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Habit doesn't make the predictions stronger: Implicit alcohol associations and habitualness predict drinking uniquely

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HIGHLIGHTS

- Does habitualness interact with implicit alcohol associations to predict drinking?
- We tested this in a study of 506 US undergraduates.
- Moderation was largely not supported.
- Habitualness and implicit alcohol association independently predicted drinking.
- Both are potential risk factors of hazardous drinking and targets for intervention.

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ABSTRACT

Introduction: As research on implicit (in the sense of fast/reflexive/impulsive) alcohol associations and alcohol advances, there is increasing emphasis on understanding the circumstances under which implicit alcohol associations predict drinking. In this study, we investigated habitualness of drinking (i.e., the extent to which drinking is automatic or occurs without thinking) as a moderator of the relations between several measures of implicit alcohol associations and key drinking outcomes.
Method: A sample of 506 participants (57% female) completed web-based measures of implicit alcohol associations (drinking identity, alcohol approach, and alcohol excitement), along with indicators of habitualness, and typical alcohol consumption, alcohol problems, and risk of alcohol use disorders.
Results: As expected, implicit alcohol associations, especially drinking identity, were positively associated with, and predicted unique variance in, drinking outcomes. Further, habitualness emerged as a consistent, positive predictor of drinking outcomes. Contrary to expectations, habitualness rarely moderated the relation between implicit alcohol associations and drinking outcomes.
Conclusions: Although moderation was rarely observed, findings indicated that even mild levels of habitualness are risky. Findings also continue to support implicit alcohol associations, particularly drinking identity, as a risk factor for hazardous drinking. Collectively, this suggests the importance of targeting both in prevention and intervention efforts.

1. Introduction

Implicit alcohol associations (i.e., associations that are more impulsive and reflexive than those measured via self-report questionnaires) are potential risk factors of and targets for hazardous drinking (see Stacy & Wiers, 2010; Wiers, Eberl, Rinck, Becker, & Lindenmeyer, 2011). As the field advances, it is important to identify the situations under which implicit alcohol associations will be more (or less) predictive of drinking. This is important theoretically (e.g., Hofmann, Friese, & Wiers, 2008)

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and for developing interventions. The extent to which drinking is habitual (i.e., automatic, occurring without "thinking") has been proposed, but not yet tested, as a moderator of the relationship between implicit alcohol associations and drinking. Therefore, we investigated habitualness as a potential moderator of the relationship between implicit alcohol associations and drinking.

Implicit alcohol associations are typically measured using so-called implicit measures, the most common of which is the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). The IAT has been adapted to evaluate a variety of alcohol-related associations, including alcohol and approach (e.g., Ostafin & Palfai, 2006), drinking and identity (e.g., Lindgren et al., 2013), and alcohol and excitement (e.g., Lindgren, Hendershot, Neighbors, Blayney, & Otto, 2011). These IATs predicted unique variance in a variety of drinking outcomes, including alcohol consumption, problems, risk of alcohol use disorders, and craving (see Lindgren, Foster, Westgate, & Neighbors, 2013; Lindgren, Neighbors, et al., 2013; Roefs et al., 2011). Although the majority of this research is cross-sectional, there is emerging evidence that implicit alcohol associations predict drinking prospectively (Lindgren, Neighbors, Wiers, Gasser, & Teachman, 2015; Stacy, 1997; Thush & Wiers, 2007) and that they can be targets for drinking interventions (Wiers, Gladwin, Hofmann, Salemink, & Ridderinkhof, 2013; Wiers et al., 2011).

One proposed moderator of the impact of implicit associations on behavior is habitualness (Hofmann et al., 2008). The proposed relationship is that as drinking becomes more habitual or under more automatic control, drinking will be better predicted by measures that capture more automatic alcohol-related processes (e.g., alcohol-related IATs). Although this relationship has not yet been tested, research in a different health domain (i.e., eating behaviors) has indicated that implicit measures better predicted consumption of sweets in more habitual sweet eaters (e.g., Conner, Perugini, O'Gorman, Ayres, & Prestwich, 2007).

Our primary goal was to evaluate habitualness as a moderator of the relationship between implicit alcohol associations and key drinking outcome variables (self-reported alcohol consumption, alcohol-related problems, and risk of alcohol use disorders). We focused on three implicit alcohol associations – implicit drinking identity, implicit alcohol approach associations, and implicit alcohol excite associations – that have predicted unique variance in drinking (Lindgren, Foster, Westgate, & Neighbors, 2013; Lindgren, Neighbors, et al., 2013; Roefs et al., 2011). We expected that those findings would replicate in the current sample. We assessed habitualness and expected that it would also be uniquely and positively associated with drinking outcomes. Finally, we evaluated the interaction of the implicit alcohol associations and habitualness and expected to find stronger relationships between implicit alcohol associations and drinking outcomes at higher levels of habitualness.

2. Method

2.1. Participants

The sample consisted of 506 undergraduates (214 men, 288 women, 2 transgender individuals, 2 who did not provide a response) who participated in an online study about cognitive processes and alcohol. Participants were between 18 and 20 years old ($M = 18.57$, $SD = .69$), in their first or second year of college, fluent in English, and recruited from a large public university in the Pacific Northwest. Fifty-two percent of participants identified themselves as White/Caucasian, 31% Asian, 11% multiracial, 1% African American, 1% American Indian/Alaska Native, and the remaining 4% answered unknown or did not respond. Twelve people were excluded from further analyses: two transgender individuals and two individuals whose gender was unreported (these individuals were excluded because of the need to control for gender in analyses), and eight individuals who made errors on two or more of the four questions designed to identify inattentive respondents.

2.2. Measures

2.2.1. IATs

Three Implicit Association Tests (IATs; Greenwald et al., 1998) were included to assess implicit alcohol associations. Detailed descriptions of the IAT can be found at Lindgren, Neighbors, et al. (2013). Briefly, each IAT had seven blocks: blocks 1, 2, and 5 were practice blocks that allowed participants to learn the task. The remaining blocks were the critical blocks. Those four test blocks consist of sorting stimuli items that represent the four concepts in each IAT (e.g., drinker, non-drinker, me, not me) using two response options (left or right). For example, stimuli belonging to the "drinker" or "me" concepts are sorted using a key on the left; stimuli belonging to the "non-drinker" or "not me" concepts are sorted using a key on the right. After two blocks containing multiple trials, the pairings are switched: stimuli belonging to the "drinker" or "not me" concepts are sorted using the left key; stimuli belonging to the "non-drinker" or "me" concepts are now sorted using the right key. The order of the pairings is counterbalanced across participants. The reaction times for the first pairing (e.g., "drinker" and "me" vs. "non-drinker" and "not me") is compared to the latter pairing ("non-drinker" and "me" vs. "drinker" and "not me") and serves as an index of the relative strength of implicit associations — e.g., shorter reaction times for the first pairing compared to the second would indicate a relatively stronger association with "drinker" and "me" (vs. "drinker" and "not me") or a stronger implicit drinking identity.

The drinking identity IAT (Lindgren, Neighbors, et al., 2013) evaluated the association of me (vs. not me) with drinker (vs. non-drinker). The approach-avoid IAT (Ostafin & Palfai, 2006) evaluated the association of alcohol (vs. water) with approach (vs. avoid). The excite-depress IAT (Lindgren et al., 2011, similar to Wiers, Van Woerden, Smulders, & De Jong, 2002) evaluated the association of alcohol (vs. water) with excite (vs. depress). For the alcohol-approach and alcohol-excite IATs, participants were asked to select four images (from a total of 15) of the alcohol that they drank the most (or, if they did not drink, that they were offered most). Those IATs used four standardized images of water. Please see Lindgren, Neighbors, et al. (2013) for the complete stimulus list for the three IATs. The order of the IATs was randomized.

Per the data cleaning practices outlined in Nosek, Greenwald, and Banaji (2007), IATs were not scored if 10% or more trials were faster than 300 ms or if 30% or more trials had errors (n = 26). IATs were scored using the D score algorithm (Greenwald, Nosek, & Banaji, 2003). D scores were calculated such that higher scores indicated stronger associations with drinker and me, alcohol and approach, or alcohol and excite, respectively. The internal consistencies for each IAT, derived by calculating and then correlating the D scores between IAT blocks 3 and 6 and blocks 4 and 7, were within the typical range of .5 to .7 (see Greenwald et al., 2003; drinking identity = .58, alcohol approach = .52, alcohol excite = .59).

2.2.2. Habitualness

A subset of questions from the Self-Report Index of Habit Strength (Verplanken & Orbell, 2003) was used to evaluate the habitualness of drinking. All items were administered, but items related to drinking quantity/frequency or dependency of drinking were excluded from analyses to reduce construct overlap. We retained items 2, 3, 5, 6, and 8 (e.g., "Drinking alcohol is something I do automatically," "Drinking alcohol is something I do without having to consciously remember"). The use of this subset versus the full scale reduced the correlations with the drinking outcomes (alcohol consumption: from .64 to .55; alcohol problems from .61 to .56; risk of alcohol use disorders from .75 to .66). Cronbach's alpha for this sample was .90.

2.2.2.1. Alcohol consumption. The Daily Drinking Questionnaire (DDQ: Collins, Parks, & Marlatt, 1985) measured daily alcohol consumption during a typical week over the last three months. Participants were