Short Communication

Resolving an identity crisis: Implicit drinking identity and implicit alcohol identity are related but not the same

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ABSTRACT

Two variations of the Implicit Association Test (IAT), the Drinking Identity IAT and the Alcohol Identity IAT, assess implicit associations held in memory between one's identity and alcohol-related constructs. Both have been shown to predict numerous drinking outcomes, but these IATs have never been directly compared to one another. The purpose of this study was to compare these IATs and evaluate their incremental predictive validity. US undergraduate students (N = 64, 50% female, mean age = 21.98 years) completed the Drinking Identity IAT, the Alcohol Identity IAT, an explicit measure of drinking identity, as well as measures of typical alcohol consumption and hazardous drinking. When evaluated in separate regression models that controlled for explicit drinking identity, results indicated that the Drinking Identity IAT and the Alcohol Identity IAT were significant, positive predictors of typical alcohol consumption, and that the Drinking Identity IAT, but not the Alcohol Identity IAT, was a significant predictor of hazardous drinking. When evaluated in the same regression models, the Drinking Identity IAT, but not the Alcohol Identity IAT, was significantly associated with typical and hazardous drinking. These results suggest that the Drinking Identity IAT and Alcohol Identity IAT are related but not redundant. Moreover, given that the Drinking Identity IAT, but not the Alcohol Identity IAT, incrementally predicted variance in drinking outcomes, identification with drinking behavior and social groups, as opposed to identification with alcohol itself, may be an especially strong predictor of drinking outcomes.

1. Introduction

Two variants of the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) measure implicit associations between one's identity (the self) and alcohol-related constructs. IATs are computer-administered reaction time tasks thought to assess the relative strength of associations between constructs held in memory and have demonstrated utility for predicting hazardous drinking, often predicting above and beyond self-report questionnaires (for reviews, see Lindgren, Neighbors, Gasser, Ramirez, & Cvencek, 2016a; Reich, Below, & Goldman, 2010). The Drinking Identity IAT (DI-IAT; Lindgren et al., 2013b) assesses the relative associations between the constructs *me* (stimuli: me, my, mine, and self) and *not me* (stimuli: they, them, theirs, other) with the constructs *drinker* (stimuli: drinker, drink, drunk, and partier) and *non-drinker* (stimuli: non-drinker, abstainer, sober, and abstain). The Alcohol-Identity IAT (AI-IAT; Gray, LaPlante, Bannon, Ambady, & Shaffer, 2011), also includes the constructs (and identical stimuli) for *me* and *not me*, but assesses their associations with alcohol and water (stimuli: images of alcohol or water, respectively). Both IATs

have good psychometric properties and are positively associated with a range of drinking outcomes (Caudwell & Hagger, 2014; Gray et al., 2011; Lindgren et al., 2016a). The DI-IAT has been more widely implemented. It predicts unique variance in multiple drinking outcomes after controlling for other well-validated cognitive factors (e.g., alcohol expectancies, drinking motives, drinking norms; Lindgren, Ramirez, Olin, & Neighbors, 2016b), as well as other alcohol-related IATs (Lindgren, Foster, Westgate, & Neighbors, 2013a; 2013b), thereby highlighting the unique role of alcohol-related identities as predictors of hazardous drinking.

Despite their similarities, the DI-IAT and the AI-IAT have not been evaluated in the same study. Therefore, it is unknown whether these IATs assess redundant information or whether one is more positively linked to drinking outcomes than the other. Thus, the primary aims of this study were to investigate their relation to one another, the incremental validity of each IAT separately after controlling for explicit drinking identity (which, to date, is unknown for the AI-IAT), and the incremental validity of each IAT when both were included in the same model. We hypothesized that the IATs would be moderately correlated,

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but not fully redundant. Competing hypotheses were offered and tested regarding the incremental validity of each IAT. First, it is possible that the DI-IAT may be a stronger predictor of drinking outcomes than the AI-IAT. Associations with behaviors and a social group are theorized to be important for substance-related identities (Frings & Albery, 2015), and the category labels and stimuli for the DI-IAT include words that involve drinking behavior and social groups (e.g., drink, partier), whereas the AI-IAT contains only pictures of alcohol itself (e.g., beer, wine). Conversely, the AI-IAT may be a stronger predictor than the DI-IAT. Alcohol itself is more proximal to actual drinking outcomes, and the AI-IAT focuses only on alcohol.

2. Method

2.1. Participants

Participants were 64 undergraduate students (50% women) from a large public Pacific Northwestern university (age: $M = 21.98$, $SD = 0.88$). Forty-two percent identified as White, 39% as Asian, 8% as multiracial, 6% as African American and 5% as Native Hawaiian, Pacific Islander, or unknown. Five percent identified as Hispanic or Latino.

2.2. Procedure

Procedures were approved by the university's Institutional Review Board. Students were invited via email to take part in a study on cognitive factors in drinking. Eligible students (at least 21 years old, a full-time student) came to the lab to complete a computer-based assessment. Participants were paid $15.

2.3. Measures

2.3.1. Implicit association tests (IATs)

Two IATs were included in the study. The DI-IAT (Lindgren et al., 2013b) assessed the associations between "*me*" (vs. "*not me*") and "*drinker*" (vs. "*non-drinker*"). The AI-IAT (adapted from Gray et al., 2011) assessed the associations between "*me*" (vs. "*not me*") and alcohol (vs. *water*). Both IATs used the traditional seven-block structure (Greenwald et al., 1998) and were computer-administered. Each block contains multiple trials in which participants are presented with a single stimulus and are asked to sort it according to the categories listed on the left or right side of the screen (using the *d* key for left and the *k* key for right) as quickly and accurately as possible. Blocks 1, 2, and 5 are practice blocks for learning the sorting rules. Blocks 3, 4, 6, and 7 are critical blocks, in which two categories are sorted on the same side using the same key. For example, in Blocks 3 and 4, one sorts "drinker" and "me" stimuli on the left and "non-drinker" and "not me" stimuli on the right. The order is reversed for Blocks 6 and 7: one sorts "drinker" and "not me" stimuli on the left and "non-drinker" and "me" stimuli on the right. The sorting speed (reaction time) for the first pairing ("drinker" and "me" vs. "non-drinker" and "not me") is compared to the sorting speed for the second pairing ("non-drinker" and "me" vs. "drinker" and "not me"). The difference in sorting speed is a proxy for the relative strength of the implicit associations (i.e., shorter sorting speed for the first pairing compared to the second would indicate a relatively stronger implicit drinking identity). The order in which IATs were presented was randomized across participants. IATs were interspersed among self-report measures.

IAT scores were calculated using the *D*-score algorithm (Greenwald, Nosek, & Banaji, 2003). Data were screened following practices recommended by Nosek, Greenwald, and Banaji (2007). *D*-scores were calculated such that higher scores indicated stronger associations with drinker and me (DI-IAT) or alcohol and me (AI-IAT). Internal consistencies (calculated by creating *D*-scores for Blocks 3 & 6 and Blocks 4 & 7 and correlating them; see Greenwald et al., 2003) were 0.49 (DI-IAT) and 0.46 (AI-IAT).

Table 1
Correlation matrix for study variables.

Measure	M (SD)	1	2	3	4	5
1. Drinking identity IAT	0.17 (0.38)	___				
2. Alcohol identity IAT	0.38 (0.33)	0.36**	___			
3. Explicit drinking identity[a]	1.93 (1.16)	0.34**	0.39**	___		
4. Typical alcohol consumption[b]	9.64 (11.14)	0.43**	0.29*	0.63**	___	
5. Hazardous drinking[c]	7.45 (5.87)	0.52**	0.34**	0.38**	0.52**	___

Note. IAT = Implicit Association Test; higher scores on IATs indicate stronger drinking and alcohol identities.
  [a] Derived from the Alcohol Self-Concept Scale; higher scores indicate greater identification with drinking alcohol.
  [b] Number of standard drinks derived from the Daily Drinking Questionnaire.
  [c] Summary score derived from the Alcohol Use Disorders Identification Test.
  * $p < 0.05$.
  ** $p < 0.01$.

2.3.2. Explicit drinking identity

The Alcohol Self-Concept Scale (ASCS) assessed explicit drinking identity (Lindgren et al., 2013b). It is a 5-item measure examining the extent to which drinking alcohol plays a role in an individual's life and personality (e.g., "Drinking is part of who I am"). Participants rated their agreement using a 7-point scale ($-3 = $ *strongly disagree* and $3 = $ *strongly agree*). Cronbach's Alpha = 0.89.

2.3.3. Drinking outcomes

The Daily Drinking Questionnaire (DDQ; Collins, Parks & Martlatt, 1985) examined participants' typical alcohol consumption in the last three months. Participants reported the number of standard drinks they consumed on each day of a typical week and were summed to represent total drinks per week. The Alcohol Use Disorder Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), a 10-item measure evaluating consumption, consequences, and symptoms of dependence, was used as an index for hazardous drinking. Items were summed. Cronbach's Alpha = 0.98.

3. Results

3.1. Descriptive statistics and correlations

See Table 1 for means and correlations between the study measures.[1] The IATs were significantly, but moderately correlated with each other ($r = 0.36$), and each was significantly associated with explicit drinking identity and both drinking outcomes (r's between 0.29 and 0.52). Mean *D*-scores were significantly different from zero for both IATs, but were positive for the DI-IAT ($M = 0.17$, $t_{58} = 3.53$, $p = 0.001$) and negative for the AI-IAT ($M = -0.38$, $t_{59} = -9.03$, $p < 0.001$), indicating that participants were more likely to associate "me" with "drinker" than with "non-drinker" but more likely to associate "me" with water than alcohol.

3.2. Regression analyses

The drinking outcome variables were positively skewed. Thus, count regression models with a negative binomial log link were used

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[1] Of the 64 participants, 53 reported drinking alcohol in the previous three months, and had stronger mean *D*-scores than 11 non-drinkers for the DI-IAT (drinkers: $M = 0.23$, $SD = 0.38$; non-drinkers: $M = -0.08$, $SD = 0.28$; $t_{57} = 2.87$, $p = 0.011$) and the AI-IAT (drinkers: $M = -0.31$, $SD = 0.29$; non-drinkers: $M = -0.71$, $SD = 0.28$; $t_{58} = 3.85$, $p = 0.002$).