Short Communication

Gender, history of alcohol use and number of drinks consumed predict craving among drinkers in a field setting

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HIGHLIGHTS

• Data are collected in a naturalistic/field setting with 1320 bar patrons.
• We examine gender, AUDIT score and drinks consumed as predictors of alcohol craving.
• Women with high AUDIT scores or higher alcohol consumption report greatest craving.
• In men, high AUDIT scores alone predicted greater craving.
• Findings have implications for targeted intervention and prevention efforts.

ARTICLE INFO

ABSTRACT

To the extent that craving serves to compel excessive drinking, it would be important to predict the intensity of an individual's craving over the course of a drinking episode. Previous research indicates that regular alcohol use (measured by the AUDIT) and the number of drinks individuals have already consumed that evening independently predict craving to drink (Schoenmakers & Wiers, 2010). The current study aims to replicate those findings by testing whether these same variables predict craving to drink in a sample of 1320 bar patrons in a naturalistic setting. In addition, we extend those findings by testing whether regular alcohol use and self-reported number of drinks consumed interact to predict craving, and whether gender independently predicts craving or interacts with other variables to predict craving. Results indicate that for men, AUDIT score alone predicted craving, whereas for women, AUDIT score and number of drinks consumed interacted to predict craving, with craving highest among women with either high AUDIT scores or relatively high consumption levels. Our findings have implications for targeted intervention and prevention efforts, as women who have a history of harmful alcohol use and consume several drinks in an evening might be at the greatest risk for continued alcohol consumption.

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1. Introduction

Craving for alcohol has received much attention in the literature (e.g., Agrawal et al., 2013; Kavanagh, May, & Andrade, 2009; Robinson & Berridge, 2001), and is regarded as an important construct of the complex prediction of drinking-related behaviors (Connolly et al., 2013; Richardson, Baillie, Reid, et al., 2008). At the event level, understanding how strongly individuals crave alcohol during a drinking episode might provide important clinical information about their degree of risk for excessive drinking and possible concomitant drinking-related negative consequences.

Individuals with a longer or more intense history of alcohol use may develop an increased tolerance to alcohol (Shapiro & Nathan, 1986), and thus may drink more within an episode in order to obtain the desired physiological and behavioral effects. History of alcohol use, then, might lead to increased craving for alcohol once drinking has been initiated.

Once alcohol consumption has begun, there are associated changes in subjective (King, de Wit, McNamara, & Cao, 2011; King, Roche, & Rueger, 2011) and cognitive (de Wit & Chutuape, 1993; Field, Wiers, Christiansen, Fillmore, & Verster, 2010; Fillmore, Blackburn & Harrison, 2008; Fillmore, Marczinski, & Bowman, 2005; Fillmore, Ostling, Martin, & Kelly, 2009; Lyvers & Maltzman, 1991; Marinkovic, Rickenbacher, Azma, & Artsy, 2012) processes that may contribute to continued alcohol-seeking. Alternatively, having access to alcohol might decrease craving for alcohol because craving may be activated primarily when access to alcohol is blocked (Tiffany, 1990). Determining whether alcohol consumption

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increases or decreases craving among drinkers is important, as changes in craving may have an effect on subsequent consumption.

To our knowledge, there has been only one study that took into account both regular/consistent use of alcohol and the amount of alcohol that bar patrons had already consumed that night, and authors found that both variables independently predicted craving (Schoenmakers & Wiers, 2010). However, this study did not address potential interactive effects of these variables, despite the potential for drinking history to differentiate between those who are and are not motivated to continue to drink. The current study aims to replicate and extend these findings to predict craving for alcohol among a sample of drinkers in a naturalistic setting. We expected that (1) those with a more harmful or hazardous recent drinking history, and (2) those who had consumed a greater number of drinks would report greater craving for alcohol. We also predicted that (3) those who had a more intense recent drinking history *and* a greater number of drinks would evidence the greatest level of craving. In addition, because research indicates that men and women have different drinking histories and patterns (Roberts, 2012; Wilsnack, Wilsnack, Kristjanson, Vogeltanz-Holm, & Gmel, 2009), we examined the role of gender in predicting craving for alcohol.

2. Material and methods

2.1. Participants and study design

The protocol was approved by the university IRB and data collection took place over two years. Local law enforcement was apprised of this field investigation, but was not directly involved at any point. The study design and methods are described in detail elsewhere (Celio, Vetter-O'Hagen, Lisman, Johansen, & Spear, 2011; Day, Celio, Lisman, Johansen, & Spear, 2013). Briefly, the study team, in groups of three to four research assistants, recruited individuals between the hours of 11 pm and 2:30 am on Thursday and Friday nights in a college city downtown bar district. Individuals displaying overt symptoms of severe impairment (e.g., grossly incoherent speech, inability to stand) were not invited to participate.

After providing verbal consent (we obtained a waiver of written consent to protect participant anonymity), participants completed a semi-structured interview and a paper-and-pencil survey. Procedures took approximately 8 min to complete. A total of 1904 individuals participated in the survey; 155 cases (8.1%) were removed due to invalid responding. Cases were also excluded if they were missing data for age,[1] gender, AUDIT score, drinks consumed, or craving (n = 429). This resulted in a final sample of 1320 participants. Participation was anonymous and voluntary; no other incentives were provided.

2.2. Measures

Demographics (age, gender, student status) were assessed via the paper-and-pencil survey.

2.2.1. Number of drinks consumed

We calculated the sum of how many standard drinks (12 oz. of beer; 1.5 oz. of hard liquor, or 5 oz. of wine) participants had consumed (1) prior to and (2) during their time in the bar district.

2.2.2. Recent alcohol use

The Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) was included as a self-report measure of past year drinking history and associated problems/risk. Scores range from 0 to 40, with higher scores indicating greater

risk. The AUDIT has been shown to provide reliable reports under naturalistic conditions (Celio et al., 2011).

2.2.3. Craving

Participants rated their craving for alcohol on a scale of 0 (low craving)–10 (higher craving).

2.3. Statistical analyses

Variables were examined to ensure they met the assumptions for parametric analyses, then bivariate correlations among the variables of interest were completed. Multiple regression analysis was used to test whether gender, AUDIT total score, number of drinks consumed, and the subsequent two- and three-way interactions predicted craving to drink, controlling for age. All independent variables and interaction terms were entered into the model simultaneously; therefore, order of entry is not a factor when interpreting results.

3. Results

3.1. Sample demographics and descriptive statistics

This sample was predominately male (57.5%) and Caucasian (76.9%) with a mean age of 20.97 years ($SD = 2.3$, range: 15–35). Participants were characterized by a moderate to high level of alcohol-related risk, with a mean AUDIT score of 12.75 ($SD = 6.84$; range: 0–40). Participants reported having consumed an average of 6.32 drinks already that evening ($SD = 4.56$, range: 0–32), and reported a mean craving rating of 5.52 ($SD = 3.37$, range: 0–10). Men (n = 759) were significantly older than women (n = 561) in the sample (21.2 versus 20.7 years, $p < .01$), scored higher on the AUDIT (13.91 versus 11.18, $p < .01$), and reported consuming more drinks (7.5 versus 4.5, $p < .01$). Men and women did not differ in self-reported craving ($p = .90$). Craving was negatively associated with age ($r = -.08$) and positively associated with AUDIT score ($r = .40$) and number of drinks consumed ($r = .19$), all $ps < .01$. Craving was not associated with gender.

3.2. Predicting craving to drink

The results of the regression indicated that the complete model explained 20% of the variance ($F(8,1319) = 41.42$, $p < .001$) (see Table 1). There were main effects of both gender ($\beta = .16$, $p < .001$, females had greater craving) and AUDIT score ($\beta = .36$, $p < .001$, higher AUDIT scores were associated with greater craving). There was no main effect of total drinks on craving ($\beta = .05$, $p = .12$). Gender and number of drinks interacted to predict craving ($\beta = .10$, $p = .002$), such that among those who reported consuming more drinks there was higher reported craving among women. The three-way interaction of gender, AUDIT, and number of drinks was significant ($\beta = -.12$, $p < .001$). Simple slopes of the 3-way interaction revealed that for women, both AUDIT ($\beta = .36$, $p < .001$) and self-reported number of drinks consumed predicted

Table 1
Multiple linear regression analyses of craving.

	B	SE	β	t	p
Age	−.04	.04	−.03	−1.00	.32
Gender	1.10	.19	.16	5.67	<.001
AUDIT	.18	.02	.36	10.04	<.001
Total drinks	.04	.02	.05	1.55	.12
Gender × AUDIT	.001	.03	.001	.02	.99
Gender × total drinks	.16	.05	.10	3.13	.002
AUDIT × total drinks	−.004	.003	−.04	−1.25	.21
Gender × AUDIT × total drinks	−.024	.006	−.12	−3.78	<.001

Note. $R^2 = .20$; gender is a dichotomous categorical variable with 0 indicating male and 1 indicating female; all continuous variables were centered.

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[1] Individuals above the age of 35 were also excluded due to small cell sizes. Age range in the full sample ranged from 15 to 77 years (range 36–77, n = 19).