



Short Communication

Psychometric evaluation of a standardized set of alcohol cue photographs to assess craving



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HIGHLIGHTS

- This study presents psychometric properties of a new set of alcohol photo cues.
- Images of alcohol standardized with beverage as the primary focus of each image
- Alcohol cue craving ratings formed one internally consistent factor.
- Findings supported convergent, incremental, and discriminant validity of cues.

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ABSTRACT

Introduction: Research using alcohol-related visual stimuli has been limited due to a lack of published studies examining the psychometric properties of alcohol cues. The primary aim of the current study was to examine the factor structure, validity, and reliability of craving ratings following exposure to alcohol cues (including beer, wine, hard liquor, and mixed drinks) in an alcohol cue-reactivity paradigm.

Methods: U.S. adults ages 21–69 [N = 195; Mage = 32.19, SD = 10.63; 74.4% male; 56.4% Asian/Pacific Islander, 34.9% White (non-Hispanic), 4.6% Other, 2.0% Hispanic/Latino, 1.5% Native American/Alaskan Native, and 0.5% African-American] completed questionnaires and provided craving, arousal, and valence ratings following alcohol, positive, negative and neutral cues in a web-based study.

Results: The alcohol craving ratings following alcohol cues formed one internally consistent factor. Convergent and incremental validity was supported as alcohol cue craving ratings were positively correlated with general craving, past-year hazardous alcohol use, and behavioral activation facets, even while controlling for neutral cue craving ratings and other related variables. Alcohol craving was significantly higher following alcohol cues compared to neutral cues and unrelated to behavioral inhibition, supporting discriminant validity.

Conclusions: These findings provide support that the alcohol cues we developed are reliable and valid stimuli for the use in alcohol cue reactivity paradigms. Future research assessing alcohol cue reactivity using this validated photographic cue set may facilitate a greater understanding of the affective processes associated with alcohol use and allow for more targeted behavioral change interventions for alcohol-related problems.

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1. Introduction

Alcohol craving or one's "desire or urge to drink," is associated with severity of alcohol use problems and impacts a person's approach or avoidance of alcohol consumption (Kramer et al., 2010; Wiers et al., 2007). While researchers have examined reactions to alcohol cues, the lack of a validated alcohol cue set to assess alcohol craving has hindered the interpretations that can be drawn across studies. Alcohol cue reactivity studies examining pictorial stimuli have included alcohol-related cues sourced from the following: (1) standardized picture sets

that were not developed with the intention of assessing craving (e.g., Normative Affective Picture System [NAPS; Stritzke, Breiner, Curtin, & Lang, 2004] and International Affective Picture System [IAPS; Lang, Bradley, & Cuthbert, 2008]; Drobles, Carter, & Goldman, 2009), (2) internet and stock photography (e.g., Carter, 2010; Drobles et al., 2009; Pulido, Brown, Cummins, Paulus, & Tapert, 2010), or (3) researcher-created photographs (e.g., Billieux et al., 2011). Some of these studies used alcohol cues without supporting psychometric evidence (Carter, 2010; Drobles et al., 2009; Grüsser, Heinz, & Flor, 2000). Other researchers provided some psychometric data related to alcohol cues; however, aspects related to the content presented within the photographs are problematic and could be improved to provide a more precise and comprehensive examination of alcohol cue reactivity (Billieux et al., 2011; Carter, 2010; Lee, Namkoong, Lee, An, & Lee, 2006).

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Of the available work to date focused on developing and evaluating a set of standardized alcohol photo cues (e.g., Billieux et al., 2011; Lee et al., 2006; Pulido et al., 2010), there remain several limitations. For example, the content of many photo cues used also include social cues, branding and labels used in advertising, and other environmental stimuli (Billieux et al., 2011; Lee et al., 2006; Pulido et al., 2010) that while potentially enhancing ecological validity, pose threats to internal validity. Further, many studies used idiographic stimuli based on each participant's preferred beverage (Coffey, Saladin, Libet, Drobos, & Dansky, 1999; Payne et al., 1992; Pomerleau, Fertig, Baker, & Cooney, 1983; Schulze & Jones, 2000) without first fully understanding the effect of personalized cues compared to standardized cues. Finally, there has been little attention to assessing craving following alcohol cue presentation, even with the repeated assertion that craving ratings are a necessary component for substance stimuli validation (e.g., nicotine: Carter et al., 2006; alcohol: Carter, 2010). Taken together, there is a lack of empirical work focused on validating a standardized alcohol cue picture set.

1.1. Current study

We aimed to evaluate the psychometric properties for a set of alcohol cues for use in non-alcohol dependent samples. The present study expanded upon previous alcohol cue standardization studies (Billieux et al., 2011; Lee et al., 2006; Pulido et al., 2010) by (1) examining a set of alcohol beverage cues that adequately excluded extraneous influences (e.g., advertising, branding, social depictions, gender stereotypes, and inclusion of cigarette smoking); (2) providing a more comprehensive assessment of validity and reliability; (3) adding the measurement of subjective craving alongside valence and arousal following each cue; and (4) including commonly consumed beverages (e.g., beer, wine, liquor, mixed drinks) in the alcohol cue set. We examined factor structure, internal consistency, as well as convergent, incremental, and discriminant validity to evaluate the psychometric properties of the alcohol cues.

2. Method

2.1. Participants and procedures

U.S. adults ($N = 195$) of ages 21–69 [$M_{\text{age}} = 32.19$, $SD = 10.63$; 74.4% male; 56.4% Asian or Pacific Islander, 34.9% White (non-Hispanic), 4.6% Other, 2% Hispanic/Latino, 1.5% Native American/Alaskan Native, and 0.5% African-American] were recruited through Mechanical Turk® (MTurk®). Participants reported past 30-day alcohol use, denied past-4-hour alcohol use, denied being an alcoholic or abstaining from alcohol,

and had an MTurk® “quality rating” of $\geq .90$. Most participants had a two-year college degree or higher (77.4%) and were employed (82.1%).

The participants were directed to Qualtrics® for informed consent, the online study, and debriefing. Upon providing informed consent, the participants completed self-report questionnaires and a cue rating task in which the participants were shown a series of photographs and asked to provide valence, arousal, and craving ratings after each cue. Twenty alcohol cues (five pictures from each of four alcohol beverage categories) and 12 pictures from each of three IAPS categories (positive, negative, neutral) were presented in randomized order. The participants were debriefed and compensated \$0.69, based on the average MTurk® rate.

2.2. Measures

The Desires for Alcohol Questionnaire (DAQ; Love, James, & Willner, 1998) measured desire to drink, ability to control drinking, anticipation of positive drinking outcomes, and anticipation of relief from negative affect or alcohol withdrawal. The DAQ has demonstrated concurrent validity and reliability among individuals with and without an alcohol use disorder (Kramer et al., 2010). See Table 1 for means, standard deviations, and Cronbach's alphas for multi-item self-report measures.

The Alcohol Use Disorder Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) is a well-established measure of past-year hazardous alcohol use (i.e., alcohol use quantity/frequency, dependence symptoms, and negative consequences).

The Behavioral Inhibition System/Behavioral Activation System (BIS/BAS; Carver & White, 1994) was used to measure individual differences in the sensitivity and regulation of both aversive motives (BIS; unidimensional) and appetitive motives (BAS; comprised of drive, fun-seeking, and reward subscales).

The Self-Assessment Manikin picture rating system (SAM; Bradley & Lang, 1994) includes two nine-point scales for rating valence (i.e., displeasure/pleasure) and arousal (i.e., calm/excitement) experienced at the moment. This method has shown strong validity and test-retest reliability in measuring affective reactions (Bradley & Lang, 1994). The participants were also asked to make alcohol craving ratings following images on 1 (no craving or desire) to 9 (intense craving or desire) scale.

2.3. Stimuli

2.3.1. Alcohol stimuli

To assess responses to alcohol cues, five photographs from each of four alcohol beverage categories (i.e., beer, wine, hard liquor, and

Table 1
Correlation matrix.

	α	Mean	SD	Gender	Ethnicity	Age	Craving ^a	DAQ	AUDIT	BIS	BASD	BASF	BASR
Gender	–	–	–	1									
Ethnicity	–	–	–		1								
Age	–	32.19	10.63	.06	–.36*	1							
Craving ^a	.99	5.23	2.61	–.17**	.66*	–.44*	1						
DAQ	.89	20.54	9.35	–1.0	.52*	–.39*	.75*	1					
AUDIT	.87	12.79	8.17	–.23*	.43*	–.38*	.61*	.61*	1				
BIS	.69	19.28	3.54	.20*	–.13	.01	–.08	–.03	–.11	1			
BASD	.78	11.50	2.51	.11	.17**	–.13	.24*	.28*	.07	.13	1		
BASF	.72	11.27	2.43	–.01	.15**	–.17**	.26*	.36*	.15**	–.001	.56*	1	
BASR	.82	16.08	3.05	.16**	–.15**	.07	–.02	.06	–.14**	.27*	.64*	.47*	1

Note. DAQ = Desires for Alcohol Questionnaire, AUDIT = Alcohol Use Disorders Identification Test, BIS = Behavioral Inhibition System, BASD = Behavioral Activation System—Drive, BASF = Behavioral Activation System—Fun-seeking, BASR = Behavioral Activation Scale—Reward. Gender: women = 0, men = 1. Ethnicity: White (non-Hispanic) = 0; non-White = 1.

^a Craving for alcohol following alcohol cues.

* $p < .01$.

** $p < .05$.

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