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Associations Between Trait Boredom and Frequency of Cannabis, Alcohol, and Tobacco Use in College Students

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ABSTRACT

Objective: Boredom is a common emotion associated with substance use in college students – a group already at risk for substance misuse. The purpose of this study is to understand how two types of trait boredom (susceptibility and proneness) in college students are associated with frequency of cannabis, alcohol, and tobacco use. **Method:** Data were collected from an online survey completed by a sample of undergraduate students (N = 414, M_{age} = 19.55, 84.5% female; 64.3% White) enrolled at a large public university in the northwest. Multivariate logistic regression was used to evaluate the association between trait boredom and frequency of cannabis, alcohol, and tobacco use after controlling for age, sex, and race. **Results:** Boredom susceptibility was a significant predictor of annual, monthly, and weekly cannabis and alcohol use, but only annual and monthly tobacco use. Boredom proneness was only a significant predictor for monthly alcohol use. **Conclusions:** Findings were generally consistent across types of substances and frequency of use for boredom susceptibility, indicating students higher in susceptibility, rather than proneness, are a subgroup to target prevention interventions to alleviate boredom and subsequent maladaptive coping mechanisms.

Key words: = trait boredom; boredom proneness; boredom susceptibility; college students; substance use; prevention science

Boredom is characterized by feelings of dissatisfaction, restlessness, and weariness (Elpidorou, 2014), and conceptualized as an unpleasant emotional state of "wanting, but being unable, to engage in satisfying activity" (Eastwood et al., 2012, p. 482). It can result in disengagement from healthy pursuits, impacting development and growth (Larson & Richards, 1991; Shaw et al., 1996). Although boredom is a common emotion, individuals vary in their ability to effectively respond. Much of the research has focused on trait boredom, or the general likelihood, or propensity, to experience boredom (Elpidorou, 2014; Mercer-Lynn et al., 2014), versus state boredom, which is momentary and transitory (Mikulas & Vodanovich, 1993; Weybright et al., 2015). Trait boredom has been associated with negative outcomes such as substance use (Weybright et al., 2015), which is illegal for adolescents and emerging adults under 21 years of age for most substances. Further, cannabis, alcohol, and tobacco use have a potential for dependency, so delaying use until the legal age reduces the likelihood of dependency and substance use disorder (Ali et al., 2020; Hingson et al., 2006; Le Strat et al., 2015). From a developmental perspective, emerging adults may be more vulnerable to such negative outcomes,

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especially college students who are already at risk for substance misuse (e.g., binge drinking; hazardous substance use; Mason et al., 2014; Slutske et al., 2004). More specifically, boredom is implicated as a reason for college students use of cannabis, alcohol, and tobacco (Cooper et al., 2017; Lee et al., 2007; Phillips et al., 2017; Wong et al., 2018). Therefore, it is important to investigate the role trait boredom plays in substance use among college students.

Although prior research repeatedly finds associations between trait boredom and substance use (Csikszentmihalyi & Larson, 2014; Johnston & O'Malley, 1986; Sharp et al., 2011; Vedelago et al., 2020), there is limited understanding of the association between differing types of trait boredom (i.e., proneness and susceptibility) and the frequency of substance use. There is much variability in cannabis and alcohol related negative outcomes (e.g., Pearson, 2019; Prince et al., 2018) and the factors contributing to substance use are complex resulting from the individual and the situation, research on boredom and substance use has included boredom as a motive for substance use (Cooper et al., 2017; Lee et al., 2007; Phillips et al., 2017; Wong et al., 2018) but often ignores the different types of boredom.

Therefore, the distinction between types of trait boredom (i.e., proneness and susceptibility) and the frequency of substance use is important as college student substance misuse (i.e., binge drinking or hazardous substance use) is concerning due to its association with negative outcomes (e.g., poor academic performance, unintentional injuries, mortality, etc.; Arria et al., 2008; Jones et al., 2001; Skidmore et al., 2016). More specifically, cannabis use in college students is at a historic high (Patrick et al., 2022) and college students are at an increased risk for frequent drinking episodes and binge drinking alcohol use (Slutske et al., 2004). Furthermore, although tobacco use has been on the decline, e-cigarette/vape use among college students is on the rise; these devices deliver more concentrated amounts of nicotine increasing the likelihood of nicotine addiction (Roberts et al., 2022; Welsh et al., 2019).

As types of trait boredom may operate differently as motivation for use of cannabis, alcohol, and tobacco, it is important to understand the factors associated with each substance to inform prevention efforts. Despite calls for efforts to directly address boredom (e.g., Vogel-Walcutt et al., 2012), few behavioral interventions exist which target boredom as a motive for engaging in substance use. Given this, the current study aims to understand how trait boredom, specifically boredom proneness and susceptibility, is associated with frequency of cannabis, alcohol, and tobacco use in college students.

Boredom

The definition of boredom is generally thought of as an unpleasant emotion resulting from a mismatch between the individual and the environment (Eastwood et al., 2012). Like other emotions, boredom conveys information such as how the current situation is not meeting expectations (Clore et al., 2001). In other words, boredom serves as a signal that can lead to responses that are positive (e.g., refocusing attention, productivity, creativity; Harris, 2000; Mann & Cadman, 2014; Park et al., 2019) or negative (e.g., substance use; Westgate, 2020; Weybright et al., 2015). Varying individual and situational factors contribute to experiences of boredom, including low and high arousal states (e.g., agitation, anger) and under- and/or over-stimulation (Eastwood et al., 2012; Gerritsen et al., 2014; Mikulas & Vodanovich, 1993; Vogel-Walcutt et al., 2012). Boredom is experienced on both a state and a trait level. Almost everyone experiences state, or momentary, boredom from time to time, including college students (Aldridge & Delucia, 1989; Danckert & Allman, 2005; Daniels et al., 2009; Mann & Robinson, 2009; Pekrun et al., 2010). Because state boredom is transitory and situational, individuals generally alleviate it by restructuring the situation (Mikulas & Vodanovich, 1993; Weybright et al., 2015). However, individuals high in trait boredom struggle to effectively cope with these momentary experiences of boredom (Mercer-Lynn et al., 2014; Weybright et al., 2015). Given this, the current study focuses on trait boredom which is less frequently experienced among individuals than state boredom (~90% versus 10% respectively; Chin et al., 2017; Miller et al.,, 2014) but is more frequently associated with health risk behavior (Biolcati et al., 2018; Harris, 2000; LePera, 2011).

Trait Boredom

Trait boredom is connected to individual internal factors resulting in a general likelihood, or propensity, to experience boredom (Elpidorou, 2014; Mercer-Lynn et al., 2014). Prior research suggests individuals experiencing trait boredom are less capable of alleviating boredom through restructuring activities when compared to individuals experiencing state boredom (Farmer & Sundberg, 1986; Kass et al., 2001; Weybright et al., 2015). Two types of trait boredom, boredom proneness and boredom susceptibility, are each thought to be motivated by different underlying self-regulatory processes and are therefore differentially associated with risk behavior (Mercer-Lynn et al., 2011; Mercer & Eastwood, 2010). Boredom proneness is the tendency to experience boredom (Farmer & Sundberg, 1986), while boredom susceptibility is the "aversion to repetition, routine, and dull people, and restlessness when things are unchanging" (Zuckerman et al., 1978, p. 140).

The approach-avoidance model suggests boredom proneness and susceptibility are related to avoidance and approach regulatory processes, respectively, which are different motivational systems involved in self-regulation (Cornwell et al., 2014). For example, more boredom is experienced throughout the day in individuals high in boredom proneness, while individuals high in boredom susceptibility experience high sensation seeking (e.g., trait) in mundane situations (e.g., state). The avoidance regulatory process reflects the behavioral inhibition system (e.g., withdraw from unwelcome stimuli, sensitivity to punishment), which is associated with boredom proneness. Boredom prone individuals often demonstrate lower levels of self-control, likely caused by inability or failures to engage in goal-directed and meaningful behaviors (Mugon et al., 2018; Westgate & Wilson, 2018).

The approach regulatory process reflects engagement of the behavioral activation system (e.g., risk taking and impulsive behaviors, sensitivity to rewards and extreme novelty; Gray, 1972, 1981; Pickering & Corr, 2008), which is associated with boredom susceptibility (Mercer-Lynn et al., 2011; Perone et al., 2019). Boredom susceptible individuals seek novelty and stimulation through risk taking and engagement in risky behaviors to alleviate feelings of boredom (Kılıç et al., 2019). Further, individuals high in boredom susceptibility have a desire to escape boring situations and may use maladaptive boredom coping mechanisms (e.g., substance use; Bieleke et al., 2022). Due to the differential associations between boredom proneness and susceptibility in relation to negative outcomes, the current study focuses on understanding how trait boredom (susceptibility and proneness) influences the frequency of substance use.

Boredom and Substance Use

The association between boredom and substance use in college students is a concern. Boredom is associated with substance experimentation and has been found to be a consistent and strong predictor of cannabis, alcohol, and tobacco use (Csikszentmihalyi & Larson, 2014; Johnston & O'Malley, 1986; Sharp et al., 2011). College students report boredom as motivation for engaging in cannabis (Lee et al., 2007; Phillips et al., 2017), alcohol (Cooper et al., 2017), and tobacco use (Wong et al., 2018). Boredom is associated with increased likeliness to use alcohol and binge drink (Biolcati et al., 2018; Patrick & Schulenberg, 2011; Weybright et al., 2015). Conversely, individuals who misuse substances are more likely to experience boredom (Iso-Ahola & Crowley, 1991; LePera, 2011).

Several contextual factors also impact college student substance use and experiences of boredom including cannabis legalization and social norms. Throughout the United States, including the Northwest, 21 states or territories have measures regulating non-medical cannabis (National Conference of State Legislatures, 2022). This results in greater access to cannabis, reductions in perceived harms of use, and increases in perceptions of use, especially in college-aged students – all factors associated with increased use (Gilson et al., 2022; Rhew et al., 2022). These associations mirror those found in the alcohol use literature (Slutske et al., 2016; Wild et al., 2001). For individuals high in trait boredom, these same factors may result in a context which facilitates risk behavior engagement to alleviate boredom.

Both types of trait boredom, proneness and susceptibility, have been associated with risk behaviors in college students. Specifically, boredom proneness is correlated with more substance use (Weybright et al., 2015), substance

misuse (Lee et al., 2007; LePera, 2011), and binge drinking (Biolcati et al., 2016). Boredom susceptibility is correlated with alcohol use (Kılıç et al., 2019; Mercer-Lynn et al., 2011), cigarette smoking (Martínez-Vispo et al., 2019), and opioid misuse (Franques et al., 2003). Despite these associations, the mechanisms by which trait boredom and substance use are associated are not well understood, including differing frequencies of substance use. Further, there is limited research assessing boredom proneness and susceptibilities associations between cannabis, alcohol, and tobacco use. Most research focuses on one specific substance versus the distinctions between multiple substances. Therefore, the current study seeks to further the understanding of the associations between trait boredom and substance use to fill a gap in the literature pertaining the frequency of cannabis, alcohol, and tobacco use.

Aim of Current Study

Boredom is thought to arise in response to a mismatch between environmental conditions and personal predispositions, and substance use may be used to address boredom. Despite prior research, there is a limited understanding of the association between trait boredom and the frequency of substance use. The purpose of the current study is to understand how types of trait boredom (susceptibility and proneness) are associated with frequency of cannabis, alcohol, and tobacco use in college students. The findings can be used to inform substance use prevention approaches. Given the current literature on trait boredom and substance use among college students, the following research questions (RQ) were explored:

- RQ1: How are boredom susceptibility and proneness associated with (a) past year and (b) past month substance use (i.e., cannabis, alcohol, and tobacco)?
- RQ2: How are boredom susceptibility and proneness associated with less than weekly versus greater than or equal to weekly substance use (i.e., cannabis, alcohol, and tobacco)?

METHODS

Study Design

Data were collected from undergraduate students enrolled in a large public university in the northwest United States. The large public university is located within a state with legalized recreational and medical cannabis use. Students completed an online survey administered between October-December 2019 for extra course credit. The study was reviewed and approved by the university's Institutional Review Board.

Participants

The sample consisted of 414 undergraduate students (M_{age} = 19.55 years, SD = 1.48 years). Approximately 84.5% identified as female for sex, 15.2% as male, and 0.2% preferred to not disclose their sex. The sample was predominantly White (64.3%; 13.5% Hispanic or Latino; 8.2% Asian or Asian American; 5.6% Multi-Racial; 5.3% Black or African American; 1.2% Native Hawaiian or Other Pacific Islander; 1.0% other; 0.7% preferred to not disclose; and 0.2% American Indian or Alaska Native). Additional details about the participants can be found in Table 1.

Measures

Trait Boredom

Boredom susceptibility. Boredom susceptibility was measured with eight items from the Brief Sensation Seeking Scale (BSSS-8; Hoyle et al., 2002). Responses were on a 5-point Likert scale from 'strongly disagree' (1) to 'strongly agree' (5). High boredom susceptibility is associated with high sensation seeking in mundane situations (e.g., approach tendencies through risk taking and impulsive behaviors; Gray, 1972, 1981; Pickering & Corr, 2008) and is typically measured with a subscale of a commonly used sensation seeking scale (Zuckerman, 1994). An example prompt from the scale used to measure boredom susceptibility in the current study is "I get restless when I spend too much time at home." Internal consistency of the scale was good (α = 0.81), and the internal consistency is consistent with other scale applications among college students (Hoyle et al., 2002).

Boredom proneness. Boredom proneness was measured with 28 items from the Boredom Proneness Scale (BPS; Farmer & Sundberg, 1986). Responses were on a 5-point Likert scale from 'strongly disagree' (1) to 'strongly agree' (5). An example prompt from the scale is "I often find myself with nothing to do and time on my hands." The internal consistency reliability of the scale with Likert-scale options has been tested across multiple studies and samples and found to be good (α=0.79-0.91; Vodanovich & Watt, 2016; current study, α = 0.82).

Frequency of Substance Use

Past year substance use. Past year substance use was measured for cannabis, alcohol, and tobacco with the item "Within the last year how often have you used: Marijuana (pot, hash, edibles, vape); Alcohol (beer, wine, liquor); and Tobacco (smoke, chew, snuff, vape; Southern Illinois University, 2021). Response options included 'did not use', 'once per year', 'six times per year', 'once per month', 'twice per month', 'once per week', 'three times per week', 'five times per week', and 'every day'. For analyses, response options were dichotomized to 'did not use' (0) and 'did use' (1). The response options were dichotomized because the skewness and kurtosis values for the scales were between +/-1, demonstrating normality for past year substance use for cannabis (skewness = 0.78; kurtosis = -0.81) and alcohol (skewness = -0.66; kurtosis = -0.77), but not tobacco (skewness = 1.25; kurtosis = 0.15).

Past month substance use. Past month substance use was measured for cannabis, alcohol, and tobacco with the item "Within the past 30 days on how many days did you have: Marijuana (pot, hash, edibles, vape); Alcohol (beer, wine, liquor); and Tobacco (smoke, chew, snuff, vape; Southern Illinois University, 2021). Response options included '0 days', '1-2 days', '3-5 days', '6-9 days', '10-19 days', '20-29 days', and 'all 30 days'. For analyses, response options were dichotomized to 'did not use' (0) and 'did use' (1). The response options were dichotomized because the skewness and kurtosis values for the scales were not between +/-1, demonstrating a lack of normality for past month substance use for cannabis (skewness = 1.22; kurtosis = 0.06), alcohol (skewness = 0.25; kurtosis = -1.16), and tobacco (skewness = 1.84; kurtosis = 2.08).

Weekly substance use. To gain a better understanding of less than weekly versus greater than or equal to weekly substance use, a new variable was created for each substance (i.e., cannabis, alcohol, and tobacco) from the past year substance use variable. The 'did not use' students were treated as missing to allow for analysis of higher frequency use. The following response options: 'once per year', 'six times per year', 'once per month', and 'twice per month' were recoded as 'less than weekly use' (0), and the following response options: 'once per week', 'three times per week', 'five times per week', and 'every day' were recoded as 'greater than or equal to weekly use' (1). The literature does not have a single definition for what constitutes as regular and heavy substance use, but regular substance use usually follows a pattern of weekly or more frequent use of substances (i.e., cannabis, alcohol, and tobacco; Gabrys & Porath, 2019). Therefore, the "greater than or equal to weekly use" variable follows this pattern of regular substance use.

Data Analysis

Using IBM SPSS Statistics (Version 27), data were cleaned for coding errors, recoded reverse scored items, and evaluated for missingness. Scales were created for boredom susceptibility and boredom proneness. Both scatter plots and z scores were analyzed for outliers. The scatter plots were examined for boredom susceptibility and boredom proneness. There did not appear to be any data points falling far from the swarm, and the swarms appeared to be linear. To verify the scatter plots, the scales were standardized by creating *z* scores and examining the frequency distribution. There were no *z* scores greater than +/-3.29, demonstrating no outliers were present. The reliabilities of each scale were run and items decreasing reliability were evaluated for removal. Descriptives including frequencies, means, and correlations were analyzed for issues of multicollinearity, and no issues of multicollinearity were found. Bivariate correlations were examined for potential confounds and to check for issues of multicollinearity for boredom susceptibility and

boredom proneness, $r(414) = .19$, $p < .001$. Additional details about the frequencies and means can be found in Table 1. There were no concerns for potential confounds. The variables are related but not redundant.

Table 1. *Descriptive Statistics*

	M (*SD*)
Boredom susceptibility	3.46 (0.73)
Boredom proneness	3.14 (0.40)
Age	19.55 (1.48)
Cannabis use	% (*n*)
Yearly (Did use; 1)	57.49 (238)
Monthly (Did use; 1)	45.17 (187)
Weekly (Greater than or equal to weekly use; 1)	25.36 (105)
Alcohol use	
Yearly (Did use; 1)	85.02 (352)
Monthly (Did use; 1)	76.33 (316)
Weekly (Greater than or equal to weekly use; 1)	47.10 (195)
Tobacco use	
Yearly (Did use; 1)	41.55 (172)
Monthly (Did use; 1)	31.88 (132)
Weekly (Greater than or equal to weekly use; 1)	19.32 (80)
Sex	
Woman (1)	84.54 (350)
Man (0)	15.22 (63)
Prefer to not disclose (0)	0.24 (1)
Race/Ethnic Identity	
White (1)	64.25 (266)
Hispanic or Latino (0)	13.53 (56)
Asian or Asian American (0)	8.21 (34)
Multi-racial (0)	5.56 (23)
Back or African American (0)	5.31 (24)
Native Hawaiian or Other Pacific Islander (0)	1.21 (5)
Other (e.g., Arab, Basque, Filipino, Pakistani) (0)	0.97 (4)
Prefer not to disclose (0)	0.72 (3)
American Indian or Alaska Native (0)	0.24 (1)

Note. $N = 414$. Participants age range = 18 – 25.

Analyses were conducted using MPlus V.8.7 (Muthén & Muthén, 1998-2021), using the MLR estimator. Three multivariate logistic regressions were used to evaluate the associations between trait boredom (susceptibility and proneness) and frequency (past year, past 30 days, weekly use) of substance use (i.e., cannabis, alcohol, and tobacco) controlling for age, sex, and race. For analyses, sex was recoded to 'all else' (0) and 'female' (1). 'All else' included response options 'male' and 'prefer to not disclose.' In addition, race was recoded to 'all else' (0) and 'white' (1). 'All else' included response options 'Hispanic or Latino', 'Asian or Asian American', 'Black or African American', 'Native Hawaiian or Other Pacific Islander', 'American Indian or Alaska Native', 'multi-racial', 'other', and 'preferred to not disclose'. The first multivariate logistic regression to answer RQ1a used boredom susceptibility and boredom proneness to predict annual cannabis, alcohol, and tobacco use. The second multivariate logistic regression to answer RQ1b used boredom susceptibility and boredom proneness to predict monthly cannabis, alcohol, and tobacco use. The third multivariate logistic regression to answer RQ2 used boredom susceptibility and boredom proneness to predict less than weekly versus greater than or equal to weekly cannabis, alcohol, and tobacco use.

RESULTS

RQ1a – Trait Boredom and Annual Substance Use

A multivariate logistic regression was conducted using boredom susceptibility and boredom proneness to predict annual cannabis, alcohol, and tobacco use after controlling for age, sex, and race/ethnicity. Cannabis, alcohol, and tobacco accounted for the 16.10%, 29.60%, and 15.90% of the total variance in the model, respectively.

For annual cannabis use, boredom susceptibility (b = 0.97, p < .001) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 2.64 (95% CI = 1.93, 3.62), which indicates that for every 1-unit increase in boredom susceptibility, the odds of annual cannabis use increase by 2.64 times.

For annual alcohol use, boredom susceptibility (b = 1.30, p < .001) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 3.68 (95% CI = 2.36, 5.73), which indicates that for every 1-unit increase in boredom susceptibility, the odds of annual alcohol use increase by 3.68 times.

For annual tobacco use, boredom susceptibility (b = 0.89, p < .001) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 2.42 (95% CI = 1.74, 3.37), which indicates that for every 1-unit increase in boredom susceptibility, the odds of annual tobacco use increase by 2.42 times.

No significant association was observed between boredom proneness and the odds of annual substance use for cannabis, alcohol, and tobacco. In summary, boredom susceptibility was associated with greater annual use of cannabis, alcohol, and tobacco, while boredom proneness was not associated with annual substance use (see Table 2 for full results for RQ1a)

Table 2. *RQ1a – Multivariate Logistic Regression for Trait Boredom and Annual Substance Use*

Substance	Predictor	*b*	*p*	*OR*	95% CI
Cannabis	Boredom susceptibility	0.97	< .001	2.64	1.93, 3.62
	Boredom proneness	-0.18	.54	0.84	0.48, 1.47
	Age	0.19	.01	1.21	1.04, 1.41
	Race	0.09	.68	1.10	0.71, 1.71
	Sex	0.67	.03	1.95	1.06, 3.58
Alcohol	Boredom susceptibility	1.30	< .001	3.68	2.36, 5.73
	Boredom proneness	0.79	.06	2.21	0.97, 5.03
	Age	0.34	.01	1.41	1.09, 1.81
	Race	0.60	.06	1.82	0.99, 3.36
	Sex	1.10	.004	3.00	1.42, 6.35
Tobacco	Boredom susceptibility	0.89	< .001	2.42	1.74, 3.37
	Boredom proneness	-0.13	.63	0.88	0.52, 1.49
	Age	-0.02	.84	0.99	0.85, 1.14
	Race	0.83	< .001	2.29	1.44, 3.65
	Sex	-0.52	.09	0.60	0.33, 1.08

Note. The results are unstandardized effects. *OR* = Odds Ratio; CI = Confidence Interval

RQ1b– Trait Boredom and Monthly Substance Use

A second multivariate logistic regression was conducted using boredom susceptibility and boredom proneness to predict monthly cannabis, alcohol, and tobacco use after controlling for age, sex, and race/ethnicity. Cannabis, alcohol, and tobacco accounted for the 13.40%, 20.30%, and 11.60% of the total variance in the model, respectively.

For monthly cannabis use, boredom susceptibility (b = 0.82, p < .001) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 2.28 (95% CI = 1.70, 3.05), which indicates that for every 1-unit increase in boredom susceptibility, the odds of monthly cannabis use increase by 2.28 times.

For monthly alcohol use, boredom susceptibility (b = 1.01, p < .001) and boredom proneness (b = 0.74, p = .03) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 2.75 (95% CI = 1.89, 4.01), which indicates that for every 1-unit increase in boredom susceptibility, the odds of monthly alcohol use increase by 2.75 times. The odds ratio for boredom proneness was 2.09 (95% CI = 1.09, 4.02), which indicates that for every 1-unit increase in boredom proneness, the odds of monthly alcohol use increase by 2.09 times.

For monthly tobacco use, boredom susceptibility (b = 0.68, p < .001) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 1.97 (95% CI = 1.45, 2.68), which indicates that for every 1-unit increase in boredom susceptibility, the odds of monthly tobacco use increase by 1.97 times.

In summary, boredom susceptibility was associated with greater monthly use of cannabis, alcohol, and tobacco, while boredom proneness was only associated with greater monthly use of alcohol (see Table 3 for full results for RQ1b).

Table 3. *RQ1b – Multivariate Logistic Regression for Trait Boredom and Monthly Substance Use*

Substance	Predictor	*b*	*p*	*OR*	95% CI
Cannabis	Boredom susceptibility	0.82	< .001	2.28	1.70, 3.05
	Boredom proneness	-0.06	.83	0.95	0.56, 1.59
	Age	0.21	.01	1.23	1.07, 1.42
	Race	-0.16	.49	0.86	0.55, 1.33
	Sex	0.84	.01	2.32	1.24, 4.33
Alcohol	Boredom susceptibility	1.01	< .001	2.75	1.89, 4.01
	Boredom proneness	0.74	.03	2.09	1.09, 4.02
	Age	0.26	.01	1.29	1.07, 1.57
	Race	0.59	.02	1.81	1.10, 2.98
	Sex	0.55	.11	1.73	0.89, 3.34
Tobacco	Boredom susceptibility	0.68	< .001	1.97	1.45, 2.68
	Boredom proneness	-0.19	.48	0.83	0.49, 1.40
	Age	0.05	.49	1.05	0.91, 1.22
	Race	0.83	.001	2.30	1.40, 3.78
	Sex	-0.26	.42	0.77	0.41, 1.44

Note. The results are unstandardized effects. *OR* = Odds Ratio; CI = Confidence Interval

RQ2 – Trait Boredom and Less Than Weekly Versus Greater Than or Equal to Weekly Substance Use

A third multivariate logistic regression was conducted using boredom susceptibility and boredom proneness to predict less than weekly versus greater than or equal to weekly cannabis, alcohol, and tobacco use after controlling for age, sex, and race/ethnicity. Cannabis, alcohol, and tobacco accounted for the 7.50%, 13.00%, and 9.40% of the total variance in the model, respectively.

For less than weekly versus greater than or equal to weekly cannabis use, boredom susceptibility (b = 0.47, p = .03) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 1.59 (95% CI = 1.49, 3.07), which indicates that for every 1-unit increase in boredom susceptibility, the odds of weekly cannabis use increase by 1.59 times.

For less than weekly versus greater than or equal to weekly alcohol use, boredom susceptibility (b = 0.76, p < .001) predicted a significant proportion of unique variance. The odds ratio for boredom susceptibility was 2.14 (95% CI = 1.49, 3.07), which indicates that for every 1-unit increase in boredom susceptibility, the odds of weekly alcohol use increase by 2.14 times.

For less than weekly versus greater than or equal to weekly tobacco use, boredom susceptibility (b = 0.47, p = .06) did not predict a significant proportion of unique variance. No significant association was observed between boredom susceptibility and the odds of less than weekly versus greater than or equal to weekly substance use for tobacco. In addition, no significant association was observed between boredom proneness and the odds of less-than-weekly versus greater-than- or equal-to-weekly substance use for cannabis, alcohol, and tobacco.

In summary, boredom susceptibility is associated with greater weekly use of cannabis and alcohol, while there were no associations for weekly substance use for boredom proneness (see Table 4 for full results for RQ2). Post-hoc analyses were conducted using the two-item boredom susceptibility sub-scale of the BSSS-8 (M = 2.55, Range = 2.39 - 2.72, s^2 = .06; Hoyle et al., 2002) to measure boredom susceptibility. Overall results remain the same for RQ1a, RQ1b, and RQ2 and can be found in the supplementary tables.

Table 4. *RQ2 – Multivariate Logistic Regression for Trait Boredom and Less Than Weekly Versus Greater Than or Equal to Weekly Substance Use*

Substance	Predictor	*b*	*p*	*OR*	95% CI
Cannabis	Boredom susceptibility	0.47	.03	1.59	1.04, 2.45
	Boredom proneness	-0.46	.19	0.63	0.32, 1.26
	Age	0.23	.02	1.26	1.04, 1.53
	Race	0.09	.76	1.09	0.62, 1.92
	Sex	-0.24	.56	0.79	0.36, 1.75
Alcohol	Boredom susceptibility	0.76	< .001	2.14	1.49, 3.07
	Boredom proneness	-0.23	.43	0.80	0.45, 1.40
	Age	0.07	.39	1.07	0.92, 1.25
	Race	0.83	.001	2.29	1.41, 3.73
	Sex	-0.75	.04	0.47	0.23, 0.97
Tobacco	Boredom susceptibility	0.47	.06	1.61	0.98, 2.61
	Boredom proneness	-0.80	.07	0.45	0.19, 1.08
	Age	0.22	.07	1.24	0.99, 1.57
	Race	0.37	.31	1.45	0.71, 2.97
	Sex	-0.002	1.00	1.00	0.42, 2.36

Note. The results are unstandardized effects. *OR* = Odds Ratio; CI = Confidence Interval

DISCUSSION

Although boredom is a normative experience among college students, understanding of the association between boredom susceptibility and proneness and the frequency of cannabis, alcohol, and tobacco use is limited. Regarding substance use, our findings align with prior research finding boredom susceptibility is associated with alcohol (Kılıç et al., 2019; Mercer-Lynn et al., 2011) and tobacco use (Martínez-Vispo et al., 2019), and boredom proneness with alcohol use (Biolcati et al., 2016). The present study expands on this work by providing insights into how boredom susceptibility and proneness are associated with the frequency of cannabis, alcohol, and tobacco use. Looking across levels of frequency, findings suggest boredom susceptibility is associated with annual and monthly use of cannabis, alcohol, and tobacco, as well as weekly use of cannabis and alcohol, but not tobacco. This suggests a different process at play for weekly tobacco users and points to differing motives based on frequency of substance use and substance class. In contrast, boredom proneness was only associated with monthly alcohol use. In addition, we controlled for age, race, and sex for each multivariate logistic regression, and there was not a consistent trend. For yearly substance use, age and sex were significant for cannabis and alcohol use, while race was significant for tobacco use. For monthly substance use, age and sex were significant for cannabis, age and race were significant for alcohol use, and race was significant for tobacco use. For weekly substance use, age was significant for cannabis, and race and sex were significant for

alcohol use. There is not a grounding in empirical or theoretical literature to support looking at boredom and race/ethnicity differences. The findings for boredom and sex are mixed. Data from the United States and other countries (e.g., Australia, Hong Kong, Lebanon) find male college students report higher levels of boredom than their female counterparts (Sundberg et al., 1991; Vodanovich & Kass, 1990). However, other studies have found no sex differences (Hickerson & Beggs, 2007).

The association of avoidance and approach regulatory processes (i.e., different motivational systems involved in self-regulation) with boredom proneness and susceptibility provides a deeper understanding of frequency of substance use (Cornwell et al., 2014). Individuals high in boredom proneness may engage in monthly use of alcohol to withdraw from their current environment. Conversely, individuals high in boredom susceptibility are likely responding by engaging in sensation seeking desiring stimulation and novelty through engagement in risky behaviors to alleviate feelings of boredom. This may be why there is greater annual and monthly use of cannabis, alcohol, and tobacco, and especially greater weekly use of cannabis and alcohol. This greater frequency may be an attempt to bring such stimulation. Individuals high in boredom susceptibility often experience high sensation seeking in mundane situations, and engage in substance use as a way cope with the boredom.

The findings were consistent across types of substances and frequency of use. College students high in boredom susceptibility often respond by engaging in sensation seeking, because, theoretically, they desire stimulation to escape the boring situation which means they may use maladaptive boredom coping mechanisms (e.g., risky or harmful behaviors; Bieleke et al., 2022). From a prevention perspective, this suggests college students higher in boredom susceptibility compared to those high in boredom proneness may need more support to alleviate the unpleasant emotion of boredom and subsequent maladaptive coping mechanisms such as substance abuse.

Researchers have called for interventions to address boredom, including clinical interventions to treat boredom proneness (Gerritsen et al., 2014) and associated methods to better identify and support effective boredom coping (Vogel-Walcutt et al., 2012). These findings provide guidance in terms of moving prevention efforts forward in terms of what type of student to target and types of information or activities that might be successful. The results of this study show that there are different risks of substance use associated with boredom susceptibility compared to boredom proneness, which combined with our understanding of the different motivational systems involved in each type of trait boredom, suggests that the same intervention may not be effective.

In other efforts, environmental campaigns targeting boredom to reduce college drinking have been released (e.g., Washington State Health Care Authority, 2020). This demonstrates an interest from university administrators in including boredom as a broader health promotion and life skill building approach to address substance use in college students. The findings from the current study point to the importance of college campuses in providing students with opportunities for positive risk taking (e.g., promotion of social activities with peers, rock climbing; Dworkin, 2005) to provide better outcomes for college students higher in boredom susceptibility.

Limitations

This study has contributed to understanding the association of boredom susceptibility and proneness with frequency of cannabis, alcohol, and tobacco use, however, there are several limitations to consider when interpreting these results. First, the measures are self-reported and cross-sectional. Therefore, the data are vulnerable to issues of inherent bias, content validity, and sensitivity. Second, our sample consists largely of female college aged students. The associations between trait boredom and substance use may differ for a college-attending men, and for college-age non-students. Future research should diversify the sample to increase generalizability of these findings.

Boredom susceptibility is measured using the BSSS-8 (Hoyle et al., 2002). The full BSSS-8 measures the four primary dimensions of sensation seeking, which includes experience seeking, boredom susceptibility, thrill and

adventure seeking, and disinhibition. Three of the four dimensions of sensation seeking are not the constructs of interest. Therefore, this could lead to concerns of content validity. Despite this, high boredom susceptibility is associated with high sensation seeking in mundane situations (e.g., approach tendencies through risk taking and impulsive behaviors; Gray, 1972, 1981; Pickering & Corr, 2008). Therefore, we believed this measure was suitable for the current study. In addition, the same analyses were examined using the two-item boredom susceptibility sub-scale of the BSSS-8 and similar results were found.

An alternative measure of boredom susceptibility within the Boredom Coping Survey is the Sensation Seeking Scale Form V – Boredom Susceptibility Sub-Scale (BSS; Zuckerman, 1994). BSS consists of 10 items assessed using a forced choice format. The reliability of this scale has been found to be low in other studies (see Gerritsen et al., 2014; Perone et al., 2019; Vodanovich & Watt, 2016). A possible next step would be to find a more reliable measure of boredom susceptibility (e.g., converting BSS from a forced choice scale to a Likert scale using exploratory factor analysis and confirmatory factor analysis).

Conclusion and Future Directions

In conclusion, the current study provides insights into how trait boredom in college students is associated with frequency of substance use and type of substance. The two types of trait boredom operate differently with the frequency of use and type of substance. Findings were generally consistent across frequency of use and types of substances for boredom susceptibility, indicating college students higher in boredom susceptibility, rather than proneness, are a subgroup to target prevention interventions to alleviate boredom to address substance use. The focus of the current study was on trait boredom and substance use. Our assumption is that individuals high in boredom susceptibility also report more substance use because they are reaching for substances to cope with boredom in the moment. One opportunity for future research to probe this assumption is to examine substance use in relation to state boredom using behavioral studies which induce boredom or ecological momentary assessments which would allow for states of boredom and subsequent coping to be caught in real time. Another opportunity for future research is to assess the associations between mental health measures and trait boredom. Prior research has found boredom to be a distinct negative emotion from depression (Goldberg et al., 2011). A future study could look at profiles of boredom (see the Meaning and Attentional Components (MAC) model; Westgate & Wilson, 2018) driven by causes and the connection between depression and meaningless boredom. With the negative consequences connected to boredom and the increases seen in boredom seen in adolescents (i.e., future emerging adults; Weybright et al., 2020), there is an opportunity for prevention science interventions for college students targeting boredom susceptibility to address substance use. Future research should evaluate boredom coping mechanisms as intervention components to address boredom susceptibility for substance use prevention.

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