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Short report

The image-based alcohol-action implicit association test

Tibor P. Palfai*, Carl K. Kantner, Kelli D. Tahaney

Boston University, USA

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ABSTRACT

Background and Objectives: Previous work has shown that automatic alcohol-action associations, assessed by the Implicit Association Test (IAT), may play a role in hazardous drinking patterns. The majority of alcohol-related IATs have been constructed using verbal stimuli, and even those who have used pictorial stimuli have only represented beverage categories with pictures. To assess implicit appetitive responses among a broader population of alcohol users, such as those who experience limitations reading and understanding English, there may be utility in the development of an IAT that utilizes only non-verbal stimuli.

Methods: The current study presents an initial effort to develop such a task and examine its association with drinking. One hundred and fifty-three university students participated individually in a laboratory study in which they first completed a pictorial alcohol-specific approach/avoid IAT, followed by self-report measures of drinking.

Results: As hypothesized, negative binomial regression analyses showed that IAT scores predicted the number of heavy drinking episodes and typical number of drinks per occasion.

Limitations: The use of a university student sample for this initial study represents an important limitation of this work, which should be addressed in future research.

Conclusions: These findings provide initial evidence for the potential use of non-verbal IATs to assess alcohol-related implicit cognition among adults. Implications for the assessment of hazardous drinking behavior across populations are discussed.

1. Introduction

There is now considerable evidence to suggest that excessive drinking may be associated with stronger automatic appetitive responses to alcohol cues (Stacy & Wiers, 2010). These responses have been characterized as a function of automatic associations in memory between alcohol cues and appetitive responses. Although assessment of these automatic associations has been demonstrated using a variety of tasks (e.g., Field, Caren, Fernie, & De Houwer, 2011; Ostafin, Palfai, & Wechsler, 2003), the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) has been the most commonly used index of automatic alcohol associations. Investigators have shown that individuals who engage in heavier drinking show stronger associations between alcohol cues in memory and positive affect (e.g., de Jong, Wiers, van de Braak, & Huijding, 2007), positive alcohol expectancies (e.g., Jajodia & Earleywine, 2003), and approach motivation (e.g., Palfai & Ostafin, 2003).

Consistent with the broader literature on the IAT, alcohol-specific IAT studies have traditionally used words to represent stimulus (e.g., alcohol) and attribute (e.g., approach) categories (e.g., Palfai & Ostafin, 2003; Wiers, Van Woerden, Smulders, & DeJong, 2002). However, to facilitate efforts to characterize individual differences in automatic associations to specific cues, there may be advantages to using pictorial representations of stimuli to represent categories (Ostafin & Palfai, 2006; Teachman, Gregg, & Woody, 2001). There is evidence to suggest that priming of automatic associations may be facilitated with pictorial cues (Fazio, Jackson, Dunton, & Williams, 1995) as more relevant schema may be activated by cues that better represent the stimuli encountered in environments. Pictorial cues of appetitive stimuli such as alcohol may be particularly salient to heavier drinkers, and as such may provide a stronger index of automatic, motivationally relevant responses to alcohol. A number of studies have shown that alcohol-related IATs that make use of picture stimuli to represent target categories (Cohn et al., 2012; Lindgren et al., 2012; Ostafin & Palfai,

* Corresponding author. Boston University, Department of Psychology, 648 Beacon Street, 4th Floor, Boston, MA 02215, USA.
E-mail address: palfai@bu.edu (T.P. Palfai).

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2006) show adequate internal reliability and predict alcohol-related outcomes.

Although there has been increased interest in the use of pictorial stimuli to represent target categories, the attribute categories (e.g., good/bad, approach/avoid) in these studies have typically been represented as verbal stimuli. The use of pictorial stimuli to represent attribute categories may be particularly useful for those who have limited verbal skills or limited verbal skills in the language in which the task is to be completed. Moreover, the use of non-verbal stimuli to represent attribute categories may provide a method of assessing motivationally relevant associations that are not verbally mediated (Slabbinck, De Houwer, & Van Kenhove, 2011). The few studies that have used pictures as stimuli for attribute categories have used them to assess implicit associations among children (e.g., Pieters, Haske van der Vorst, Engels, Wiers, 2010; Thomas, Smith, Ball, & Tasmania, 2007). Pieters, van der Vorst, Engels, and Wiers (2010), for example, found that 11-12 year-olds who showed stronger associations between angry adult facial expressions and alcohol pictures were more likely to use alcohol. The use of non-verbal stimuli to represent all categories in the IAT has not yet been examined among adult populations of drinkers. Moreover, no study to date has explored whether alcohol-action associations as measured by the IAT may be represented non-verbally.

The current study presents an initial effort to develop this type of alcohol non-verbal IAT task and examine its association with drinking. In this initial phase, the task was developed with university undergraduates, the population on which a good deal of research on the alcohol IAT has been conducted. University student drinkers completed a non-verbal IAT prior to a series of self-report questionnaires. Based on previous work with the approach-avoid IAT (e.g., Ostafin & Palfai, 2006; Palfai & Ostafin, 2003), the main hypothesis was that response times on the image-based alcohol-action IAT would be associated with more frequent heavy episodic drinking in the past 30 days. Associations with typical drinking amounts per occasion and frequency of drinking were also examined.

2. Methods

2.1. Participants

Subjects consisted of undergraduate students over the age of 18 from a large private university in the northeastern United States. Students participated in exchange for course credit in introductory psychology. Recruitment and study procedures were approved by the university's IRB. A total of 153 subjects completed study procedures. The mean age of the sample was 19.24 (SD = 1.18) years, and 75.2% of participants were female, which did not differ by group. The majority of the sample (56%) was Caucasian (25% Asian, 4% Black, 1% Hawaiian/Pacific Islander, 14% other), 8.5% identified as Hispanic and 77% identified English as their first language. Students had a mean of 1.79 (SD = 2.86) heavy drinking episodes, consumed a mean of 2.18 (SD = 2.49) drinks per occasion, and consumed alcohol on a mean of 2.9 (SD = 3.60) occasions in the past month. Male students were more likely to engage in drinking more frequently than female students [3.95 (SD = 4.27) vs. 2.55 (SD = 3.33)] and to consume more drinks on a typical drinking occasion [3.16 (SD = 3.45) vs. 1.97 (SD = 2.15)] but not more likely to engage in heavy episodic drinking (using gender specific definitions) [2.18 (SD = 3.44) vs. 1.66 (SD = 2.65)].[1]

2.2. Measures and procedures

All procedures took place during a 1-h laboratory session. Subjects first provided informed consent and then were randomized to the IAT order condition. The IAT was administered, followed by self-report questionnaires on individual differences and alcohol use behaviors.

Alcohol use. The Daily Drinking Questionnaire- Modified (Dimeff, Baer, Kivlahan, & Marlatt, 1999) was used to collect information on past month alcohol use. Subjects indicated the frequency and typical quantity of drinking per occasion over the past 30 days, as well as the number of heavy drinking episodes (5 or more drinks on one occasion for males and 4 or more for females) in the past 30 days.

2.3. Non-verbal alcohol action IAT

Automatic action associations to alcohol cues were examined with a non-verbal alcohol-specific IAT developed for this study. The task required that participants categorize a series of stimuli presented one at a time according to one of four categories: two target categories (i.e., alcohol, water) and two attribute categories (i.e., approach avoid). The stimulus set for the attribute and target categories were pictures. The alcohol and water pictures consisted of single or multiple bottle/can pictures of established brands (e.g., Budweiser, Coors, Corona, Jack Daniel's, Miller Light, Perrier, Evian, Dasani, FIJI, Aquafina) as well as unbranded water bottles. The approach and avoid pictures consisted of either a man or woman engaging in different actions. The approach pictures included, “man gesturing for embrace”, “woman and child running toward one another”, “woman gesturing come here”, “hand reaching for trophy”, “arm and hand extended out to shake”. The avoid pictures included actions such as, “woman running away”, woman gesturing stop”, man blocking his head with hands and turning away”, “man gesturing stop”, “woman shielding face.”.[2] The approach set consisted of The IAT consisted of 7 blocks—(a) a 20-trial alcohol-water picture discrimination task (e.g., right = alcohol, left = water), (b) a 20 trial approach-avoidance picture discrimination task (e.g., right = approach, left = avoid), (c) a 20-trial combination block (e.g., right = alcohol or approach, left = water or avoid), (d) a 40-trial combination block of the same combination, (e) a 20-trial single category discrimination block where the target categories are reversed (right = water, left = alcohol), (f) a 20 trial combined incongruent block (e.g., right = water or approach, left = alcohol or avoid), and (g) a 40-trial incongruent block. The IAT was presented in two orders that were counterbalanced across students—one with “alcohol” and “approach” in the first combined block and one with “alcohol” and “avoid” in the first combined block.

Reaction time data were prepared for analysis by first removing incorrect responses and outliers that Exceeded 10,000 ms (Greenwald, Nosek, & Banaji, 2003). Participants who did not complete at least 80% of the trials correctly (n = 7) were removed from subsequent analyses and one participant was removed because of inconsistencies in responding (e.g., reporting no drinking in the past month but 3 heavy drinking episodes). The implicit appetitive response index was based on the D2SD score (D3), which was calculated by examining the difference between response

[1] Univariate ANOVAs showed that males were more likely to engage in drinking more frequently [$F(1, 151) = 4.35$, $p < .05$] and to consume more drinks on a typical drinking occasion [$F(1, 151) = 6.33$, $p < .05$] but not more likely to engage in heavy episodic drinking (using gender specific definitions) [$F(1, 151) = .96$, $p = .33$].

[2] As the approach-avoid picture stimuli were novel, each picture was rated by a pilot sample of 20 students on 7 point Likert-scale items ranging from −3 (very clearly avoid) to 0 (unclear/I don't know) to +3 (very clearly approach). Mean ratings for the approach pictures were 2.60 (SD = .31) and mean ratings for the avoid pictures were 2.4 (SD = .35).