Implicit alcohol–relaxation associations in frequently drinking adolescents with high levels of neuroticism

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HIGHLIGHTS

- Implicit processes play, especially in adolescence, an important role in drinking.
- Knowledge of antecedents of implicit alcohol associations is limited.
- The current study examined personality-related antecedents in adolescents.
- Strongest alcohol-relaxation associations for neuroticism with frequent drinking.
- Precursors of implicit processes allow identification of risk groups.

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ABSTRACT

Introduction: Most individuals start drinking during adolescence, a period in which automatically activated or implicit cognitive processes play an important role in drinking behavior. The aim of this study was to examine personality-related antecedents of implicit associations between alcohol and positive or negative reinforcement motives in adolescents. It was hypothesized that frequent alcohol consumption in combination with specific personality traits (neuroticism for negative reinforcement and extraversion for positive reinforcement) could predict specific implicit alcohol–relaxation and arousal associations.
Methods: Participants completed a brief Big Five Questionnaire and alcohol use questions at T1. Approximately eight months later (T2), two Brief Implicit Association Tests were completed to assess alcohol–relaxation (negative reinforcement, $n = 222$) and alcohol–arousal (positive reinforcement, $n = 248$) associations.
Results: Results indicated that frequently drinking adolescents who scored high on neuroticism had the strongest alcohol–relaxation associations eight months later. No significant predictors were observed for alcohol–arousal associations.
Conclusions: The current study identified precursors of strong implicit alcohol–relaxation associations (i.e., high levels of neuroticism in combination with frequent alcohol consumption) which can inform future prevention and intervention studies.

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1. Introduction

Implicit alcohol associations play an important role in alcohol use, and especially in adolescence (Rooke & Hine, 2011; Rooke, Hine, & Thorsteinsson, 2008). Both for theoretical and prevention reasons, it is important to identify precursors of these implicit alcohol associations in adolescents. However, at the moment we know little about such precursors. Therefore, the aim of the current prospective study was to examine personality-related antecedents of implicit alcohol associations regarding both positive and negative reinforcement motives in adolescents.

Alcohol misuse is associated with a range of negative consequences such as damage to the self (e.g., personal injuries, unintended and unprotected sexual activities, suicide), to others (e.g., physical and sexual violence), and institutional costs (Perkins, 2002). Most individuals initiate alcohol consumption and binge drinking during adolescence (Tucker, Orlando, & Ellickson, 2003). In such an early stage, alcohol consumption is considered occasional with positive reinforcement processes often driving consumption. The subsequent development of alcohol addiction

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(a chronically relapsing disorder) in a subgroup has been associated with a transition from impulsivity to compulsivity and more negative reinforcement and automaticity driving the consumption (Koob & Volkow, 2010).

Cognitive factors have been put forward in different models as playing an important role in the development of addictive behaviors. In traditional psychological models of addiction, explicit, rational decision making processes have been described, such as cost–benefit analysis to decide whether or not to use alcohol. In more recent cognitive models, the additional role of automatically activated processes in addictive behaviors is emphasized (Bechara, 2005; Wiers et al., 2007). An important example concerns automatically activated or implicit alcohol memory associations. It has been shown, for example, that implicit alcohol associations predicted alcohol use prospectively, when controlling for previous alcohol use and explicit processes (Stacy, 1997). Consistent with this, a meta-analysis, including 89 effect sizes, concluded that such implicit cognitions were reliably associated with alcohol use, in both adolescents and adults (Rooke et al., 2008). Furthermore, it has been suggested that this association between implicit cognitions and alcohol use might be particularly strong in adolescents as, for example, impulse control processes are not fully developed, while more emotional and reward-seeking processes (i.e., related to automatic processes) are most active in this period (e.g., Krank & Goldstein, 2006; Wiers et al., 2007). Indeed, the relationship between implicit drinking associations and binge drinking was stronger in adolescents than in adults (Rooke & Hine, 2011). Thus, there are strong indications that implicit alcohol associations are an important factor in the prediction of alcohol use and problems, especially in adolescence.

Two types of reinforcement processes have been identified in alcohol use: positive reinforcement (alcohol use will result in a more positive affect; enhancement motive) and negative reinforcement (alcohol use will result in alleviation of negative affect; coping motive) (Cox & Klinger, 1988). It has consistently been shown that explicit assessment of these outcomes is associated with different aspects of drinking behavior; enhancement motives with heavy drinking and coping motives particularly with alcohol-related problems (Kuntsche, Knibbe, Gmel, & Engels, 2005). Importantly, while this distinction between positive and negative reinforcing outcomes has mainly been studied in explicit cognitions, it can also be differentiated in more implicit associations (cf. Salemink & Wiers, 2014). For example, it has been shown that both implicit alcohol–positive arousal and alcohol–relaxation associations were associated with drinking outcomes respectively (Hendershot, Lindgren, Liang, & Hutchison, 2012; Thush et al., 2008). Thus, both at explicit and implicit levels, positive and negative reinforcement processes can be distinguished, with the latter being most often associated with drinking problems.

Thus, it is currently known that adolescence is a crucial starting point for drinking behavior and that within this period, implicit alcohol associations play an important role. From a prevention perspective, it would be useful to know who develops such associations as this allows the identification of specific risk groups. Up to now however, studies examining antecedents of implicit alcohol associations are limited and the aim of the current study is to examine personality factors that influence those associations in adolescents. In the field of explicit cognitions, specific associations between personality types and drinking motives have been shown (Kuntsche, Knibbe, Gmel, & Engels, 2006); neuroticism is associated with drinking to cope and extraversion with enhancement drinking (Cooper, Frone, Russell, & Mudar, 1995; Kuntsche et al., 2006). We hypothesized that the personality constructs of neuroticism and extraversion, in combination with frequent alcohol consumption, could also predict specific implicit alcohol associations. That is, frequent alcohol use in adolescents scoring high on neuroticism (T1) could result in strong alcohol–relaxation associations (T2, eight months later) and that such use in adolescents scoring high on extraversion (T1) could result in strong alcohol–arousal associations (T2). To test these

hypotheses, personality characteristics and frequency of alcohol consumption were assessed in adolescents at T1 and eight months later implicit alcohol associations were assessed (T2). This study is unique in evaluating the role of personality characteristics as antecedents of implicit alcohol associations in the crucial period of adolescence.

2. Method

2.1. Participants and procedure

Participants are a subsample from a larger longitudinal project for Research on Adolescent Development and Relationships, younger cohort (RADAR-Y; Van Lier et al., submitted for publication), which was approved by the Medical–Ethical Committee of University Medical Centre Utrecht. The adolescents were recruited from various Dutch elementary schools. A description of the study was sent to the home address, and parents and adolescents provided informed consent to participate. In the current study, data from the fifth wave was used; both the annual assessment data (March 2010, T1) and the internet assessment eight months later (November 2010, T2). Adolescents filled out the personality and drinking questionnaire during the annual assessment conducted at home, and supervised by trained research assistants. Eight months later, the alcohol–relaxation and alcohol–arousal associations were assessed on separate days during the online internet assessment. Participants received €100 for participation in the (full family) annual assessment and an additional €10 for participation in the internet assessment.

For the current sample, adolescents were selected who indicated having drank alcohol, at least once, in the past and who completed at least one implicit alcohol association task. As the alcohol associations task were completed on separate days, sample sizes differ slightly between the tasks due to differences in attendance rate, technical problems, etc. After identifying unique participants, applying the improved scoring algorithm for the implicit association test (Greenwald, Nosek, & Banaji, 2003), removing multivariate outliers ($n = 2$ relaxation associations, $n = 3$ for arousal associations), the final sample for the alcohol–relaxation associations was $n = 219$ (M age = 17.0, $SD = 0.6$; 111 males) and for alcohol–arousal associations $n = 245$ (M age = 17.0, $SD = 0.5$; 132 males). There are 97 participants overlapping in the two groups.

2.2. Materials

2.2.1. Brief Implicit Association Test (BIAT)

Adolescents completed two Brief Implicit Association Tests (BIATs, Sriram & Greenwald, 2009) to assess the strength of implicit alcohol–relaxation and alcohol–arousal associations. The BIAT uses a briefer format than the Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998) and does not make the contrast category explicit. Participants were instructed to focus on a category or two categories, and these were presented at the top of the screen. In the middle of the

Table 1
Structure of the relaxation and arousal Brief Implicit Association Test (BIAT).

Blocks	No. of trials	Function	Focal category	
			Relaxation BIAT	Arousal BIAT
1	12	Practice	Relaxed	Alcohol
2	12	Practice	Alcohol	Active
3	12	Combination 1	Relaxed + alcohol	Alcohol + active
4	24	Combination 1	Relaxed + alcohol	Alcohol + active
5	12	Practice	Soda	Miserable
6	12	Combination 2	Relaxed + soda	Alcohol + miserable
7	24	Combination 2	Relaxed + soda	Alcohol + miserable

Note. For half of the participants, the positions of Blocks 2, 3, and 4 are switched with those of Blocks 5, 6, and 7, respectively.