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## Curiosity Killed the Cocktail? Curiosity, Sensation Seeking, and Alcohol-related Problems in College Women

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### Abstract

Curiosity, composed of two factors: exploration and absorption, has been previously associated with life satisfaction, life meaningfulness, and enhanced positive affect. It also shares some overlap with sensation seeking, which has been linked to alcohol use and other addictive behaviors. The present research explored the association between curiosity and college women's problematic drinking in the context of sensation seeking. Participants (79 women) completed questionnaires measuring curiosity, sensation seeking, alcohol consumption, and consequences related to alcohol consumption. A zero-inflated negative binomial model indicated that curiosity and sensation seeking accounted for unique variance in alcohol-related problems after controlling for drinking. The curiosity factors had opposing relationships to alcohol-related problems: higher scores on absorption were associated with more alcohol related problems whereas higher scores on exploration were associated with fewer alcohol related problems. Should findings be replicated, the curiosity factors may represent additional prevention and intervention targets. Future directions for research about curiosity and drinking and for the inclusion of positive psychology constructs in addictive behaviors research are discussed.

### Keywords

alcohol; curiosity; alcohol problems; sensation seeking; positive psychology

## 1. Introduction

### 1.1. Background

To what extent are positive psychological constructs associated with decreased alcohol use and problems? Recently, researchers have argued for the importance and consideration of

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#### Statement 2: Contributors

Lindgren and Mullins designed the study. All authors contributed to the protocol. Mullins conducted literature review and provided summaries of previous research studies. Blayney collected the study data and wrote the method section of the first draft. Neighbors conducted the statistical analyses and wrote the results section of the first draft. Lindgren and Mullins wrote the introduction and discussion sections. All authors have contributed to and approved the final manuscript.

#### Statement 3: Conflict of Interest

All authors declare that they have no conflicts of interest.

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constructs that are linked to well-being and adaptive functioning (e.g., Seligman & Csikszentmihalyi, 2000). To this end, Kashdan, Rose, and Fincham. (2004) proposed that curiosity, a desire for novel stimuli and situations, is a critical element in the development of well-being. As described by Kashdan et al. (2004), curiosity has two factors: exploration, the desire to seek out new information and experiences, and absorption, the tendency to become involved and engaged by such activities). Curiosity is linked with both adaptive and maladaptive behaviors. On the one hand, it is positively correlated with several components of well-being, such as finding one's life meaningful, having positive affect, and being satisfied with one's life (Kashdan et al., 2004; Kashdan & Steger, 2007). On the other hand, curiosity is conceptually and statistically related to sensation seeking,  $r$ 's range from .31 to .37 (see Kashdan et al., 2004), which is, in turn, associated with alcohol and other substance use and problems as well as other risky behaviors (e.g., Arnett, 1994; Crawford, Pentz, Chou, Li, & Dwyer, 2003; Donohew et al, 1999; Jackson, Sher, & Schulenberg, 2008).

## 1.2 Rationale

In this study, we considered the relations among the two curiosity factors, sensation seeking, alcohol consumption, and alcohol-related problems. We focused on a sample of female college students because, despite their high rates of alcohol consumption, heavy episodic drinking (4 or more drinks/occasion), and negative consequences (see Johnston, O'Malley, Bachman, & Schulenberg, 2008; Wechsler et al., 2002; Young, Morales, McCabe, Boyd, & Darcy, 2005), drinking among college women was thought to be less of a concern until recently. Also, the majority of female college students fall into the developmental period of emerging adulthood (Arnett, 2000), a period characterized by intense exploration and increased risk for substance use (e.g., Schulenberg & Zarrett, 2006; Teese & Bradley, 2008). Moreover, although some attention has been given to predictors of college women's alcohol *consumption*, the predictors of alcohol-related *problems* been less often investigated (LaBrie, Hummer, Neighbors, & Larimer, 2009).

## 1.3 Aims

We had two aims. First, we examined the zero-order correlations among the two curiosity factors, sensation seeking, alcohol consumption, and alcohol-related problems. Second, we investigated whether the relations between curiosity, sensation seeking and alcohol-related problems were moderated by alcohol consumption. Our hypotheses were two-sided: to the degree that curiosity related to drinking as sensation seeking does, women higher in the exploration and/or absorption factors should report more alcohol-related problems. Alternatively, curiosity and sensation seeking could be two sides of a larger construct (e.g., inquisitiveness), with curiosity representing a more positive side and sensation seeking representing a more negative side. If that is the case, exploration and absorption should be negatively related to alcohol problems and sensation seeking should be positively related to alcohol problems.

## 2. Methods

### 2.1 Participants

Participants were 79 women from the University of Washington who were part of a longitudinal study about alcohol and sexual assault. This sample was from the 6-month follow up. Participants were compensated \$25. The mean age was 18.66 years ( $SD = 1.73$ ). Fifty-three percent identified as Caucasian, 33% as Asian American, and 14% as African American, Hispanic American, or bi/multi-racial. Seventy percent were freshman, 21% were sophomores, 9% were juniors or above.

## 2.2 Measures

**Daily Drinking Questionnaire**—Alcohol consumption was measured by the Daily Drinking Questionnaire (Collins, Parks, & Marlatt, 1985). It measures the number of standard drinks a participant consumed in a typical week over the past three months.

**Rutgers Alcohol Problems Index**—Alcohol-related problems were measured by Rutgers Alcohol Problems Index (White & Labouvie, 1989). Two items were added related to drinking and driving. Thus, items consisted of 25 alcohol-related problems and assessed the frequency of consequences experienced over a three-month period ( $\alpha = .89$ ).

**Sensation seeking**—Sensation seeking was measured by the Brief Sensation Seeking Scale (Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002). It consists of eight items and has a five-point Likert scale ranging from 0 (“strongly disagree”) to 5 (“strongly agree”). Composite scores were created by summing responses to all items ( $\alpha = .70$ ).

**Curiosity**—The Curiosity and Exploration Inventory (Kashdan et al., 2004). has seven items and has a seven-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). It has two factors: exploration (the desire to seek out novel information and experiences), composed of 4 items ( $\alpha = .71$ ), and absorption (the tendency to become deeply involved and interested in such activities), composed of 3 items ( $\alpha = .74$ ).

## 2.3 Procedure

Invitation letters and emails were sent to participants. They included a web URL for the survey and a unique pin code. Participants gave informed consent and completed these measures, along with several others not reported here, on the computer of their choice. All procedures were approved by the University’s institutional review board.

## 3. Results

### 3.1 Descriptive statistics and zero-order correlations

On average, participants reported consuming 2.80 drinks per week ( $SD = 4.61$ ) and having 2.10 alcohol-related problems ( $SD = 3.87$ ). Curiosity-exploration (C-EXP) scores averaged 18.83 ( $SD = 3.18$ ); curiosity-absorption (C-ABS) scores averaged 12.70 ( $SD = 3.39$ ), and sensation seeking (SS) scores averaged 24.27 ( $SD = 5.19$ ). The following correlations between pairs of variables were significant at  $p < .05$  ( $r$ 's are reported in parentheses): drinks per week and alcohol-related problems (.31), alcohol-related problems and C-EXP (–.38), C-EXP and C-ABS (.36), and SS and alcohol-related problems (.29).

### 3.2 Preliminary analysis

Analysis of distributions revealed that C-EXP, C-ABS, and SS were approximately normally distributed. In contrast, neither drinks per week nor alcohol related problems approximated normal distributions. Rather, in both cases, the distributions revealed a large number of zero responses (i.e., zero-inflated) followed by scores which approximated negative binomial distribution.

### 3.3 Zero-inflated negative binomial regression analysis

Given the extreme departure from normality in the distribution of the primary outcome measure (i.e., alcohol related problems), a count regression approach was used as the primary analytic strategy. Count regression models allow for an increasing range of criterion distributions that can be fit (Cohen, Cohen, West, & Aiken, 2003). In this case, the specific model used was zero-inflated negative binomial (ZINB) regression with log link. In zero-inflated models,

simultaneous tests are performed for two portions of the model: logistic and counts. Output is generated separately for both portions. The logistic portion of the model functions like a logistic regression model and tests for unique associations of predictors with “always zero” versus “nonzero” scores on the outcome (e.g., the absence of alcohol related problems vs. the presence of alcohol related problems). The counts portion of the model provides tests for unique associations within the full range of the negative binomial distribution of values including zeros (see Atkins & Gallop, 2007 for an overview of this approach).

Consistent with the primary aims, the ZIBN model was run in two steps. All predictors were mean-centered to facilitate interpretation of parameter estimates. Drinks per week, C-EXP, C-ABS, and SS were entered at step 1 to evaluate their unique associations with alcohol-related problems. Two-way product terms were entered at step 2 to evaluate drinking as a moderator of the associations of C-EXP, C-ABS, and SS with alcohol-related problems. Alpha, an estimate of the dispersion parameter, was significant at each step ( $ps < .05$ ), indicating that the ZIBN model was a better fit than a zero-inflated Poisson model.

**3.3.1 Results from the logistic portion of the model**—Results indicated only a non-significant trend for drinks per week (see Table 1) with higher consumption associated with the presence of alcohol-related problems and lower consumption associated with the absence alcohol-related problems. C-EXP, C-ABS, and SS, were all non-significant predictors of the absence versus presence of alcohol-related problems, as were their interactions with drinks consumed per week.

**3.3.2. Results from the counts portion of the model**—*In* contrast, the counts portion of the model (step 1) yielded significant main effects for each predictor (e.g., drinks per week, C-EXP, C-ABS, and SS). Higher scores on curiosity-exploration were associated with experiencing fewer alcohol-related problems in the previous three months. In contrast, great alcohol consumption and higher scores on curiosity-absorption and sensation seeking were associated with experiencing more alcohol-related problems in the previous three months. None of the two-way interactions were significant.

## 4. Discussion

### 4.1. Overview

Our goal was to investigate the relations among curiosity, sensation-seeking, alcohol consumption, and alcohol-related problems. Most importantly, results indicated that curiosity may be a double-edged sword with respect to alcohol-related problems. On the one hand, higher scores on the exploration factor were associated with fewer alcohol-related problems. On the other hand, higher scores on the absorption factor were associated with more alcohol-related problems. In addition, consistent with previous findings, sensation seeking was positively associated with drinking related problems. Moreover, sensation seeking measure and the two curiosity factors each made unique contributions (e.g., above and beyond typical alcohol consumption) towards in the prediction of alcohol-related problems. Thus, these findings suggest that the two factor of curiosity are distinct from sensation-seeking, with one factor – e.g., absorption—having a similarly (positive) association with alcohol-problems and the other -- e.g., exploration – having a contrasting (negative) association with alcohol-problems.

### 4.2. Implications

Ultimately, these finding suggest that curiosity may be influential in alcohol-related problems. The curiosity-exploration factor may ultimately be found to be a protective factor against alcohol-related problems and curiosity-absorption may ultimately be found to be an additional risk-factor. To the extent that that is the case, a greater understanding of the relation between

curiosity and alcohol-related problems and/or making curiosity a treatment target might assist in the prevention of alcohol problems. Moreover, some prevention programs may already, unwittingly, be doing so. For example, current prevention and interventions for college drinkers often seek to help students identify alternative activities that do not involve alcohol. Such strategies may increase students' tendencies to seek out other aspects of college life, thereby facilitating healthy exploration of novel experiences. Similarly, college drinking interventions often teach skills related to monitoring one's drinking and disrupting one's tendency to become totally engaged in drinking. Such strategies may minimize students' tendencies to become completely absorbed in drinking. These possibilities are clearly speculative, but they have intriguing implications for the curiosity construct and for the identification of additional mediators of alcohol intervention/prevention strategies. More generally, there may be other positive and strength-based constructs that would be useful to consider in terms of the etiology of, prevention of, and treatment for addictions.

#### 4.3. Limitations and future directions

There are several important limitations that should be addressed in future studies. First, in this sample, sensation seeking and curiosity factors were not significantly correlated, which is inconsistent with Kashdan et al. (2004). This contradiction may stem from differences in the specific sensation seeking measures and samples used. Kashdan et al. (2004) used Zuckerman et al.'s (1978) sensation seeking measure and investigated college women and men, whereas the present study used Hoyle et al.'s (2002) measure and focused only on college women. Related to sampling differences, because the present study was limited to female U.S. undergraduate students, future studies must include larger, more diverse samples to establish the generalizability of findings. For example, it is unknown whether study findings would hold for men or for people with longer and/or heavier drinking histories. In addition, longitudinal studies are necessary to investigate the development of curiosity and establish its influence on alcohol related problems over time. Further research is essential to determine whether (a) exploration acts as a protective factor against alcohol-related problems, and (b) absorption is a risk factor for alcohol-related problems; however, it may be that one or both curiosity factors represent additional intervention target(s). Because intervention programs may already be targeting aspects of curiosity, future research that investigates whether curiosity is a mediator of prevention/intervention strategies could be highly informative.

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**Table 1**

Zero-inflated negative binomial regression results examining alcohol-related problems as a function of drinks per week, curiosity-exploration, curiosity-absorption, and sensation seeking.

	Predictor	<i>B</i>	<i>SE B</i>	<i>t</i>
Logistic portion of model				
Step 1	Drinks per week	-7.32	4.367	-1.68 <sup>†</sup>
	Curiosity-exploration (C-EXP)	-0.913	0.819	-1.11
	Curiosity-absorption (C-ABS)	0.007	0.467	-0.02
	Sensation seeking (SS)	1.165	0.778	1.50
Step 2	Drinks per week X C-EXP	0.304	0.381	0.80
	Drinks per week X C-ABS	0.249	0.407	0.61
	Drinks per week X SS	-0.461	0.303	-1.52
Counts portion of model				
Step 1	Drinks per week	0.079	0.032	2.43**
	Curiosity-exploration (C-EXP)	-0.232	0.050	-4.66***
	Curiosity-absorption (C-ABS)	0.105	0.047	2.23*
	Sensation seeking (SS)	0.162	0.036	4.45***
Step 2	Drinks per week X C-EXP	-0.004	0.031	-0.12
	Drinks per week X C-ABS	0.015	0.025	0.62
	Drinks per week X SS	-0.003	0.020	-0.28

Note.

<sup>†</sup>  $p < .10$ .

\*\*\*  $p < .001$ .

\*  $p < .05$ .