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Willingness as a Mediator of the Effects of Personality on Alcohol-Related Consequences between the First and Second Years of College: A Longitudinal Prospective Study

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Abstract

The present study used a prospective longitudinal design to examine whether willingness to experience negative alcohol-related consequences mediated the effects of personality on consequences (e.g., blacking out, getting into a fight, and regretted sex). Students ($N = 2024$) were assessed at three time points: fall semester of the students' first year in college (baseline), 6-months post-baseline, and one-year post-baseline. Personality constructs were assessed at baseline (i.e., impulsivity, sensation seeking, self-regulation), willingness to experience negative alcohol-related consequences and negative alcohol-related consequences were examined at baseline and one-year post-baseline. A structural path model was used to examine if willingness mediated the effects of personality on consequences. Covariates assessing baseline drinking and consequences were also included in the model. Results demonstrated willingness to experience consequences significantly mediated the effects of impulsivity, sensation seeking, and self-regulation on consequences. Findings from this study support the idea that consequence-specific cognitions, such as willingness, can explain changes in consequences associated with personality. This suggests that intervention efforts aimed at reducing negative alcohol-related consequences could benefit from the inclusion of consequence-specific cognitions, personality (e.g., impulsivity, sensation seeking, and self-regulation), and drinking.

Keywords

alcohol-related consequences; willingness; impulsivity; sensation seeking; self-regulation

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1. Introduction

Alcohol-related consequences are a major health hazard on college campuses (Barnett et al., 2014; Hingson, Zha, & Smyth, 2017; Hingson, Zha, & White, 2017; Jackson & Sher, 2008). Negative consequences that can result from heavy drinking include academic and social problems (missing class or work, having a regretted sexual experience, and starting a fight), accidental injuries, and death (American College Health Association [ACHA], 2014; Hingson, Zha, & Weitzman, 2009). Alcohol consumption is the most reliable predictor of consequences, yet tends to only account for ~50% of the variance in total consequences (Larimer, Turner, Mallett, & Geisner, 2004; Mallett, Varvil-Weld, Turrise, & Read, 2011; Turner, Larimer, & Sarason, 2000). To inform interventions and improve their efficacy at reducing consequences, researchers have examined constructs other than drinking that predict consequences. Both personality characteristics, such as impulsivity, sensation seeking, and self-regulation (e.g., Hustad, Carey, Carey, & Maisto, 2009; White & Jackson, 2005; Wills, Pokhrel, Morehouse, & Fenster, 2011) and cognitions, such as willingness to experience consequences (Mallett et al., 2015; Mallett, et al., 2011), are associated with experiencing consequences. Previous research has examined the associations between consequences and these personality and cognitive constructs separately. However, theories related to behavioral decision-making (e.g., prototype-willingness model) and past empirical research suggest these constructs may work together to predict alcohol-related consequences (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gibbons, Gerrard, Reimer, & Pomery, 2006). Further investigation is therefore warranted.

1.1. Personality: Impulsivity, Sensation Seeking and Self-regulation

The direct effects of behavioral disinhibition (e.g., impulsivity, sensation seeking) and inhibition (e.g., self-regulation) on consequences are well-documented in the literature (e.g., Hustad et al., 2009; White & Jackson, 2005; Wills et al., 2011). Findings suggest higher levels of impulsivity and sensation seeking, and lower levels of self-regulation, are associated with a greater number of alcohol-related consequences. Although personality traits, such as sensation seeking, tend to be reliably associated with consequences (see Baer, 2002, for a review), interventions targeting personality traits have not been shown to reliably reduce consequences for individuals that score above average on the specified trait (e.g., Conrod, Stewart, Comeau, & Maclean, 2006; Lammers et al., 2017; Stewart et al., 2005). Furthermore, the mechanisms through which the aforementioned personality traits might influence consequences are not entirely clear. The present study addresses this gap in the literature by examining a potential cognitive mediator of the association between the aforementioned personality traits and negative alcohol-related consequences.

1.2. Cognitive Constructs

Previous research suggests that cognitive constructs that mediate the effects of personality might serve as a viable target in brief interventions (e.g., Turrise, Jaccard, & McDonnell, 1997). *Willingness* is one cognitive construct that could help explain the effects of personality on alcohol-related consequences. According to the prototype-willingness model, (behavioral) willingness is a proximal cognitive antecedent of *social reactivity* (i.e.,

unplanned or spontaneous decision making to participate in risky behavior in response to environmental circumstances; see Gerrard et al., 2008, for a review). This type of unplanned or spontaneous decision making that occurs in response to environmental stimuli reflects behavior typical of individuals who are high on impulsivity and sensation seeking, and low on self-regulation. Evidence for these associations stem from work by Gibbons and colleagues. Findings from their research revealed that individuals who lacked self-control (more impulsive) were more willing to engage in substance use behaviors (Gibbons, et al., 2006). Further, they observed that individuals who showed higher self-regulation were less willing to engage in substance use behaviors. Taken together, Gibbons and colleagues' findings provide evidence that willingness constructs might serve as cognitive proxies for personality.

Measures of willingness (e.g., willingness to drink) typically assess specific behaviors (e.g., drinking) considered risky because they are associated with harmful outcomes (e.g., arrested for driving under the influence; alcohol poisoning). Research has shown that for adolescents and emerging adults, behavioral willingness reliably predicts a variety of risk behaviors such as substance use, neglecting to use condoms, and riding with a drinking driver (Brown & Eisenberg, 1995; Gerrard, Gibbons, & Gano, 2003; Hultgren, Scaglione, Cleveland, & Turrisi, 2015; Zabin, 1994). In relation to alcohol use, willingness to drink has been shown to be associated with both riskier drinking and negative alcohol-related consequences (e.g., Gerrard et al., 2002; Lewis, King, Litt, Swanson & Lee, 2016; Litt et al., 2014). However, because drinking only accounts for approximately half of the variance in negative alcohol-related consequences (Larimer et al., 2004; Mallett et al., 2011; Turner et al., 2000), consequence-specific predictors, such as willingness to experience consequences, are needed to address this gap (Mallett et al., 2015; Mallett et al., 2011).

Willingness to experience negative alcohol-related consequences can be considered a derivative of the willingness construct traditionally used in association with drinking outcomes (i.e., willingness to drink; e.g., Gerrard et al., 2002; Litt et al., 2014). This measure assesses the degree to which a person is open to experiencing a negative outcome if they were to drink (Mallett et al., 2011). As such, this measure can be interpreted as the level of risk/harm an individual is willing to take/experience when they drink. Previous research has demonstrated that willingness to experience negative alcohol-related consequences can predict consequences independent of alcohol use (Mallett et al., 2015; Mallett et al., 2011). This suggests that there could be an added benefit to using the consequence-specific measure over a drinking-specific measure when examining consequences.

1.3. The Current Study

Research described thus far suggests that willingness measures that specifically address negative alcohol-related consequences may mediate the effects of personality on consequences. To examine this, the present study used a longitudinal design to examine willingness to experience negative alcohol-related consequences as a mediator of the effects of impulsivity, sensation seeking, and self-regulation on alcohol-related consequences between the first and second years of college. Based on the work described in Gibbons et al. (2006; also see Gerrard et al., 2008), we hypothesized:

Hypothesis 1: Higher impulsivity will predict increases in willingness, which in turn will predict increases in consequences.

Hypothesis 2: Higher sensation seeking will predict increases in willingness, which in turn will predict increases in consequences.

Hypothesis 3: Higher self-regulation will predict decreases in willingness, which in turn will predict decreases in consequences.

2. Materials and Methods

2.1. Recruitment Procedures and Participant Retention

The current study took place at a large public university in the northeastern United States. During fall semester, 4,000 first-year college students were randomly selected from the university registrar's database to complete the baseline questionnaire (October of first year; T1). A total of 2,690 (67.3%) participants completed the questionnaire, and 2,024 (75.2%) of those who completed met inclusion criteria (i.e., first-year students, 18 to 19 years old, reported drinking in the month prior to baseline). Eligible participants were then invited to complete a 6-month (April of first year; T2), and 1-year (October of second year; T3) follow-up. Surveys were timed to avoid overlap with exams in order to reflect typical drinking patterns. Participants received \$25 for completing the T1 and T2 surveys, and \$30 for completing the T3 survey. Participants received an additional \$5 (per survey) if they completed each survey within 5 days of receipt. All procedures were approved by the university's institutional review board.

The number of students who completed both T1 and T2 (92.2%), and both T1 and T3 (87.6%) surveys was considerably high. There were small but significant positive effects for missing (vs. not missing) at T3 on baseline drinking (typical weekly drinking, $r = .09$, $p < .01$; frequency drunk, $r = .05$, $p = .02$) and consequences ($r = .08$, $p < .01$).

2.2. Participants

The average age of participants at T1 was 18.18 ($SD = 0.39$) years. A majority identified as female (56.0%) and White (87.4%). Minority individuals were represented in the sample (Hispanic, 5.1%; Asian, 4.7%; African American, 3.3%; multiracial, 2.9%). Approximately 16% indicated current or planned membership in a fraternity or sorority, and 40.7% indicated participating in athletics (i.e., intramural, club, or varsity-level).

2.3. Measures

Consequences were assessed at T1 and T3, willingness to experience consequences was assessed at T1 and T2, and personality (impulsivity, sensation seeking, and self-regulation) and drinking behaviors were assessed at T1. All measures were first examined for outliers (skew > 2 and kurtosis > 5) and then adjusted in accordance with procedures described in Tabachnick and Fidell (1996). Measures that were adjusted for outliers are indicated below. Means (M), standard deviations (SD), and reliabilities (α) for each of the measures are indicated in Table 1.

2.3.1. Negative consequences (assessed at T1 and T3)—Twelve items from the Brief Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler, Strong, & Read, 2005) and the Young Adult Alcohol Problems Screening Test (YAAPST; Hurlbut & Sher, 1992; Larimer, Lydum, Anderson, & Turner, 1999) were assessed at each time point. Items examined physiological (*vomiting; having a hangover; blacking out; passing out*), academic (*having academic work suffer because of drinking; missing/skipping class*), sexual (*making inappropriate sexual advances toward someone after drinking; being pressured or forced to have sex with someone while drinking; regretted sexual situations because of drinking*), and social (*starting a serious argument or fight with someone; becoming rude, obnoxious, or insulting after drinking; experiencing problems between oneself and a significant other or relatives because of drinking*) consequences of drinking (see Mallett et al., 2015). Students were asked to report the number of times they experienced each consequence on a 9-point Likert scale ranging from *never* (0) to *40 or more times* (8). Items were summed within each wave to create baseline ($\alpha = .87$) and T3 follow-up ($\alpha = .88$) measures of overall consequences. Outlier adjustment was applied to the baseline and follow-up measures.

2.3.2. Willingness to experience consequences (assessed at T1 and T2)—Participants were asked to report their willingness to experience each of the 12 consequences over the next few months (e.g., vomiting, starting a serious argument or fight with someone). The exact wording of an item from the scale was as follows: *I am willing to experience “blacking out” as a result of my drinking* (see Mallett et al., 2015). For the remaining items, each of the consequences was substituted for “blacking out”. Response options were *strongly disagree, moderately disagree, slightly disagree, neither agree nor disagree, slightly agree, moderately agree, strongly agree*. Items were averaged within each time point to create composite scores for willingness to experience consequences at baseline ($\alpha = .90$) and at T2 follow-up ($\alpha = .92$).

2.3.3. Personality constructs (assessed at T1)

2.3.3.1. Impulsivity and sensation seeking: Four items were taken from a modified version of Zuckerman’s (1994, 1996) sensation seeking scale (see Mastroleo, Scaglione, Turrisi, & Mallett, 2013) to assess sensation seeking (i.e., *I like wild and uninhibited parties; I generally seek new and exciting experiences and sensations*) and impulsivity (i.e., *I am an impulsive person; I often get into trouble because I do things without thinking*). Response options ranged from *strongly disagree* (−2) to *strongly agree* (2). Items were averaged within each scale to create separate composite scores for sensation seeking ($\alpha = .65$) and impulsivity ($\alpha = .74$).

2.3.3.2. Self-regulation: Participants were asked to answer 6 items from the Shortened Self-Regulation Questionnaire (SSRQ; Brown, Miller, & Lawendowski, 1999; Carey, Neal, & Collins, 2004). These six items were: *Once I have a goal, I can usually plan on how to reach it; I set goals for myself and keep track of my progress; I learn from my mistakes; I can usually find several different possibilities when I want to change something; I get easily distracted from my plans; and I have trouble making up my mind about things* ($\alpha = .63$). Response options ranged from *strongly disagree* (−2) to *strongly agree* (2). The scale’s

reliability was improved after dropping the items *I get easily distracted from my plans* and *I have trouble making up my mind about things* ($\alpha = .80$). The four remaining items were averaged to produce a composite score for self-regulation.

2.3.4. Drinking behaviors—A latent variable was created to capture “typical” and “heavy” drinking (see Mallett et al., 2015). For typical drinking, participants reported the typical number of drinks they consumed on each day of the week during the current semester (Daily Drinking Questionnaire, DDQ; Collins, Parks, & Marlatt, 1985). Responses were summed to indicate the number of drinks typically consumed each week ($\alpha = .73$). DDQ was adjusted for outliers.

To assess heavy drinking, participants reported the number of times they were drunk/very high from alcohol in the past 30 days (Dimeff, Baer, Kivlahan, & Marlatt, 1999). Response options ranged from *never* (0) to *nine or more* (5). The modal response was 1–2 times.

2.4. Analytic Strategy

Zero-order correlations were used to examine associations between predictors, mediators, covariates, and consequences (see Table 1).

Missingness was addressed using full information maximum likelihood (FIML) estimation in Mplus (version 8; Muthén & Muthén, 2017).

A structural path model was conducted in Mplus (version 8; Muthén & Muthén, 2017) to examine if T2 willingness to experience consequences mediated the effects of T1 personality (impulsivity, sensation seeking, and self-regulation; predictors) on T3 consequences (outcome), controlling for baseline covariates (T1 willingness, drinking, and consequences). In the model, consequences were regressed onto the mediator (β path), predictors, and baseline covariates (c paths); and the mediator was regressed onto the personality predictors and baseline covariates (α paths). All predictors were correlated in the model. An overview of the model is provided in Figure 1.

Significant mediation effects were determined using the test of joint significance (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). According to MacKinnon and colleagues (2002), statistically significant results ($p < .05$) for both α and β paths suggest significant mediation effects. Mediated effects are the product of the α and β values ($\alpha\beta$), which can be interpreted as the estimated strength of the mediated effects.

Because there was evidence of non-normality for drinking and consequences, the model was estimated using bootstrapped samples ($N = 2000$). Effects were determined to be significant at $p < .05$ if the asymmetrical 95% confidence intervals (CIs) did not contain zero.

3. Results

3.1. Correlations between Predictors and Outcomes

Pearson correlations between the predictors and consequences are listed in Table 1. All three personality predictors and willingness to experience consequences were significantly

correlated with each other and with consequences at baseline and follow-up (all $ps < .05$). All of the correlations examined were in the expected direction. For example, the associations between willingness to experience consequences, sensation seeking, and impulsivity were positive.

3.1.1. Mediated effects—As a first step in the examination of the mediated effects, we examined the direct effects of the personality predictors and baseline covariates on T3 consequences (controlling for all other variables; see Figure 2). Results revealed that sensation seeking was significantly positively associated with increases in negative alcohol-related consequences from T1 to T3. Finally, the covariates, baseline drinking and consequences were significantly positively associated with consequences at T3.

Using the joint significance approach to determine mediation, willingness to experience consequences at T2 was observed to mediate the effects of T1 impulsivity, sensation seeking, and self-regulation on consequences at T3 (see Table 2 and also Figure 2). Specifically, students who scored higher on sensation seeking at baseline increased willingness to experience consequences at T2, which in turn increased the number of overall consequences reported at T3. The same pattern of mediation was observed for impulsivity (increased willingness at T2 and increased consequences at T3). In contrast, an opposite pattern was observed for self-regulation: students who scored higher on self-regulation at baseline reported decreases in willingness to experience consequences at T2, which in turn decreased consequences at T3.

4. Discussion

College student alcohol-related consequences are a major health problem (e.g., Barnett et al., 2014; Hingson, Zha, & Smyth, 2017; Hingson, Zha, & White, 2017). The majority of college-based alcohol interventions target constructs that are directly related to risky drinking with the assumption that consequences are being targeted as well (e.g., social norms and drinking motives; see Carey, Scott-Sheldon, Carey & DeMartini, 2007; Carey, Scott-Sheldon, Elliott, Garey & Carey, 2012; Crounse & Larimer, 2011). However, risky drinking by itself only accounts for approximately half of the variance in consequences (Larimer et al., 2004; Mallett, et al., 2011; Turner et al., 2000). The present study adopted a novel approach and examined consequence-specific constructs that directly influence alcohol-related consequences controlling for drinking. We examined willingness to experience negative alcohol-related consequences as a mediator of the effects of personality on negative alcohol-related consequences. Research has shown behavioral willingness is positively associated with substance use risk behaviors (e.g., riding with a drinking driver; Hultgren et al., 2015). Willingness to experience negative alcohol-related consequences can be considered a derivative of traditional willingness drinking measures and assesses the degree to which a person is open to experiencing a negative outcome if they were to drink (Mallett et al., 2011). We hypothesized that higher impulsivity and sensation seeking would predict increases in willingness to experience consequences, which in turn would predict increases in consequences. We also hypothesized higher self-regulation would predict decreases in willingness to experience consequences, which in turn would predict decreases in consequences. Our findings revealed support for all of our hypotheses. Previous

examinations of willingness to experience consequences have focused primarily on consequence-specific cognitions as a predictor of consequences (Mallett et al., 2015; Mallett et al., 2011). The present study extends those findings by providing insight into some of the factors that could influence willingness (e.g., impulsivity, sensation seeking, and self-regulation).

4.1. Implications

Larimer and Crounce's review of college alcohol interventions (2007) noted that interventions tend to be consistent in modifying drinking, but less so in reducing consequences. College drinking interventions tend to primarily focus on modifying risky drinking (e.g., Carey et al., 2007; Carey et al., 2012; Crounce & Larimer, 2011). The results of the current study suggest potential benefits of targeting consequence-specific predictors, such as willingness to experience alcohol-related consequences, and personality constructs that directly influence these cognitive constructs (e.g., impulsivity, sensation seeking, self-regulation). The effects of willingness to experience consequences was observed to influence consequences when controlling for drinking. This suggests that specifically targeting willingness to experience consequences in interventions may improve effect sizes. One plausible way to do this would be to target high-risk personality traits (e.g., impulsivity and sensation seeking) with willingness. Further, by targeting known antecedents of willingness, such as perceived favorability towards a prototypical individual (e.g., Brody et al., 2004; Gibbons, Gerrard, Lane, Mahler, & Kulik, 2005), intervention effects may be even stronger on consequences.

4.2. Limitations and Future Directions

First, the campus from which students were sampled was homogeneous with respect to ethnicity and race. Additional research is needed to determine if these effects generalize to more diverse samples. Second, we used abbreviated versions of existing measures to examine impulsivity, sensation seeking, and self-regulation. As is the case with large studies involving multiple aims, there is tremendous competition to include more constructs. Long measures create respondent burden and necessitate the use of abbreviated versions. Although there does not appear to be any reason to suspect that the findings observed in the current study were due to the modifications, we provide some caution regarding our findings given the abbreviated versions. Last, the range of years examined in the current study was limited to the first two years of college and future studies are needed to understand these influences beyond the second year of college.

4.3. Conclusions

In sum, the present study offers valuable insight into the nature of a less studied consequence-specific cognition: willingness to experience consequences. Results from this study provide the first evidence that willingness to experience consequences can mediate the effects of personality on consequences. These findings suggest the efficacy of intervention efforts aimed at reducing consequences may improve if cognitive and personality constructs are also addressed.

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Highlights

- Higher *self-regulation* predicted lower *willingness to experience consequences*
- *Impulsivity* and *sensation seeking* were positively associated with willingness.
- Willingness was negatively associated with *alcohol-related consequences*.
- Willingness mediated the effects of all three personality constructs on consequences.

Figure 1.

Model depicting the effects of T1 predictors (impulsivity sensation, seeking, self-regulation) and covariates (willingness to experience consequences, total consequences, drinking behavior) on T2 willingness to experience consequences (paths α^{1-6}) and T3 total consequences (c^{1-6}), and the effect of T2 willingness on T3 consequences (β^1). Correlations between baseline predictors and covariates were included in the model (dotted lines).

Figure 2.

Model illustrating significant ($p < .05$; solid lines) and non-significant ($p > .05$; dashed lines) effects of T1 personality predictors and covariates on T2 willingness to experience consequences and T3 total consequences, as well as the effects of T2 willingness on T3 consequences. Unstandardized betas and standard errors (in parentheses) are provided for each path; not depicted but included in the model are the correlations between baseline predictors and covariates.

Table 1

Descriptive statistics and zero-order correlations between predictors/covariates and consequence subtypes

	1.	2.	3.	4.	5.	6.	7.	8.	9.	<i>M</i>	<i>SD</i>	<i>α</i>
1. Self-regulation (T1)	----	----	----	----	----	----	----	----	----	1.13	0.66	.80
2. Sensation Seeking (T1)	.08	----	----	----	----	----	----	----	----	1.19	0.99	.65
3. Impulsivity (T1)	-.13	.47	----	----	----	----	----	----	----	-0.60	1.00	.74
4. Daily Drinking Questionnaire (T1)	-.15	.38	.31	----	----	----	----	----	----	10.84	8.66	.73
5. Frequency of Drunkenness (T1)	-.13	.36	.27	.73	----	----	----	----	----	2.22	1.53	----
6. Willingness to Experience Consequences (T1)	-.27	.27	.24	.43	.37	----	----	----	----	-27.65	9.73	.90
7. Willingness to Experience Consequences (T2)	-.26	.27	.29	.40	.36	.51	----	----	----	-26.30	10.59	.92
8. Consequences (T1)	-.25	.31	.34	.60	.58	.47	.34	----	----	6.94	7.96	.87
9. Consequences (T3)	-.18	.32	.29	.46	.47	.38	.40	.57	----	7.14	8.03	.88

Note. All correlations were significant at $p < .05$; *M* = mean; *SD* = standard deviation; *α* = Cronbach's alpha.

Table 2

The direct and indirect effects related to the study hypotheses.

Predictors	Personality on willingness (α paths)		Willingness on consequences (β path)		Mediated effect ($\alpha\beta$)	
	<i>b</i> (<i>SE</i>)	95% CIs	<i>b</i> (<i>SE</i>)	95% CIs	<i>b</i> (<i>SE</i>)	95% CIs
Self-regulation (α^1)	−2.11 (0.45)	[−2.99, −1.22]*	0.13 (0.02)	[0.08, 0.17]*	−0.27 (0.07)	[−0.41, −0.12]*
Sensation Seeking (α^2)	0.58 (0.26)	[0.07, 1.08]*	0.13 (0.02)	[0.08, 0.18]*	0.08 (0.04)	[0.001, 0.15]*
Impulsivity (α^3)	1.12 (0.28)	[0.56, 1.65]*	0.13 (0.02)	[0.08, 0.18]*	0.15 (0.04)	[0.05, 0.22]*

Note. unstandardized betas (*b*); standard errors (*SE*); confidence intervals (CIs); effect is significant at $p < .05$ if CIs does not include zero (*).