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Endorsement of the “Firewater Myth” Affects the Use of Protective Behavioral Strategies among American Indian and Alaska Native Students

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Abstract

Belief in an American Indian/Alaska Native (AI/AN) specific biological vulnerability (BV) to alcohol problems (aka the “*firewater myth*”) has been found to be associated with worse alcohol outcomes among AI/AN college students who drink, despite also being associated with greater attempts to reduce drinking. In the current study, we examined the associations of belief in a BV and belief that AI/AN people have more alcohol problems with the use of alcohol protective behavioral strategies (PBS) among AI/AN college students. PBS examined, as measured by the Protective Behavioral Strategies Scale-20, included manner of drinking, limiting/stopping drinking, and serious harm reduction strategies. Participants were college students who identified being AI/AN ($n=137$) and had drunk in the past month, and were selected from a larger multi-site study on PBS. Mediation models revealed that greater belief in a BV and belief that AI/AN people have more alcohol problems were both negatively associated with manner of drinking, which in turn was associated with greater past month alcohol use and alcohol consequences. These beliefs were not significantly associated with other PBS. Consistent with prior research with other student

populations, both manner of drinking and limiting/stopping drinking were associated with less alcohol use and all three domains of PBS were directly associated with fewer alcohol consequences. The results suggest that these beliefs regarding AI/AN people and alcohol negatively affect the use of strategies aimed at avoiding drinking behavior that can lead to rapid drinking and a higher blood alcohol content, contributing to alcohol consequences.

Keywords

American Indian; Alaska Native; alcohol; stereotype; protective behavioral strategies

1. Introduction

College students have high rates of heavy drinking and serious alcohol consequences (Courtney & Polich, 2009; Hingson, Zha, & Weitzma, 2009; Knight et al., 2002; White & Hingson, 2013). One means of reducing alcohol use and consequences among college drinkers is the use of alcohol protective behavioral strategies (PBS) to reduce alcohol consumption and intoxication as well as the negative consequences associated with drinking (Pearson, 2013). Three empirically derived domains of PBS that are widely examined in the literature include limiting/stopping drinking, manner of drinking, and serious harm reduction (see Pearson, 2013 for an extensive review). *Limiting/stopping drinking* involves limiting alcohol intake during a drinking session and/or limiting the drinking session (e.g., setting a drinking limit or stopping at a pre-determined time). *Manner of drinking* involves avoiding drinking behavior that is likely to lead to a higher blood alcohol content (e.g., not gulping or chugging, not trying to keep pace with other drinkers). *Serious harm reduction* involves the use of strategies to avoid serious alcohol-related harm (e.g., using a designated driver, drinking with trusted individuals; Martens et al., 2005; Pearson, 2013).

In general, greater use of PBS are associated with less alcohol consumption and experiencing fewer negative alcohol consequences in cross-sectional (Araas & Adams, 2008; Martens et al., 2005; Pearson, Kite, & Henson, 2012) and prospective studies (Martens, Martin, Littlefield, Murphy, & Cimini, 2011; Napper, Kenney, Lac, Lewis, & LaBrie, 2014). However, specific domains of PBS have been shown to vary in their association with alcohol use and consequences. Cross-sectional and longitudinal research has found that manner of drinking is most consistently and uniquely related to less drinking and fewer alcohol consequences relative to other PBS, while serious harm reduction strategies are more associated with experiencing fewer alcohol consequences than with consumption (Frank, Thake, & Davis, 2012; Madson & Zeigler-Hill, 2013; Martens et al., 2005, 2011; Napper et al., 2014; Pearson et al., 2012; Pearson, Kite, & Henson, 2013). Finally, several studies have found more limited effects on alcohol use or consequences for stopping/limiting drinking PBS, particularly when controlling for the effects of other PBS (Martens et al., 2005, 2011; Napper et al., 2014; Pearson et al., 2012). Although some studies have demonstrated that stopping/limiting strategies do reduce alcohol consumption and consequences (Braitman, Linden-Carmichael, & Henson, 2017; Pearson et al., 2013).

While individual and contextual factors have been shown to affect the use of PBS in college students (Braitman et al., 2017; Bravo, Prince, & Pearson, 2015, 2016, 2017; Brett, Leffingwell, & Leavens, 2017; Treeby, Rice, Cocker, Peacock, & Bruno, 2018), there is little research examining PBS use among American Indian and Alaskan Native (AI/AN) students (Gonzalez & Skewes, 2018). Such research is important as factors affecting harm reduction strategies among AI/ANs are nuanced (Allen, Mohatt, Fok et al., 2014; Crofi; Rieckmann, & Spence, 2014) and may not always be viewed favorably given alcohol's use as a tool of colonization (Beauvais, 1998). While AI/AN peoples have high rates of abstinence (Cunningham, Solomon, & Muramoto, 2016), there is also evidence of higher rates of severe alcohol use disorders as well as greater alcohol-related morbidity and mortality compared with non-AI/ANs (Centers for Disease Control and Prevention, 2008; Grant et al., 2015; Vaeth, Wang-Schweig, & Caetano, 2017; Whitesell, Beals, Crow, Mitchell, & Novins, 2012). These disparities are associated with sociocultural inequalities, the intersection of static and dynamic risk factors, and the lasting effects of historical as well as contemporary traumas (Allen, Mohatt, Beehler, & Rowe, 2014; Enoch & Albaugh, 2017; Whitesell et al., 2012).

One factor that may affect the use of PBS among AI/AN students is belief in the notion that AI/ANs are more susceptible to the effects of alcohol and more vulnerable to alcohol problems due to biological or genetic differences (aka the "*firewater myth*"¹; Blume, 2016; La Marr, 2003; Leland, 1976; Mail & Johnson, 1993; Schaefer, 1981). There is little evidence to support the notion that biological differences or genetics play a greater or different role in alcohol use disorders among AI/ANs compared to other racial groups (Enoch & Albaugh, 2017; Ehlers, Liang & Gizer, 2012; Ehlers & Gizer, 2013; Gizer, Edenberg Gilder, Wilhelmsen, & Ehlers, 2011); however, the idea that alcohol-related health disparities affecting AI/ANs are due to biological variables appears to be common. In a recent study, 53% of AI/AN college students who drank agreed to some extent with the notion of a AI/AN specific biological vulnerability to alcohol problems (Gonzalez & Skewes, 2018). Greater belief in a biological vulnerability, as measured by agreement with this notion, was associated with greater heavy episodic drinking alcohol consequences, guilt for drinking even small amounts of alcohol, temptation to drink heavily, as well as negative and positive alcohol expectancies, despite also being associated with greater efforts to control drinking (Gonzalez & Skewes, 2016). In contrast, students' belief that AI/AN people drink more and have more alcohol problems was not significantly related to any of these drinking outcomes. The findings suggest that while greater belief in a biological vulnerability may be associated with efforts to control drinking it may have negative effects on AI/AN students' efforts to moderate their drinking or avoid alcohol consequences.

Both the disease model of alcoholism and the notion of a biological vulnerability attribute alcohol misuse to factors that are internal, global, and stable, which may foster hopelessness

¹This phrase has been used to refer to variations on the notion that alcohol affects AI/AN peoples differently than people of European ancestry. The naming of this myth follows a practice of some research examining the effects of negative stereotypes about minority groups, which use loaded terms to refer to these stereotypes. With guidance from our advisory board, we choose to use this phrase in the manuscript title as it evokes the history and the stereotype to which it refers as well the injustice and oppression behind it. However, given its association with a painful history and stereotype, it also may evoke negative emotions such as anger or guilt, and thus judicious use is called for.

regarding one's ability to drink moderately and one's efforts to control alcohol intake (Walters, 2002). Consistent with this notion, in our prior research with AI/AN students who drink, greater belief in a biological vulnerability was associated with lower self-efficacy to resist drinking heavily in tempting situations (Gonzalez & Skewes, 2016), and among students who were more frequent heavy episodic drinkers, greater belief in a biological vulnerability was associated with lower self-efficacy for the use of PBS (Gonzalez & Skewes, 2018).

Although we had hypothesized that belief in biological vulnerability would be associated with less use of PBS because these strategies would be deemed ineffective for a disease-based attribution like a biological vulnerability, greater belief in a biological vulnerability was not associated with opinions regarding effectiveness of PBS or with AI/AN students' use of PBS (Gonzalez & Skewes, 2018). Instead, greater belief in a biological vulnerability was associated with greater use of abstinence-based strategies (e.g., "Completely stay away from things that remind you of drinking," and "Completely avoid people who drink") for trying to limit alcohol-related negative consequences, as well as greater belief in the effectiveness of abstinence-based strategies for resolving problems with alcohol. However, we found that abstinence-based strategies were not associated alcohol use and were associated with greater, rather than fewer, alcohol consequences for students who were average or high in belief in a biological vulnerability (Gonzalez & Skewes, 2018). In contrast, greater use of PBS was associated with less frequent heavy episodic drinking, although was not found to be associated with fewer alcohol consequences.

Gonzalez and Skewes (2018) was the first study to our knowledge to examine the use of PBS among AI/AN college students; however, that study used a unidimensional measure of PBS rather than a well validated multidimensional scale, which may have obscured associations between belief in a biological vulnerability and the use of specific PBS, as well as the associations of specific PBS with alcohol use and alcohol consequences. Our previous study also did not examine whether belief that AI/AN people drink more and have more alcohol problems was negatively associated with the use of PBS, although conceivably it might be due to a self-fulfilling prophecy or to a stereotype threat (Blume, 2016; Gonzalez & Skewes, 2016; La Marr, 2003). In the current study, we examined the associations of belief in a biological vulnerability and belief that AI/AN people have more alcohol problems with alcohol outcomes (i.e., use and consequences) via specific PBS (i.e., manner of drinking, stopping/limiting drinking serious harm reduction strategies) among AI/AN college students.

2. Method

2.1 Participants and Procedures

Participants were college students ($n=7,307$) recruited to participate in an online survey from psychology department participant pools at 10 universities across 10 U.S. states (for more information, see Bravo, Villarosa-Hurlocker, Pearson, & Protective Strategies Study Team, 2018). For the current study 137 students who self-identified as AI/AN (including those who indicated mixed heritage) and who reported consuming alcohol at least one day in the previous month were selected (distribution by location of university: 21.9% Alaska; 16.1% Washington; 19.0% Colorado; 1.5% Wyoming; 3.6% Missouri; 6.6% New Mexico; 15.3%

Virginia; 8.0% Mississippi; 7.3% Idaho; 0.7% Nebraska). The majority of participants were female ($n=94$; 68.6%), with a mean age of 21.69 ($Median=20.00$; $SD=4.29$) years. Participants received research participation credit for completing the study. This was a multi-site, multi-investigator project in which each university's Institutional Review Board approved the study. To enhance validity of the study and to avoid inadvertent harm in the dissemination of these findings, a small AI/AN community advisory board that included AI/AN students and faculty aided in the interpretation of the results and reviewed this manuscript.

2.2. Measures

“Firewater myth”.—The Revised Firewater Myth Scale (RFMS; Gonzalez & Skewes, 2016) includes a total of 14 items statements about AI/ANs. For this study, endorsement of the nine-item RFMS Biological Vulnerability subscale was used to measure degree of belief in a biological vulnerability to alcohol problems. Example items include: “Alaska Natives and American Indians are more likely to have a genetic vulnerability to problems with alcohol,” and “Alaska Natives and American Indians metabolize alcohol differently than non-Native people.” In addition, endorsement of the two-item RFMS Alcohol Problems subscale was used to measure degree of belief that AI/ANs drink more than other ethnic/racial groups and that AI/ANs who drink are likely to have alcohol problems. These subscales were derived via an exploratory factor analysis with AI/AN students, and have evidenced convergent and divergent validity with beliefs about the nature of alcoholism (Gonzalez & Skewes, 2016). Items are rated from 1 (*strongly agree*) to 6 (*strongly disagree*). To reduce the likelihood of reinforcing negative stereotypes and or causing reactance, items on both subscales include reverse scored items that negate the notion of a biological vulnerability or greater alcohol problems among AI/AN peoples. Further, the 14 items that relate to AI/ANs are embedded among 21 distractor items relating to other ethnic groups (e.g., African American, Hispanic, White/European American), a number of which are designed to parallel items that focused on AI/AN peoples (e.g., “Many African Americans don’t drink at all.”). After appropriate reverse scoring, higher mean scores indicate greater belief.

PBS use.—Past month use of alcohol PBS was assessed using the Protective Behavioral Strategies Scale-20 (PBSS-20; Treloar, Martens, & McCarthy, 2015). The PBSS-20 is a refinement of the most widely used measure of PBS, the Protective Behavioral Strategies Scale (Martens et al., 2005). Exploratory and confirmatory factor analysis has validated a three-factor structure (limiting/stopping drinking, manner of drinking and serious harm reduction), and the PBSS-20 has demonstrated good test-retest reliability and concurrent validity (Treloar et al., 2015). Although Treloar et al. (2015) dropped an item (“drink shots of liquor”) from the original measure for psychometric reasons, this item was maintained in the current study by modifying it to be consistent with the remaining items (“avoid drinking shots of liquor”). Items are rated on a 6-point response scale (1=*never*, 6=*always*) and subscale scores reflect mean item endorsement.

Alcohol use.—Typical quantity was measured with a modified version of the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985). Participants indicated how much

they drink during a typical week in the past 30 days using a 7-day grid from Monday to Sunday. These responses were summed to reflect drinks per week.

Alcohol-related consequences.—Past 30-day alcohol-related consequences were assessed using the 24-item Brief-Young Adult Alcohol Consequences Questionnaire (B-YAACQ; Kahler, Strong & Read, 2005). Items are rated dichotomously as present (1) or absent (0) and were summed to quantify alcohol consequences. Convergent validity of the full YAACQ (Read, Kahler, Strong & Colder, 2006) has been demonstrated with AI/AN students (Gonzalez & Skewes, 2016).

2.3. Analyses

Before analyses were conducted, all variables were screened for univariate outliers. The small number of outlying variables detected ($< 1\%$) were replaced with a score equivalent to 3.29 standard deviations from the mean (Tabachnick & Fidell, 2012). To test the proposed mediation models (see Figures 1-2), saturated path analysis models were conducted using *Mplus* 7.4 (Muthén & Muthén, 1998-2017). Specifically, six multiple mediator models were tested: 1-3) RFMS biological vulnerability $\rightarrow$ PBS use subscale $\rightarrow$ alcohol use $\rightarrow$ negative alcohol-related consequences; and 4-6) RFMS alcohol problems $\rightarrow$ PBS use subscale $\rightarrow$ alcohol use $\rightarrow$ negative alcohol-related consequences. Gender and age were included as covariates in the models. Total, direct, and indirect effects were examined using bias-corrected bootstrapped estimates based on 10,000 bootstrapped samples. Parameters were estimated using maximum likelihood estimation, and missing data were handled using full information maximum likelihood. Statistical significance was determined by 95% bias-corrected unstandardized bootstrapped confidence intervals that did not contain zero.

3. Results

Descriptive statistics, reliability coefficients, and correlations among study variables are presented in Table 1. The total, indirect, and direct effects for the mediation model are summarized in Tables 2 and 3 and depicted in Figures 1 and 2.

3.1. Mediation Models

Mediation models revealed a similar pattern of results for both RFMS subscales. Individuals who endorsed either the RFMS biological vulnerability or alcohol problems subscales more strongly reported using significantly fewer manner of drinking PBS, which in turn was significantly associated with lower past month alcohol use and fewer past month negative alcohol-related consequences (see Figures 1 and 2). Greater alcohol use was also significantly associated with more negative alcohol-related consequences in all models. Across models, neither RFMS subscale was directly associated with alcohol use or consequences; however, significant indirect effects suggest that both were positively associated with greater alcohol use and consequences via their negative effect on manner of drinking. Specifically, there were three significant indirect effects: 1) PBS use mediated the associations between endorsement of the RFMS biological vulnerability (indirect $\beta=0.06$) and alcohol problems (indirect $\beta=0.05$) subscales with alcohol use, such that higher endorsement of either RFMS subscale was associated with higher alcohol use via lower use

of manner of drinking; 2) manner of drinking mediated the associations between endorsement of the RFMS biological vulnerability (indirect $\beta=0.03$) and alcohol problems (indirect $\beta=0.04$) subscales with negative alcohol-related consequences, such that higher endorsement of either RFMS subscale was associated more consequences via lower use of manner of drinking; and 3) a double mediation effect such that endorsement of the RFMS biological vulnerability (indirect $\beta=0.02$) and alcohol problems ($\beta=0.02$) subscales were associated with lower manner of drinking PBS use; which in turn was associated with higher alcohol use; which in turn was associated with more negative alcohol-related consequences.

4. Discussion

While many studies have examined college student drinking in an effort to improve drinking outcomes, few studies have examined AI/AN specific factors or how general factors, such as the use of PBS may help to protect AI/AN students from harm. Consistent with prior research with other student populations, both manner of drinking and limiting/stopping drinking were associated with less past month alcohol use and all three domains of PBS were directly associated with fewer past month alcohol consequences in this sample of AI/AN college students. The current study found that belief in an AI/AN specific biological vulnerability to alcohol problems, as well belief that AI/ANs drink more and have more alcohol problems, were both associated with less use of manner of drinking PBS, which in turn was associated with greater recent alcohol use and alcohol consequences among AI/AN students. These beliefs were not found to be significantly associated with limiting/stopping drinking or serious harm reduction PBS. In a prior study with AI/AN students, belief in a biological vulnerability was not associated with the use of PBS, despite being associated with lower self-efficacy for the use of PBS (Gonzalez & Skewes, 2018). The current study's findings suggest that examining the use of PBS as a unitary construct in that prior research may have obscured the association of belief in a biological vulnerability with specific PBS.

Neither belief in a biological vulnerability nor belief regarding AI/AN people having more alcohol use and problems were associated with the use of serious harm reduction strategies in the current study. This may be because these PBS strategies are not related to regulating or controlling alcohol use, but rather focus on methods used to avoid major alcohol risks or consequences and may be used without limiting drinking. Likewise, belief in a biological vulnerability and belief regarding AI/AN people having more alcohol use and problems were not found to be associated with strategies used to limit or stop drinking episodes. These finding for belief in a biological vulnerability was contrary to our expectation that this belief may result in hopelessness or even perceived pointlessness regarding the use of these control strategies given the perception of an inborn vulnerability to developing problems with alcohol due to biology or genetics. However, our results suggest that these beliefs regarding alcohol and AI/AN people do not affect the use of control or limit strategies. Instead, they appear to have a negative effect on the use of strategies aimed at avoiding drinking behavior that can lead to rapid drinking and a higher blood alcohol content (e.g., drinking games, gulping or chugging, keeping pace with or trying to out-drink others). This highlights the potentially problematic nature of these beliefs, based both on the findings of this study and prior research that shows that manner of drinking is one of the most robust PBS for limiting alcohol use and consequences (Frank et al., 2012; Madson & Zeigler-Hill, 2013; Martens et

al., 2005; Napper et al., 2014). Manner of drinking PBS are largely social in nature. It may be that the effects of beliefs regarding alcohol and AI/AN people on drinking may be particularly triggered in drinking situations with social pressure or where social perceptions and comparisons are heightened. This may reflect a stereotype threat response in which stress resulting from concern about being perceived by others as fulfilling a negative AI/AN stereotype may impair ability to self-regulate alcohol use in social heavy drinking contexts, resulting in a self-fulfilling prophecy.

In the current study, belief in a biological vulnerability showed only indirect associations with alcohol use and consequences, whereas in our prior study it showed small to moderate direct associations with heavy episodic drinking and with alcohol consequences (Gonzalez & Skewes, 2016). There are a number of differences between these studies that may account for the difference in findings. The current study focused on past month drinks per week and alcohol consequences, while in our prior study (Gonzalez & Skewes, 2016, 2018) belief in a biological vulnerability was examined in relation to past year heavy episodic drinking and alcohol consequences. Further, the current study included students who endorsed being AI/AN when asked about race in the demographics portion of a larger convenience sample of psychology students from universities in 10 states. In contrast, the previous study used purposive sampling to recruit AI/AN participants for a study regarding opinions on alcohol misuse interventions, and the sample was primarily Alaska Native (Gonzalez & Skewes, 2018). Given the differences in recruitment and sampling strategies it is possible that the samples differed in regard to ethnic identity and attitudes or expectancies regarding alcohol. Finally, an examination of mean belief in a biological vulnerability is in the current study ($M=3.16$, $SD=.97$) with the previous study ($M=4.00$, $SD=1.06$; Gonzalez & Skewes, 2016), as well as belief regarding greater alcohol use and problems among AI/AN people ($M=3.64$, $SD=1.30$ – current study; $M=4.12$, $SD=1.13$ – previous study), suggests less endorsement of these beliefs in the current study sample.

In addition to the already noted limitations, another important limitation of this study was the cross-sectional design. Given this, causal inferences cannot be made regarding the temporal order of the constructs examined. Further, the current study used a sample of AI/AN-identified students that was not specific to a given region of the country, cultural tradition, or tribal group. While this can be viewed as a strength, it also may obscure differences in beliefs and expectancies regarding alcohol and Native peoples between groups, an important consideration given that there are over 600 current state- or federally-recognized AI/AN tribes. Further, it is unknown if our findings would generalize to non-college students or to tribal college settings. It also is important to note that students were nested in universities that may have differed in alcohol use, norms, policies, and behavior; however, nested analyses were not conducted. Finally, this study had a relatively small sample size, reflective of the small portion of AI/AN students at the universities where the study was conducted.

4.1. Conclusion

Greater belief in a biological vulnerability and greater belief regarding AI/AN people having more alcohol use and problems were both significantly associated with using fewer manner

of drinking PBS. There also were significant indirect effects between these beliefs and both alcohol use and consequences that was mediated by manner of drinking PBS use. Although the associations were small between drinking outcomes and these beliefs regarding AI/AN peoples, the findings of this study suggest one potential mechanism through which these beliefs may negatively impact drinking outcomes for AI/AN students who drink, namely, by negatively impacting the use of PBS. Future studies are needed to elucidate how these beliefs may influence the use of manner of drinking PBS. This research is needed to design harm reduction interventions that meets the needs of AI/AN college students. This is an important goal, as AI/AN students are underrepresented in higher education, and despite being academically capable, AI/AN students compared with other ethnic or racial groups have the highest rate of dropout (Keith, Stastny, & Brunt, 2016; Patterson, Butler-Barnes, & Van Zile-Tamsen, 2015). For all students, alcohol misuse during college is a significant contributor to alcohol problems and academic failure (Hingson et al., 2009; White & Hingson, 2013). Thus, addressing alcohol misuse among students is important in general; however, this research suggests that AI/AN students have additional concerns that are not currently addressed by standard interventions for college students. Colleges should consider providing culturally responsive harm–reduction interventions for AI/AN students that addresses the role of alcohol in colonization, as well as debunking alcohol-related stereotypes and myths.

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Highlights

- Belief in a biological vulnerability was negatively associated with manner of drinking
- Belief that AI/ANs have more alcohol problems was negatively associated with manner of drinking
- Manner of drinking and limiting/stopping drinking associated with less alcohol use
- Protective behavioral strategies were associated with fewer alcohol consequences

Figure 1.

Depicts the standardized effects of the Revised Firewater Myth Scale (RFMS) Biological Vulnerability path models predicting alcohol outcomes via Protective Behavioral Strategies Scale-20 subscales. Significant associations are in bold typeface for emphasis and were determined by a 95% bias-corrected unstandardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero. RFMS=Revised Firewater Myth Scale. The effects of covariates (i.e., gender and age) are not shown for parsimony but are available upon request from the authors.

Figure 2.

Depicts the standardized effects of the Revised Firewater Myth Scale (RFMS) Alcohol Problems path models predicting alcohol outcomes via Protective Behavioral Strategies Scale-20 subscales. Significant associations are in bold typeface for emphasis and were determined by a 95% bias-corrected unstandardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero. RFMS=Revised Firewater Myth Scale. The effects of covariates (i.e., gender and age) are not shown for parsimony but are available upon request from the authors.

Table 1

Bivariate correlations among study variables

	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>	Range
1. RFMS Biological Vulnerability	<u>.90</u>								3.16	0.97	1-5.56
2. RFMS Alcohol Problems	-.02	<u>.64</u>							3.64	1.30	1-6
3. PBSS Limiting/Stopping Drinking	-.03	-.07	<u>.84</u>						3.43	1.21	1-6
4. PBSS Manner of Drinking	-.14	-.18	.59	<u>.88</u>					3.34	1.34	1-6
5. PBSS Serious Harm Reduction	-.04	.05	.50	.37	<u>.87</u>				5.03	1.01	1-6
6. Alcohol Use ^b	.01	.09	-.30	-.31	-.17	---			5.66	6.05	0-31
7. Alcohol Consequences	.15	.11	-.25	-.30	-.25	.38	<u>.90</u>		5.82	5.42	0-23
8. Age	.14	-.11	.04	.28	.12	-.03	-.08	---	21.69	4.29	18-38
9. Sex ^a	-.02	.18	.12	.18	.30	-.18	-.01	.07	0.69	0.46	---

Note. RFMS = Revised Firewater Myth Scale. PBSS = Protective Behavioral Strategies Scale-20. Significant associations are in bold typeface for emphasis and were determined by a 95% bias-corrected unstandardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero. Cronbach's alphas are underlined and shown on diagonals.

^aSex was coded such that men=0 and women=1.

Table 2

Summary of total indirect effects of RFMS Biological Vulnerability and PBS subscales on alcohol consumption and negative alcohol-related consequences in independent mediation models

Effects	Alcohol Use		Negative Alcohol-related Consequences	
	β	95% CI	β	95% CI
Predictor Variable: <i>RFMS Biological Vulnerability</i>				
Total	.010	-0.93, 1.07	.166	-0.09, 1.84
Total indirect ^a	.010	-0.21, 0.40	.008	-0.29, 0.49
PBSS Limiting/Smiddleping Drinking	.010	-0.21, 0.40	.005	-0.09, 0.24
PBSS Alcohol Use	---	---	.000	-0.27, 0.39
PBSS Limiting/Smiddleping Drinking → Alcohol Use	---	---	.003	-0.06, 0.14
Direct	.000	-0.98, 0.99	.158	-0.09, 1.74
Predictor Variable: <i>RFMS Biological Vulnerability</i>	β	95% CI	β	95% CI
Total	.010	-0.92, 1.07	.165	-0.10, 1.84
Total indirect ^a	.057	0.08, 0.86	.036	-0.18, 0.70
PBSS Manner of Drinking	.057	0.08, 0.86	.033	0.02, 0.53
PBSS Alcohol Use	---	---	-.016	-0.37, 0.25
PBSS Manner of Drinking → Alcohol Use	---	---	.019	0.02, 0.29
Direct	.047	1.30, 0.69	.129	0.29, 1.60
Predictor Variable: <i>RFMS Biological Vulnerability</i>	β	95% CI	β	95% CI
Total	.007	0.96, 1.03	.165	0.09, 1.82
Total indirect ^a	.007	-0.06, 0.34	.013	-0.29, 0.54
PBSS Serious Harm Reduction	.007	-0.06, 0.34	.011	-0.09, 0.39
PBSS Alcohol Use	---	---	.000	-0.28, 0.40
PBSS Serious Harm Reduction → Alcohol Use	---	---	.002	-0.02, 0.11
Direct	.000	-1.00, 1.00	.152	-0.10, 1.70

Note. RFMS = Revised Firewater Myth Scale. PBSS = Protective Behavioral Strategies Scale-20. Significant associations are in bold typeface for emphasis and were determined by a 95% bias-corrected unstandardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero. The effects of covariates (i.e., gender and age) are not shown for parsimony but are available upon request from the authors. Direct effects for all predictors are shown in Figure 1.

^aReflects the combined indirect associations within the model.

Table 3

Summary of indirect effects of RFMS Alcohol Problems and PBS subscales on alcohol use and negative alcohol-related consequences in independent mediation models

Effects	Alcohol Use		Negative Alcohol-related Consequences	
	β	95% CI	β	95% CI
Predictor Variable: <i>RFMS Alcohol Problems</i>				
Total	.121	-0.24, 1.49	.115	-0.28, 1.35
Total indirect ^a	.024	-0.09, 0.41	.054	-0.06, 0.56
PBSS Limiting/Smiddleping Drinking	.024	-0.09, 0.41	.013	-0.04, 0.24
PBSS Alcohol Use	---	---	.033	-0.10, 0.41
PBSS Limiting/Smiddleping Drinking → Alcohol Use		---	.008	-0.02, 0.14
Direct	.096	-0.33, 1.34	.061	-0.50, 1.05
Predictor Variable: <i>RFMS Alcohol Problems</i>	β	95% CI	β	95% CI
Total	.120	-0.24, 1.50	.111	-0.30, 1.33
Total indirect ^a	.054	0.03, 0.65	.078	0.02, 0.73
PBSS Manner of Drinking	.054	0.03, 0.65	.038	0.01, 0.45
PBSS Alcohol Use	---	---	.022	-0.16, 0.37
PBSS Manner of Drinking → Alcohol Use	---	---	.018	0.01, 0.24
Direct	.067	-0.52, 1.24	.033	-0.61, 0.98
Predictor Variable: <i>RFMS Alcohol Problems</i>	β	95% CI	β	95% CI
Total	.122	-0.24, 1.50	.115	-0.28, 1.34
Total indirect ^a	-.001	-0.15, 0.10	.041	-0.14, 0.49
PBSS Serious Harm Reduction	-.001	-0.15, 0.10	-.002	-0.20, 0.14
PBSS Alcohol Use	---	---	.043	-0.06, 0.47
PBSS Serious Harm Reduction → Alcohol Use	---	---	.000	-0.05, 0.03
Direct	.123	-0.24, 1.51	.074	-0.41, 1.05

Note. RFMS = Revised Firewater Myth Scale. PBSS = Protective Behavioral Strategies Scale-20. Significant associations are in bold typeface for emphasis and were determined by a 95% bias-corrected unstandardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero. The effects of covariates (i.e., gender and age) are not shown for parsimony but are available upon request from the authors. Direct effects for all predictors are shown in Figure 2.

^aReflects the combined indirect associations within the model.