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## Do impulsivity and biological sex moderate associations between alcohol-related sexual willingness and behavior among young adults?

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## Keywords

Impulsivity, Alcohol, Sex, Willingness, Young Adult

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This study examined three-way interactions between baseline levels of willingness to engage in alcohol-related sexual behaviors, facets of impulsivity (i.e., urgency, lack of premeditation, and sensation seeking) and biological sex on alcohol-related sexual behaviors 6 months later. Participants were a sample of high-risk 18–25 year olds ( $N = 321$ , mean age 22.44) from a larger randomized controlled trial with eligibility criteria including engaging in unprotected sexual behavior after drinking alcohol within the past month at baseline. Results indicated females reporting high urgency and willingness levels were the most likely to engage in alcohol-related sex and to use a condom/dental dam after drinking. Males reporting low urgency levels and high sensation seeking and willingness levels engaged in more alcohol-related sex compared to females. Interventions to decrease alcohol-related sexual behavior by reducing willingness could incorporate sex-specific and impulsivity-related content, particularly related to urgency.

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### **Introduction**

Systematic reviews and daily-level research indicate that consuming alcohol is associated with a higher likelihood of engaging in risky sexual behavior among young adults (Kilwein et al., 2017; Patrick et al., 2009, 2015). Alcohol use and alcohol-related risky sexual behaviors (i.e., having multiple or casual sexual partners and engaging in unprotected sex; Cooper, 2002; Lewis et al., 2014) are prevalent in the U.S. among young adults (Kilwein et al., 2017; Patrick et al., 2012; Rehm et al., 2012; SAMHSA, 2019). Specifically, around 50% of young adult drinkers have reported consuming alcohol prior to engaging in sexual behaviors (Fairlie et al., 2018; Wells et al., 2010), with around 10% of young adults reporting usually or always engaging in sex after drinking (Connor et al., 2015). Notably, engaging in sexual behaviors after

consuming alcohol is associated with more sexual partners, negative consequences, regretted sex, failure to engage in safe sex, and sexually transmitted infections (Connor et al., 2015; Rehm et al., 2012). It is important to expand our understanding of potential risk factors of engaging in alcohol-related sexual behaviors outside of drinking frequency, drinking quantity, and previous sexual behavior given the negative consequences associated with alcohol-related sex (Connor et al., 2015; Rehm et al., 2012).

One theoretical construct that can be applied to understand decision making processes is an individual's willingness (i.e., openness) to engage in a risk behavior under certain conditions. Willingness is strongly associated with future behavior among young adults, making both age and willingness important factors to consider (Gerrard et al., 2008; Gibbons et al., 2007; Todd et al., 2016). However, it is important to determine

other characteristics of individuals for whom the association between willingness and behavior may be particularly robust to best understand targets for future harm reduction interventions.

Research indicates impulsivity may potentially amplify behavioral willingness (Gerrard et al., 2008; Gibbons et al., 2016; Mao et al., 2018). For example, individuals may be more willing to engage in risky behaviors if they don't think about the potential consequences due to high impulsivity levels. Impulsivity is a component of an individual's personality and is commonly composed of five related facets: positive urgency, negative urgency, lack of premeditation, lack of perseverance, and sensation seeking (Cyders & Smith, 2007; Whiteside & Lynam, 2001). Urgency is acting upon impulses while experiencing strong affect and can be positive (e.g., excited) or negative (e.g., upset); lack of premeditation refers to acting without planning; lack of perseverance is an inability to remain focused on tasks; and sensation seeking is pursuing exciting and novel experiences (Whiteside & Lynam, 2001). Research suggests that lack of perseverance is not closely related to risky behaviors, including alcohol use (Adams et al., 2012; Lynam & Miller, 2004). Moreover, the current study only measured negative urgency. As such, only negative urgency, lack of premeditation, and sensation seeking will be further discussed in the current study.

Overall, more impulsive individuals have an increased willingness and likelihood of engaging in alcohol use, sex with multiple partners, sex after drinking, and unprotected sex (Coskunpinar et al., 2013; Deckman & DeWall, 2011; Derefinko et al., 2014; Gibbons et al., 2016). However, research has not yet examined whether impulsivity moderates the association between willingness to engage in alcohol-related sexual behavior and actual alcohol-related sexual

behavior. Understanding this will allow us to know which individuals, based on impulsivity, have the strongest associations between willingness to engage in alcohol-related risky sexual behaviors and actual behavior, increasing the potential for preventative interventions.

Associations between impulsivity and behavior differ between males and females in part due to biological mechanisms (Cross et al., 2011; Seo et al., 2008). Specifically, compared to males, females who report high levels of impulsivity also report having increased expectations of alcohol relating to sexuality (Balodis et al., 2009). Given these findings, it is important to determine whether biological sex and specific facets of impulsivity strengthen the association between willingness to engage in alcohol-related risky sexual behavior and actual alcohol-related risky sexual behavior. Results may suggest tailoring interventions to include biological sex-specific feedback relating to willingness to engage in alcohol-related sexual behaviors among more impulsive individuals.

This study examines the associations between willingness to engage in alcohol-related sexual behavior and 1) the number of times an individual consumed alcohol before or during sex, and 2) the likelihood of using a condom/dental dam after drinking among young adults aged 18 – 25. Specifically, this study only focused on alcohol-related sexual behaviors, and not sexual behaviors when alcohol was not consumed. Additionally, the current study tested whether urgency, lack of premeditation, sensation seeking, and biological sex moderate above associations. For brevity, 'willingness to engage in alcohol-related sexual behavior' will herein be referred to simply as 'willingness' and 'negative urgency' will be referred to simply as 'urgency'. Specifically, the current study hypothesizes that high levels of willingness will predict a greater likelihood and

frequency of engaging in alcohol-related sexual behaviors (H1, main effects). These associations will be strongest among individuals who report higher levels of urgency, lack of premeditation, and sensation seeking (H2, two-way interactions), particularly among females (H3, three-way interactions).

## Methods

### Participants and Procedures

Participants ( $N = 402$ ) from a larger parent study utilizing a randomized controlled trial were recruited nationally. Participants completed a brief online consent and screening survey. Study eligibility criteria included: be age 18-25, provide sexual desire (e.g., on a scale of heterosexuality to homosexuality), not be in a serious monogamous relationship, have not used a condom during vaginal or anal sex after drinking at least once in the past month, have had an alcoholic drink at least once a week on average over the past 3 months, and have had one episode of heavy episodic drinking (i.e., having five drinks for males or four drinks for females in the span of two hours; SAMHSA, 2019) in the past month. After meeting eligibility criteria participants completed a telephone screening to verify information, followed by an online baseline survey and random intervention assignment stratified by biological sex.

Participants were randomized at baseline to one of three intervention conditions: (1) integrated personalized feedback (information relating to alcohol use specific to sexual behavior), (2) combined personalized feedback (alcohol information was not integrated with sexual behavior information), or (3) attention control (health-related information such as nutrition or exercise). As there were no significant differences between the two intervention groups (Lewis et al.,

2019), intervention assignment was dichotomized as either 0 (attention control) or 1 (integrated or combined). Intervention assignment was controlled for in all analyses to be able to determine effects of willingness, impulsivity, and sex while holding this constant.

Following the intervention, participants were invited to complete a 1-month and a 6-month follow-up survey. Data for the current study include baseline and 6-month measures. Of the 402 participants that completed the 6-month survey, 80 were removed for having missing data and one was removed for having an outlier for drinks per week. Thus, the final analytic sample size consisted of 321 individuals. A Federal Certificate of Confidentiality ensured participants' privacy, and all study procedures were approved by the university's institutional review board. No adverse events were reported. For further details see Lewis et al. (2019).

### Measures

#### *Dependent Variables (6 Months)*

**Consuming alcohol before or during sex.** Participants were asked (Lewis et al., 2007): "You said you had oral, vaginal, or anal sex \_\_ times in the past month. Of the \_\_ times, how many times did you consume alcohol before or during the sexual encounter?" This variable was utilized as both a count and the likelihood in analyses.

**Condom/dental dam use after drinking.** Participants responded to (Lewis et al., 2007): "You said you had consumed alcohol before or during oral, vaginal, or anal sex \_\_ times in the past month. During the \_\_ times, how many times did you use a condom/dental dam?" Responses were dichotomized as one time or more (1) or zero (0) due to small cell sizes.

*Independent Variable (Baseline)*

**Willingness to engage in alcohol-related sexual behavior.** Participants were provided with a scenario in which they are drinking and the potential for sexual behaviors arise, using the question stem “In this scenario, how willing are you to...when drinking with an attractive person?” (e.g., “have oral sex but only with a condom/dental dam”; “have vaginal sex without a condom”) Responses were on a 5-point scale ranging from 0 (Not at all willing) to 4 (Completely willing; Gerrard et al., 2008). A willingness score was created by taking the mean of all 11 items ( $\alpha = 0.83$ ).

*Moderators (Baseline)*

**Impulsivity.** Participants responded to, “For each of the following statements, indicate the degree to which the statement describes you.” Responses were measured on a 5-point scale ranging from 0 (Not at all) to 4 (Very much). Example items include: “I have trouble controlling my impulses” (urgency; 12 items,  $\alpha = 0.86$ ), “I have a reserved and cautious attitude toward life” (lack of premeditation; 11 items reverse-coded,  $\alpha = 0.91$ ), and “I generally seek new and exciting experiences and sensations” (sensation seeking; 12 items,  $\alpha = 0.91$ ). Scores for the each of the three subscales represent the mean of the subscales (Whiteside & Lynam, 2001).

**Biological Sex.** Participants provided their birth sex. Female was coded as 1 and male was coded as 2.

*Covariates (Baseline)*

**Age.** Participants provided their current age in years.

**Typical drinks per week.** Participants were asked to “Consider a typical week during the past month, how much alcohol, on

average (measured in number of drinks), do you drink on each day of a typical week?” A sum score was created for the number of typical drinks per week (Daily Drinking Questionnaire, Collins et al., 1985).

**Peak number of drinks.** The Quantity/Frequency Index (Baer, 1993; Marlatt et al., 1995) asked participants to “Think of the occasion you drank the most during the past month. How MUCH did you drink?” Peak number of drinks ranged from 0 drinks to 25 or more drinks (coded as 25 drinks).

**Sexual behavior.** Participants were asked “How many times, in total, have you had oral, vaginal, or anal sex in the past month?” (Lewis et al., 2007).

**Intervention group.** Intervention assignment was dichotomized as either 0 (attention control) or 1 (integrated or combined), and was controlled for in all analyses.

**Analytic Plan**

This study conducted a secondary analysis using previously collected data from a larger randomized controlled trial. Descriptive statistics and correlations were examined. A hurdle Poisson model estimated the likelihood and the number of times an individual consumed alcohol before or during sex (Zeileis et al., 2008) due to a non-normal distribution marked by an excessive rate of zeros (~40%). A logistic regression model estimated the dichotomous outcome of having used a condom/dental dam after drinking alcohol. Analyses for each outcome at 6-months included main effects (willingness, urgency, lack of premeditation, sensation seeking, and biological sex) and product terms to evaluate interactions. All models controlled for age, typical drinks per week at baseline, peak number of drinks at baseline, baseline sexual behavior, and intervention assignment. Two-way inter-

actions were tested for the seven combinations of willingness, each of the impulsivity facets, and biological sex; three-way interactions included the three combinations of all three variables. Variables were mean centered in all analyses to aid in the interpretation of results. Interactions were graphed and interpreted using low and high values, set as  $-1$  and  $+1$  *SD* from the mean. Post-hoc power analyses indicate there is sufficient power to detect the two-way interaction effects if the correlation between interaction term and the outcome is more than 0.15 (Baranger, 2021).

## Results

### Descriptive Information

Table 1 provides descriptive statistics and correlations for all variables. The mean age of the analytic sample at baseline ( $N = 321$ ) was 22.44 years old ( $SD = 1.89$ ), 54% were female; 14% were Hispanic/Latino; and the racial backgrounds were: 68% white, 12% other/mixed, 11% African American, 7% Asian, 1% American Indian/Alaska Native, and 1% Native Hawaiian/Pacific Islander. Willingness was correlated with biological sex, urgency, sensation seeking, and the number of times an individual drank before or during sex ( $p < 0.05$ ). All correlations had a value lower than  $r = 0.7$ , indicating no multicollinearity. On average, individuals drank 2.68 ( $SD = 4.29$ ) times before or during sex in the past month. Over one-fourth (27.1%) of participants reported using a condom/dental dam after drinking at least once within the past month.

### Consuming Alcohol Before or During Sex

#### *Likelihood*

Contrary to H1, results indicated no main effects of willingness on the likelihood of

consuming alcohol before or during sex (see Table 2). However, there was a significant two-way interaction (H2) between willingness and urgency on the likelihood of consuming alcohol before or during sex. The two-way interaction effects indicated that the willingness had a stronger effect on the likelihood of the outcome among the participants with lower urgency (comparing between low urgency [solid line] and high urgency [dashed line] within the same sex [i.e., color] in Figure 1). Results further indicated that the three-way interaction (H3) between willingness, biological sex, and urgency was positively associated with the likelihood of consuming alcohol before or during sex. Specifically, the highest predicted probability of engaging in sex during or after drinking occurred among females with both high urgency and high willingness levels, and the pattern of the moderating effect of urgency on the association between willingness and outcome was more noticeable among male participants (red lines; see Figure 1). There were no other significant three-way interactions in the likelihood portion of the model.

#### *Count*

Similar to the likelihood portion, there was not a main effect of willingness on the number of times consuming alcohol before or during sex (H1) (See Table 2). However, results indicated that willingness had a stronger effect on the count of the outcome among the participants with lower urgency and higher sensation seeking levels (H2). Finally, when examining three-way interactions (H3), the interaction between willingness, biological sex, and urgency was negatively associated with the number of times drinking before or during sex; whereas the three-way interaction between willingness, biological sex, and sensation seeking was positively associated with the

Table 1

*Descriptive Statistics and Correlations*

	<i>M or %</i>	<i>SD</i>	Range	1	2	3	4	5	6	7	8	9	10	11
1. Age	22.44	1.91	18-25											
2. Biological Sex	43.9% Male	-	1-2	.04										
3. Typical Drinks per Week	18.66	11.75	0-75	-.04	.29***									
4. Peak Number of Drinks	9.92	4.37	0-25	.00	.31***	.69***								
5. # of Times had Sex	7.20	10.65	0-100	.08	-.04	.05	.08							
6. Intervention received	67.6%	-	0-1	-.08	.04	.02	-.01	-.05						
7. Willingness	2.14	0.82	0-4	.04	.53***	.29***	.30***	.19***	-.04					
8. Urgency	1.66	0.89	0-4	-.09	-.13*	.16**	.04	.07	-.11	.11*				
9. Lack of Premeditation	1.75	0.77	0-4	-.07	-.08	.08	-.01	.01	.01	.00	.17**			
10. Sensation Seeking	2.62	0.92	0-4	.03	.15**	.18**	.22***	.10	-.02	.26***	.17**	.10		
11. # of Times Drank Before Sex	2.68	4.29	0-31	.05	.04	.20***	.12*	.17**	-.06	.16**	.06	.09	.10	
12. Condom/Dental Dam Use	27.1% used 1+ times	-	0-1	.04	.10	.12*	.09	-.01	-.09	.08	-.02	-.01	.05	.24***

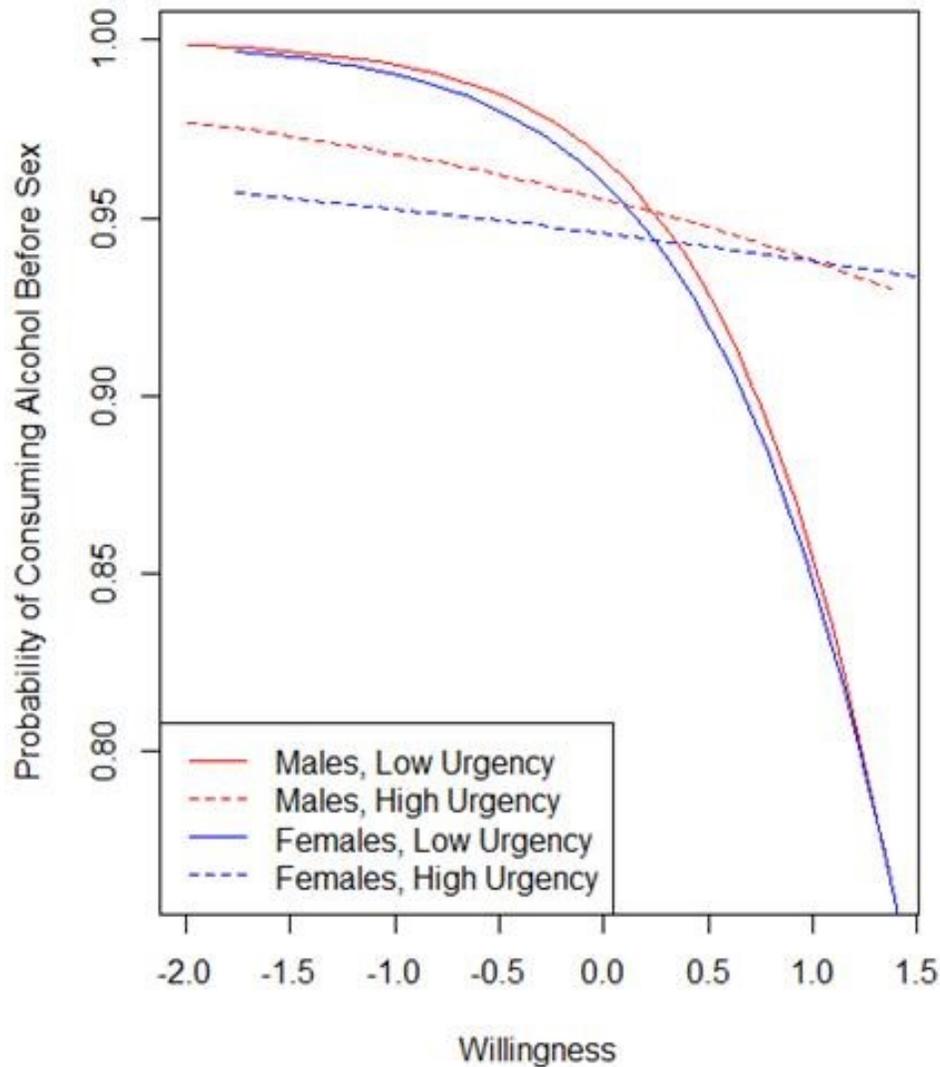
Note.  $N=321$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ . *SD* = Standard deviation. Female = 1, Male = 2.

Table 2

*Number of Times Consuming Alcohol Before or During Sex*

	Likelihood		Count	
	<i>OR</i>	<i>95% CI</i>	<i>RR</i>	<i>95% CI</i>
Age	1.04	(0.91, 1.18)	1.03	(0.99, 1.07)
Male Sex	0.70	(0.37, 1.34)	0.97	(0.80, 1.20)
Typical Drinks per Week	1.02	(0.99, 1.05)	1.02*	(1.01, 1.02)
Peak Number of Drinks	1.02	(0.94, 1.11)	0.99	(0.97, 1.01)
# Times had Sex	1.02	(0.99, 1.06)	1.01*	(1.00, 1.01)
Intervention	1.03	(0.62, 1.73)	0.87	(0.74, 1.01)
Willingness	2.66	(0.77, 9.21)	0.88	(0.60, 1.29)
Urgency	0.71	(0.24, 2.08)	1.00	(0.72, 1.39)
Lack of Premeditation	0.57	(0.17, 1.92)	1.45*	(1.00, 2.10)
Sensation Seeking	2.08	(0.73, 5.94)	0.79	(0.56, 1.10)
<b>Two-way Interactions</b>				
Willingness*Urgency	0.20*	(0.05, 0.81)	3.17*	(2.12, 4.75)
Willingness*Lack of Premeditation	2.77	(0.71, 10.78)	0.90	(0.58, 1.41)
Willingness*Sensation Seeking	2.29	(0.63, 8.39)	0.50*	(0.31, 0.80)
Sex*Urgency	1.09	(0.50, 2.36)	1.05	(0.82, 1.33)
Sex*Lack of Premeditation	1.73	(0.74, 4.02)	0.90	(0.68, 1.17)
Sex*Sensation Seeking	0.77	(0.40, 1.50)	1.07	(0.86, 1.33)
Sex*Willingness	0.68	(0.30, 1.54)	1.07	(0.83, 1.39)
<b>Three-way Interactions</b>				
Willingness*Sex*Urgency	3.18*	(1.19, 8.53)	0.53*	(0.40, 0.70)
Willingness*Sex*Lack of Premeditation	0.41	(0.16, 1.07)	1.01	(0.75, 1.37)
Willingness*Sex*Sensation Seeking	0.55	(0.25, 1.24)	1.61*	(1.22, 2.13)

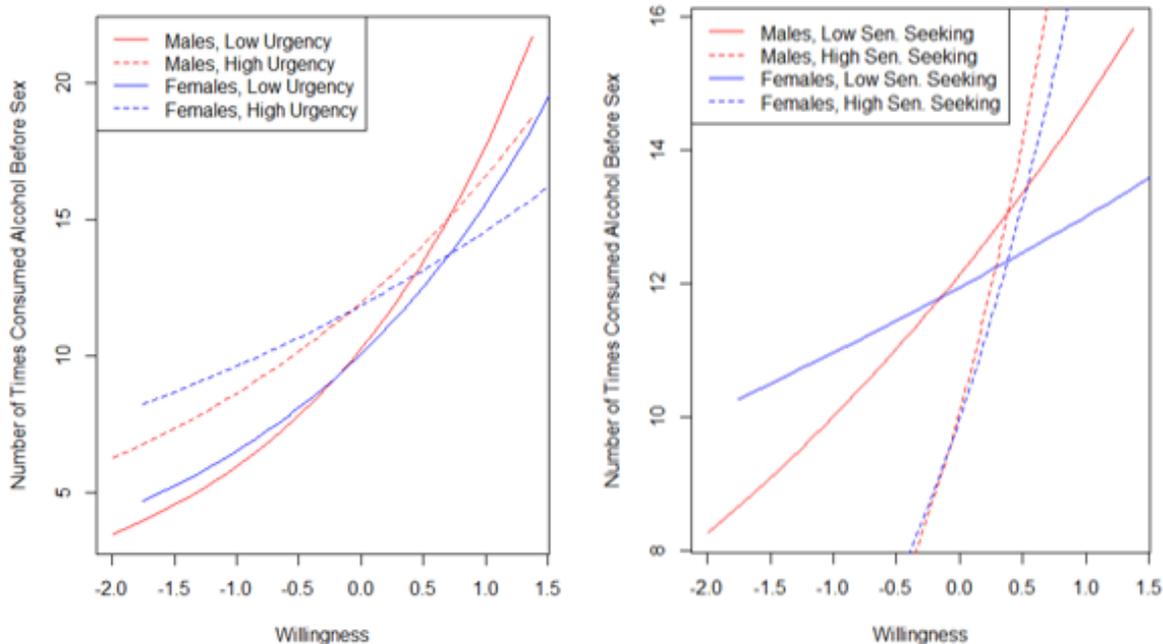
*Note.*  $N = 321$ , \* $p < 0.05$ . RR = risk ratio; OR = odds ratio; CI = 95% confidence interval.



*Figure 1.* The interaction between willingness to engage in alcohol-related sexual behavior, biological sex, and urgency predicting the probability of consuming alcohol before or during sex.

number of times drinking before or during sex. Specifically, males reporting high levels of willingness and either low levels of urgency or high levels of sensation seeking reported the largest number of times consuming alcohol before or during sex (see

Figure 2). The pattern of the moderating effects of both urgency and sensation seeking on the association between willingness and the outcome was more noticeable among male participants (see Figure 2). There were no other significant three-way interactions.



*Figure 2.* The interactions between willingness to engage in alcohol-related sexual behavior, biological sex, and urgency/sensation seeking predicting the number of times consumed alcohol before or during sex.

### Use of a Condom/Dental Dam After Drinking

Similar to the previous model, willingness was not a significant predictor of the odds of using a condom/dental dam after drinking (H1), and the only significant two-way interaction occurred between willingness and urgency (H2). The two-way interaction indicated that willingness had stronger effects on the outcome among those with high levels of urgency. The three-way interaction between willingness, biological sex, and urgency was positively associated with the odds of using of a condom/dental dam after drinking (H3). Specifically, females experiencing high levels of urgency and willingness had the highest odds of using a condom/dental dam after drinking. However, the odds of using a condom/dental dam after drinking were very similar among individuals experiencing high willingness,

regardless of urgency levels or biological sex (see Figure 3). The pattern of the moderating effect of urgency on the association between willingness and the outcome was more noticeable among female participants (see Figure 3). There were no other significant three-way interactions (see Table 3).

### Discussion

This study provides important insight into the moderating roles that facets of impulsivity and biological sex play on the associations between willingness and alcohol-related sexual behavior among a high-risk sample of young adults aged 18-25. Relating to H1, despite a significant correlation between willingness and one outcome (# of times drank before sex,  $r = 0.16$ ), there were surprisingly no main effects of willingness on either outcome after controlling for other factors in the model.

This may be because in this particular higher-risk sample, willingness may not be as predictive of behavior as intentions, which play a larger role in behavior as individuals gain more experience (Gerrard et al., 2008). Given the eligibility criteria of the larger study, participants must have had at least one occasion of engaging in alcohol-related sexual behaviors without a condom/dental dam within the past month at baseline.

Supporting H2, urgency moderated associations between willingness and the number of times drinking before or during sex and likelihood of using a condom/dental dam after drinking. Additionally, sensation seeking moderated the association between

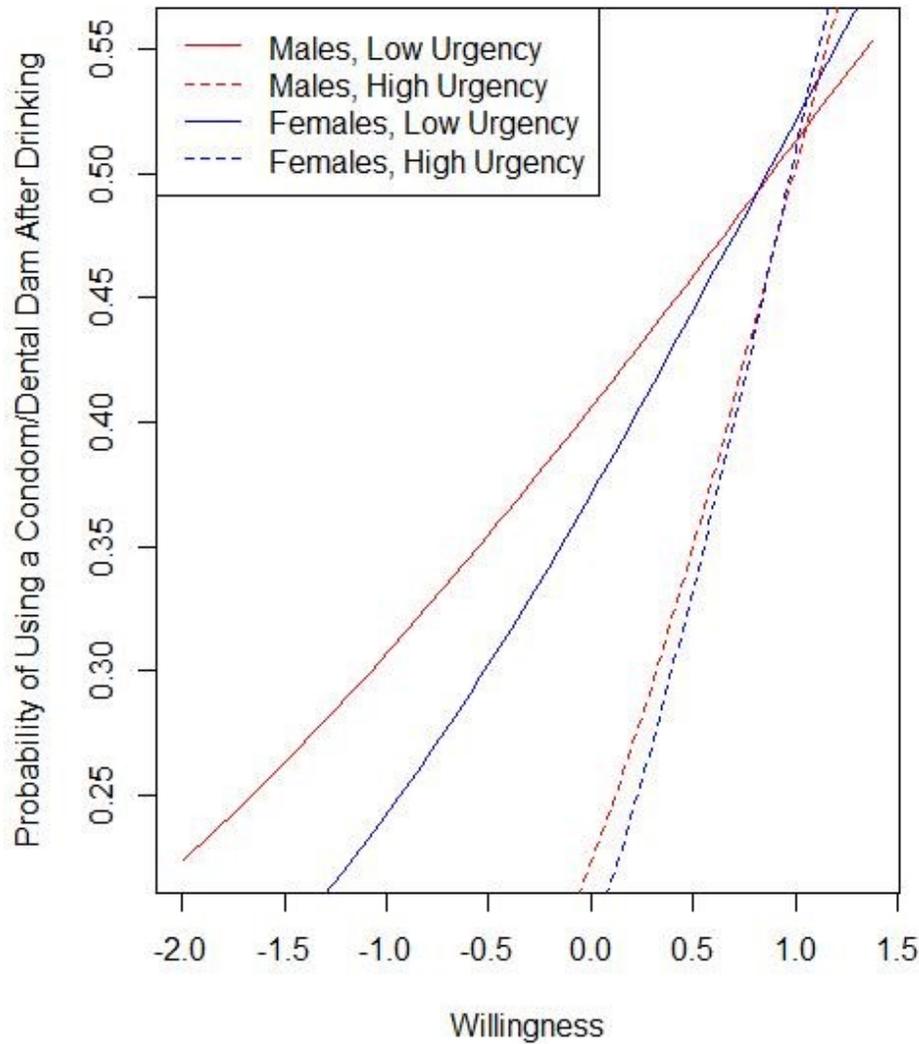
willingness and the number of times drinking before or during sex. Lack of premeditation was not a significant moderator of any associations, contrary to hypotheses. These results suggest that willingness may interact with specific facets of impulsivity, namely urgency and sensation seeking, which can lead to increased engagement in alcohol-related risky sexual behaviors. One possible reason why lack of premeditation was not found to moderate any study associations is that previous research indicates this facet of impulsivity requires planning and may be more associated with intentions (Vaughn & King, 2016).

Table 3

*Use of a Condom/Dental Dam After Drinking*

	<i>OR</i>	<i>95% CI</i>
Age	1.05	(0.91, 1.21)
Male Sex	0.97	(0.47, 1.92)
Typical Drinks per Week	1.02	(0.99, 1.05)
Peak Number of Drinks	0.99	(0.91, 1.08)
# Times had Sex	1.00	(0.97, 1.02)
Intervention	0.63	(0.36, 1.10)
Willingness	1.03	(0.26, 4.04)
Urgency	0.91	(0.29, 2.86)
Lack of Premeditation	0.62	(0.17, 2.23)
Sensation Seeking	1.75	(0.57, 5.53)
<b>Two-way Interactions</b>		
Willingness*Urgency	0.18*	(0.03, 0.84)
Willingness*Lack of Premeditation	1.80	(0.35, 10.10)
Willingness*Sensation Seeking	0.60	(0.11, 2.89)
Sex*Urgency	0.81	(0.35, 1.83)
Sex*Lack of Premeditation	1.38	(0.58, 3.27)
Sex*Sensation Seeking	0.68	(0.34, 1.36)
Sex*Willingness	1.21	(0.51, 2.95)
<b>Three-way Interactions</b>		
Willingness*Sex*Urgency	3.03*	(1.08, 8.96)
Willingness*Sex*Lack of Premeditation	0.83	(0.28, 2.39)
Willingness*Sex*Sensation Seeking	1.15	(0.46, 3.01)

Note.  $N = 321$ ,  $*p < 0.05$ . OR = odds ratio; CI = 95% confidence interval.



*Figure 3.* The interaction between willingness to engage in alcohol-related sexual behavior, biological sex, and urgency predicting the probability of using of a condom/dental dam after drinking.

Finally, when examining the results in line with H3, females with high levels of urgency and willingness were more likely to consume alcohol before or during sex, and had higher odds of using a condom/dental dam after drinking, compared to males. In contrast to our hypotheses, males with low urgency and high levels of sensation seeking and willingness engaged in alcohol use a greater number of times before or during sex, compared to females. These results are

suggestive that interventions should include sex-specific feedback, as both males and females had high risk levels depending on the outcome of interest.

### **Implications for Health Behavior Theory**

Results of this work have potential implications for strategies to reduce alcohol-related risky sexual behavior and related risk. For example, alcohol-related sexual behavior

interventions may aim to prevent an individual's urgency levels from rising, or provide ways to manage high urgency levels to reduce risk. Results also suggest that harm reduction alcohol-related sexual behavior interventions should consider tailoring impulsivity information by biological sex, as males and females were found to have differing risk based on the alcohol-related sexual behavior being assessed.

As there were consistent associations observed with the impulsivity facet of urgency, research is needed to identify the best strategy to target an individual's urgency levels. Moreover, future research should examine whether there are similar findings in different age groups to determine the age range to which future interventions may be applicable. It is important to assess age differences, as willingness tends to shift towards more intention-based decisions with increasing age and experience, and impulsivity tends to be highest during adolescence and young adulthood (Gerrard et al., 2008; Steinberg et al., 2008). Given the potential impact of results and the importance of willingness and facets of impulsivity, it is necessary to continue conducting this research with a focus on theoretical implications. Moreover, the development and implementation of harm reduction strategies using a theoretical framework is necessary to make meaningful changes throughout the lifecourse.

### **Limitations**

Although there are many strengths of this study, several limitations must be considered. First, given the eligibility criteria of the parent study, findings may only be generalizable to the population described here, a relatively higher-risk population of young adults. However, given the current study's research questions, it is unclear whether a sample considered 'lower' risk

would be sufficiently powered to adequately address study aims. Moreover, the sample size of the study may be underpowered to detect associations, particularly between the three-way interaction terms and the outcome if effect sizes are small. Furthermore, the demographic makeup of the sample (86% non-Hispanic/non-Latino, 68% white) is limited and thus results are not generalizable to more diverse populations. Additionally, data for this study only included negative urgency, which does not provide information regarding associations with positive urgency. Lastly, data are drawn from a larger study which included an intervention (which was collapsed in analyses here) with lasting effects (Lewis et al., 2019), which may impact results and implications found by decreasing the occurrence of alcohol-related sexual behaviors at 6-months. However, intervention assignment was included in models to mitigate this concern.

### **Conclusion**

The current study provides new information regarding associations between willingness to engage in alcohol-related risky sexual behaviors, impulsivity facets, biological sex, and engaging in alcohol-related risky sexual behaviors over a 6-month period. Results indicate that out of the three facets of impulsivity examined, urgency has the strongest and most consistent associations with alcohol-related risky sexual behavior and differs by biological sex, which has the potential to inform and define more targeted populations for interventions aiming to reduce alcohol-related risky sexual behaviors among young adults.

### **Discussion Question**

Our findings indicate a difference in alcohol-related sexual behaviors among young adults by willingness, impulsivity facets, and sex

assigned at birth. How can these findings be incorporated into future research, prevention, and intervention materials?

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