Short Communication

Predicting alcohol use with a recoding-free variant of the Implicit Association Test

Katrijn Houben a,⁎, Klaus Rothermund b, Reinout W. Wiers c

a Clinical Psychological Science, Maastricht University, PO BOX 616, 6200 MD Maastricht, The Netherlands
b Friedrich-Schiller-University Jena, Germany
c University of Amsterdam, The Netherlands

A R T I C L E   I N F O

Keywords:
Alcohol
Implicit cognition
Implicit Association Test
IAT-RF
Recoding

A B S T R A C T

Recently, a modified version of the Implicit Association Test (IAT), the IAT-RF (IAT-Recoding Free) was developed which prevents recoding processes by switching response assignments randomly between trials rather than between blocks. In this study, the IAT-RF was used to measure and examine the predictive validity of recoding-free implicit alcohol associations with positive arousal. Findings with the IAT-RF demonstrated that alcohol was overall more strongly associated with negative sedation than with positive arousal. However, more importantly, the size of this compatibility effect was positively correlated with alcohol use indicating that stronger implicit alcohol associations with positive arousal are related to increased drinking. Further, implicit alcohol associations with positive arousal measured with the IAT-RF also predicted unique variance in alcohol use above the variance explained by explicit measures. Hence, the present findings suggest that implicit associations with positive arousal may play an important role in drinking behavior, and demonstrate the validity of the IAT-RF as a measure of implicit alcohol associations.

© 2009 Elsevier Ltd. All rights reserved.

1. Introduction

Dual-process models stress that addictive behaviors, such as alcohol abuse, are steered by both controlled and automatic or implicit cognitive processes (e.g., Wiers et al., 2007). This understanding of addictive behaviors in terms of two semi-independent cognitive processes has stimulated the use of indirect measures of implicit alcohol-related cognitions, such as the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). Studies using the IAT demonstrated implicit alcohol associations with negative affect that are negatively related to drinking (e.g., De Houwer, Crombez, Koster, & De Beul, 2004; Houben & Wiers, 2006, 2007; Wiers, van Woerden, Smulders, & de Jong, 2002), and implicit alcohol associations with arousal that predict increased drinking (e.g., Wiers et al., 2002).

However, compatibility effects in the IAT are not necessarily based on implicit memory associations but can also be influenced by recoding processes that obscure the interpretation of IAT effects (Rothermund, Wentura, & De Houwer, 2005). Recoding means that there exists a feature (e.g., salience or familiarity) that allows a simple mapping of one target and one attribute category onto one response (e.g., because exemplars of both categories are familiar) and of the other target and attribute category to the other response (e.g., because exemplars of these categories are unfamiliar). Target and/or attribute stimuli can thus be categorized on the basis of other features than the “nominal definitions” of the categories. Although Houben and Wiers (2006) demonstrated that recoding in terms of salience cannot fully account for all of the effect variance in an alcohol-IAT, these findings do not exclude the possibility that salience as well as other types of recoding might affect alcohol-IATs.

To overcome this problem, Rothermund, Teige-Mocigemba, Gast, and Wentura (2009) introduced the IAT-RF (Recoding-Free IAT), which eliminates recoding by switching response assignments of categories randomly between trials within a single block, rather than between blocks as in the standard IAT. Hence, the IAT-RF could be a valuable alternative to the standard IAT for studying alcohol-related implicit processes. Here, we examined whether compatibility effects in the IAT-RF predict unique variance in drinking behavior above explicit cognitions. Further, unlike previous studies where implicit alcohol associations with positive affect and arousal were measured in a single IAT-RF, Wiers et al. (2002) demonstrated that a composite of implicit arousal associations and implicit affective associations predict unique variance in alcohol use, suggesting that implicit alcohol associations with positive arousal are important predictors of drinking. By eliminating confounding due to recoding, this study provides a pure test of the predictive validity of implicit alcohol associations with positive arousal.

2. Methods

Participants were 52 male heavy drinkers (Mean age=21.79 years, SD=4.00; alcohol use: M=28.58 servings of 10 g/week, SD=10.98, assessed with the timeline follow-back method (TLFB; Sobell & Sobell, 1990); alcohol problems: M=14.06, SD=3.72, on the Alcohol Use...
The IAT-RF consisted of three blocks. In the first block (20 trials), participants practiced the classification of attribute stimuli into a positive arousal and a negative sedation category (see Appendix). The response assignment of the attribute categories was counterbalanced. In the second block (20 trials), participants practiced the classification of target stimuli into alcohol and soft drinks (see Appendix). During this block, the response assignment of the target categories switched randomly between trials with the restriction that each target was presented once in each response assignment. In the third block (160 trials), participants had to classify both target and attribute stimuli with switching response assignments for the target categories. Response assignments switched randomly between trials with the restriction that half of the trials were presented in one response assignment (e.g., positive arousal + alcohol vs. soft drinks + negative sedation) and the other half of the trials in the other response assignment (positive arousal + soft drinks vs. alcohol + negative sedation). Stimuli were presented randomly in the middle of the computer screen. Category labels were presented on the left and right of the presented stimulus in accordance with the response assignment, 1500 ms before the upcoming stimulus. The intertrial interval was 250 ms. Explicit Alcohol–Related Expectancies were assessed with an expectancy questionnaire. Participants indicated on a 100 mm Visual Analogue Scale (VAS) how much they agreed (0 = disagree, 100 = agree) with the statement “After drinking alcohol, I feel …”, which was completed with the same words used in the IAT-RF, including the labels. Explicit Attitudes toward Alcohol were measured with 2 semantic differentials: Participants indicated on a 100 mm VAS how much they considered drinking alcohol to be unpleasant–pleasant, and boring–fun (higher values on the scales indicate more positive attitudes). Participants first received the IAT-RF and then the questionnaires.

3. Results

Response latencies in the IAT-RF were log-transformed and aggregated separately for trials with compatible (alcohol + positive arousal vs. soft drinks + negative sedation) and incompatible (alcohol + negative sedation vs. soft drinks + positive arousal) response assignments. The compatibility effect was calculated as the difference between these two means so that higher scores indicate faster responses if alcohol and positive arousal (and soft drinks and negative sedation) were assigned the same response; higher values on the attitude measure indicate more positive attitudes toward drinking alcohol.

AUDIT scores. IAT-RF effects were significantly correlated with alcohol use (Table 1), indicating that stronger implicit alcohol associations with positive arousal are related to higher levels of alcohol use. The incremental validity of the IAT-RF was tested in a hierarchical regression analysis predicting alcohol use. Explicit attitudes, entered in step 1, significantly predicted alcohol use, and compatibility effects in the IAT-RF, entered in step 2, significantly predicted alcohol use above explicit attitudes (Table 2). Similarly, we examined the incremental validity of the IAT-RF for the prediction of alcohol-related problems. Negative expectancies, entered in step 1, significantly predicted alcohol-related problems, and IAT-RF compatibility effects predicted alcohol-related problems at borderline significance above negative expectancies in step 2 (Table 2).

4. Discussion

The present findings attest to the usefulness of the IAT-RF for studying implicit associations underlying alcohol use. First, we found stronger implicit alcohol associations with negative sedation than with positive arousal, when recoding influences were prevented. This result is consistent with previous studies demonstrating stronger implicit alcohol associations with negative affect than with positive affect (e.g., De Houwer et al., 2004; Houben & Wiers, 2006, 2007; Wiers et al., 2002). However, compatibility effects in previous studies were notably larger than the compatibility effect in this study. Possibly, the combination of affect with arousal resulted in smaller compatibility effects in this study, since previous studies have demonstrated both implicit alcohol associations with negative affect and with arousal (e.g., De Houwer et al., 2004; Wiers et al., 2002). In addition, we used the IAT-RF that eliminates recoding processes, which may also have reduced compatibility effects compared to previous studies that used the standard IAT. In line with this reasoning, smaller and reversed compatibility effects indicating more implicit alcohol tendencies towards alcohol have been found with indirect measures that are relatively uninfluenced by recoding, such as the Extrinsic Affective Simon Task (EAST; De Houwer, 2003; e.g., de Jong, Wiers, van de Braak, & Huijding, 2007).

Second, the IAT-RF predicted unique variance in alcohol use above the variance explained by explicit cognitions. Specifically, stronger implicit alcohol associations with positive arousal (or weaker implicit alcohol associations with negative sedation), predict increased levels of drinking. These findings are consistent with previous research using standard IATs demonstrating that stronger implicit alcohol associations with positive affect and with arousal predict increased alcohol consumption above the variance in drinking behavior explained by
explicit cognitions (e.g., Wiers et al., 2002). Moreover, implicit alcohol associations were also largely unrelated to explicit alcohol-related cognitions. Hence, the present findings suggest that drinking behavior is influenced by two semi-independent cognitive processes that predict unique variance in alcohol use.

Acknowledgments

Katrijn Houben, Deparment of Clinical Psychological Science, Maastricht University, The Netherlands; Klaus Rothermund, Department of Psychology, Friedrich-Schiller-University Jena, Germany. Reinout W. Wiers, Department of Psychology, University of Amsterdam. This research was funded by “VIDI” grant 452.02.005 from the Dutch National Science Foundation (N.W.O.). Correspondence concerning this article should be addressed to Katrijn Houben, Clinical Psychological Science; Maastricht University; PO BOX 616; 6200 MD Maastricht, The Netherlands. E-mail: K.Houben@psychology.unimaas.nl.

Appendix A

Target stimuli

Alcohol: beer, wine, whisky, drink, vodka.
Soft drinks: Fanta, Coke, Sprite, sinaas (lemonade), ice-tea.

Stimuli of the (Dutch) alcohol and soft drinks categories were matched on familiarity (M = 5.07, SD = 1.23, and M = 4.81, SD = 1.43, respectively; 1 = completely unfamiliar, 7 = very familiar), valence (M = 4.49, SD = .83, and M = 4.53, SD = .83, respectively; 1 = extremely negative, 7 = extremely positive), arousal (M = 4.37, SD = .87, and M = 4.62, SD = 1.00, respectively; 1 = extremely passive, 7 = extremely active), and number of syllables.

Attribute stimuli

Active: cheerful, energetic, lively, excited, chatty.
Miserable: cheerless, horrible, nauseous, unhappy, listless.

Stimuli of the (Dutch) positive arousal (‘active’) category and the negative sedation (‘miserable’) category, respectively, scored high (M = 6.15, SD = .55) and low (M = 1.52, SD = .50), and respectively, also scored high (M = 6.26, SD = .46) and low (M = 1.88, SD = .52) on arousal. Stimuli of the two attribute categories were matched on familiarity (M = 5.77, SD = .79, and M = 3.69, SD = 1.62, respectively) and number of syllables.

References