuroticism—Depression, the trait seems to be protective, with these individuals using/misusing alcohol at lower rates. While some previous research supports a relationship between stress, neuroticism, and clinical depression (Pereira-Morales, Adan, & Forero, 2019), our measure of Neuroticism—Depression represents a general tendency towards moodiness as opposed to a persistent and sometimes debilitating disorder. Amongst the other BFI domains, and in line with existing literature, we found that Conscientiousness and Agreeableness were negatively correlated with stress levels (Bibbey et al., 2013; Chu et al., 2015; Martens et al., 2009). However, in contrast with previous studies that report high levels of Conscientiousness and Agreeableness are associated with lower overall alcohol use (Malouff, Thorsteinsson, Rooke, & Schutte, 2007; Roberts & Bogg, 2004), we found that these traits were not negatively associated with alcohol use/misuse when considering covariates and comorbid personality domains. It is possible that we did not detect correlations between these variables because of the low overall alcohol use/misuse in our sample. Future examinations of this population, when the undergraduates have more access to alcohol, might identify a relationship between Conscientiousness or Agreeableness and alcohol use/misuse. Overall, these findings provide unique insight into the role of personality as it relates to hazardous/harmful alcohol use in freshmen undergraduates.

4.1. Conclusions

Several study limitations should be noted. First, the present study used a single-domain self-report assessment of stress, associated with increased likelihood of response bias and social desirability bias (Devaux & Sassi, 2016). More comprehensive and objective measures of stress levels might include physiological assessment, such as skin conductivity, heartrate, or cortisol measures which have shown be strongly associated with perceived stress (Barnes, Davis, & Treiber, 2007; O'Brien, Tronick, & Moore, 2013; Walvekar, Ambekar, & Devaranavadagi, 2015). Second, our sample was recruited from a predominantly Caucasian sample of a single private university in the Southeastern United States. As such, these findings might not generalize to other institutions with more diverse students. A future goal of the MAPme project is expansion to other universities and populations to allow for the broader applications of future findings. Third, we used the AUDIT-Total score, which confounds alcohol consumption and problematic alcohol use behaviors. While the study participants reported low alcohol use and misuse behaviors, and we were not well-powered to detect unique effects of these constructs, future research could expand on the present study by examining alcohol consumption and problems separately. Lastly, this study is limited by its cross-sectional design. To best examine the relationship between stress and personality on alcohol use/mise, future studies could take a longitudinal state-trait perspective, treating personality and Neuroticism specifically as stable traits and stress as a state. Data from this sample will continue to be collected until the students graduate, allowing longitudinal examinations into alcohol use/misuse trajectories, and the associations between stress, personality traits, and hazardous/harmful alcohol use.

In conclusion, this study provides additional evidence for the role of BFI domains and facets in alcohol use/misuse, above stress levels. While stress and alcohol use/misuse are correlated, when personality is taken into account, stress does not appear to account for any unique variance in liability to use/misuse alcohol among freshman students Thus, Neuroticism and the Neuroticism-Depression facet specifically appear to be the most robust predictors of alcohol use and misuse among incoming freshmen and could serve as useful population risk indicators for campuses (Seigers & Carey, 2010).

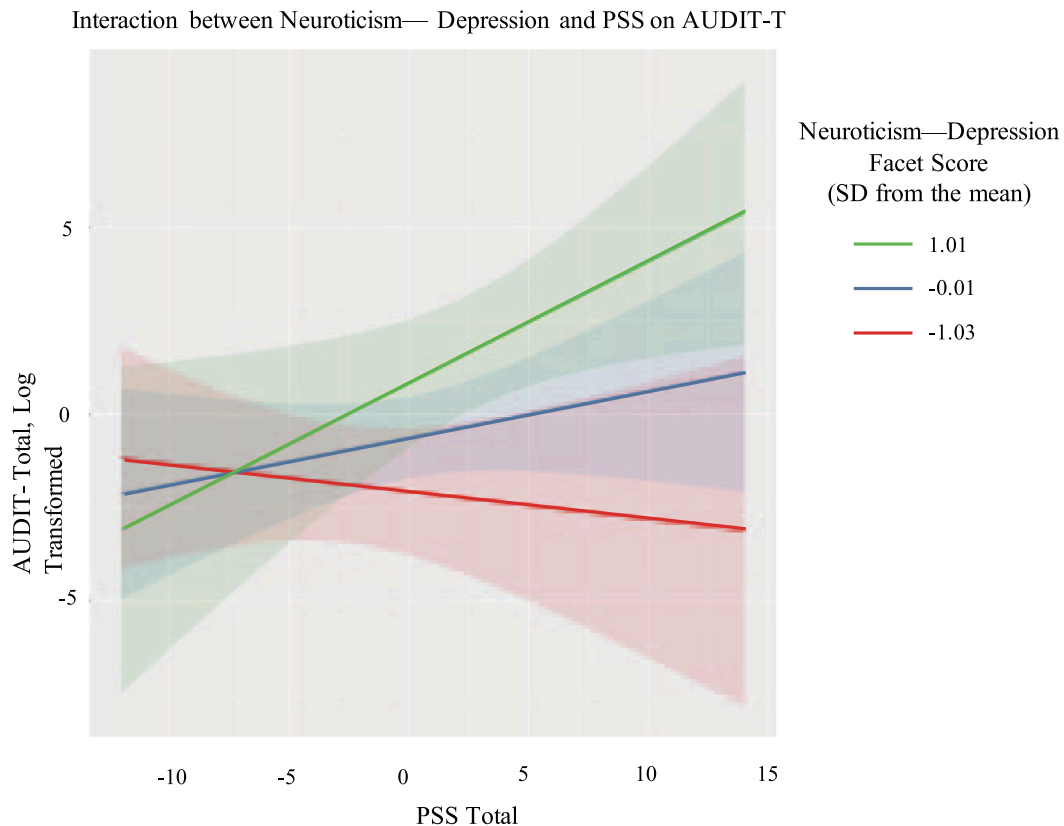Interaction between Neuroticism— Depression and PSS on AUDIT-T

Fig. 1. Interaction between Neuroticism– Depression and PSS on AUDIT-T. In a multiple regression of Big Five personality domains and perceived stress on AUDIT-T, PSS Total is moderated by Neuroticism– Depression score. Neuroticism– Depression scores were plotted in three different groups: those with depression scores above one standard deviation from the mean, below one standard deviation from the mean, and within one standard deviation from the mean. All variables were mean-centered prior to plotting.

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