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Context Effects of Alcohol Availability at Home: Implicit Alcohol Associations and the Prediction of Adolescents' Drinking Behavior

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ABSTRACT. Objective: Recent studies suggest that the predictive effect of implicit alcohol associations is context dependent. Findings indicate that implicit associations are more easily retrieved in an alcohol-associated setting or context (e.g., bar) compared with a neutral setting. In line with this reasoning, we hypothesized that alcohol availability at home might moderate the relationship between implicit alcohol associations and future drinking behavior of adolescents. **Method:** Participants were 262 at-risk adolescents (235 boys, 27 girls, adolescents with externalizing behavioral problems) with a mean age of 14.11 years (*SD* = 0.86, age range: 12–16 years) at baseline. Adolescents completed a questionnaire and a modified version of the Implicit Association Test (i.e., Single Category Implicit Association Test; SC-IAT). **Results:** Stronger implicit alcohol associations predicted increase in frequency of alcohol use, only in adolescents who indicated that alcohol was available at home. No moderating effects were found for increase in quantity of alcohol use and problematic alcohol use, suggesting that implicit alcohol associations particularly influence the decision of whether to drink in adolescence. **Conclusions:** The findings illustrate that the availability of alcohol in the home setting influences adolescents' implicit alcohol associations and consequently affects the frequency of alcohol use. In this way, alcohol availability at home may be an important contextual factor to consider when examining the effect of implicit alcohol associations on the future drinking behavior of adolescents. (*J. Stud. Alcohol Drugs, 77,* 749–756, 2016)

RECENT RESEARCH HAS DEMONSTRATED the relevance of automatically activated or implicit processes in the understanding of adolescents' drinking behavior (Wiers et al., 2007). Adolescents are more likely to drink heavily when action tendencies are predicted by implicitly triggered neurocognitive processes (Grenard et al., 2008; Thush et al., 2008). Implicit alcohol associations refer to alcohol-related associations in memory one can have and that can be spontaneously activated by external stimuli (Stacy et al., 1994; Wiers & Stacy, 2006). This can either be negative (e.g., hangovers) or positive (e.g., fun, tasty, social). In the presence of alcohol stimuli, implicit associations can trigger behavioral responses toward alcohol and increase drinking behavior (Thush & Wiers, 2007).

Both individual and social factors are relevant when considering the relationship between alcohol associations and alcohol use. Individual factors such as working memory (Grenard et al., 2008; Thush et al., 2008), response inhibition (Peeters et al., 2012), and personality (Zack et al., 2002) influence the predictive value of alcohol associations on alcohol. Social factors, such as the context in which behavioral decisions are made, determine the extent to which implicit associations are accessible from memory (Krank & Goldstein, 2006). These associations are more easily activated in an alcohol setting (e.g., bar) compared with a neutral context (Havermans et al., 2004; Lau-Barraco & Dunn, 2009). Dunn and Yniguez (1999), for instance, found that children (age range: 9–10 years) exposed to alcohol commercials more likely activated positive alcohol associations compared with children who were exposed to soft-drink commercials.

Findings from other studies suggest that exposure to alcohol stimuli in the media increases alcohol use among adolescents (Koordeman et al., 2011; Snyder et al., 2006). In addition, Krank and colleagues (2005, 2006) demonstrated that the predictive effect of implicit associations on alcohol use increases when associations are retrieved in an alcohol-related setting. These findings suggest that the accessibility and predictive validity of implicit alcohol associations are influenced by the context in which they are primed. Therefore, it could be hypothesized that alcohol availability at home enhances accessibility of implicit alcohol associations, and in a similar way influences the drinking behavior of adolescents (Krank et al., 2005).

From "bar context" to "home context"

In line with experimental research (Krank et al., 2005; Lau-Barraco & Dunn, 2009; Wall et al., 2000, 2001)—which has shown that, in an alcohol context, the influence of im-

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plicit alcohol associations on alcohol use is stronger—it is hypothesized that this may be similar in the home context. When alcohol is visible to adolescents, the home context might be viewed as an environment associated with alcohol. Van der Vorst et al. (2013) demonstrated that parental drinking was related to adolescents' alcohol memory associations and that these associations predicted alcohol use in adolescents 1 year later. Even before adolescents initiated drinking, implicit alcohol associations mediated the link between parental drinking and onset of drinking in adolescents. The authors argued that parental drinking strengthens adolescents' implicit associations, which in turn affect the drinking behavior of their offspring.

In the present study, we proposed a moderating instead of a mediating effect of the home context. That is, alcohol availability at home could serve as a prime and may strengthen the development of positive implicit alcohol associations of adolescents. Consequently, implicit alcohol associations in a home context where alcohol is available may guide behavioral decisions related to adolescents' drinking behavior. This study is the first to examine the role of alcohol availability at home in relation to implicit associations and adolescents' alcohol use. We assumed a moderating effect of alcohol availability at home, with a stronger predictive effect of implicit alcohol associations on the future drinking behavior of adolescents who are exposed to alcohol at home, compared with adolescents who are not exposed to alcohol at home.

Method

Participants

Participants in the current study took part in a longitudinal study consisting of four waves over a period of 2 years (6–8 months between waves). For the current study, we used the data from the second (T1), third (T2), and fourth waves (T3) because no data of the Single Category Implicit Association Test (SC-IAT; Karpinski & Steinman, 2006) were available for the first wave. Adolescents were recruited from 17 different secondary Dutch Special Education schools for students with externalizing behavioral problems (e.g., attention-deficit/hyperactivity disorder, conduct disorder). Youth who attend these schools are not necessarily diagnosed with an externalizing behavioral disorder (based on criteria from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition;* American Psychiatric Association, 1994). Adolescents who need extra supervision because of problems with attention and/or behavior regulation are referred to special education because they are not able to attend mainstream education.

Boys were overrepresented in this sample (88%), which is a reflection of the population in special education schools for students with behavioral problems (Valdés et al., 1990). This group of adolescents was assumed to be a risk group for problematic alcohol use (Kepper et al., 2011). Participants were 283 adolescents (254 boys, 29 girls) with a mean age of 14.11 years (SD = 0.86, age range: 12–16 years) at T1. At T2, approximately 6 months later, 230 adolescents (response rate = 82%, M_{age} = 14.54, SD = 0.79, age range: 13–17 years) participated in the study, and 196 adolescents participated in the last wave (response rate = 69%, M_{age} = 14.95, SD = 0.76, age range: 13–17 years). This study evaluated several variables, including age, gender, alcohol use, illicit drug use, alcohol availability, and SC-IAT scores as possible predictors of missingness. Results revealed no significant effects of gender, alcohol/other substance use, alcohol availability, or SC-IAT scores of missingness at T2. Only age remained a significant predictor of missingness, with older adolescents more likely dropping out of the study. This replicates previous findings of Peeters et al. (2015), in which we performed a sensitivity analysis on our missing data.

In accordance with Dutch ethical standards, a letter of informed consent described the purpose of the study, explained the voluntary nature of participation, ensured participants' anonymity, and asked for passive parental permission to allow adolescents to participate in the study. Parents could decline participation by their child by signing a letter. Fifteen parents (3.8%) and seven students (1.7%) declined participation. Adolescents and/or schools were compensated for their participation. Schools received 150 Euros for their participation; adolescents received 10 Euros in voucher form for completing the first two waves and 20 Euros in voucher form for completing four waves. Some schools did not allow financial compensation for their students. In such cases, schools used the money for the purchase of schoolbooks or for other improvements that were visible to the students.

At each wave, participants completed a questionnaire and a task on the computer under the guidance of a trained research assistant. Some adolescents who were absent during the time of assessment completed the questionnaire under the guidance of a teacher. The computer task was always completed under the supervision of a trained research assistant. Some adolescents had incomplete data on the computer task (n = 29; i.e., SC-IAT data) or questionnaire (n = 21; i.e., alcohol use and availability). Adolescents with missing data on the grouping variable (i.e., alcohol availability) were excluded from further analysis because Mplus requires observed information on that variable. Full information maximum likelihood (FIML) was used to deal with other types of missing data (Newman, 2003). This resulted in a sample of 262 (235 boys, 27 girls) adolescents (M_{age} = 14.13, SD = .86, age range: 12–16 years) who were eligible for analyses (T1).

Measures

Alcohol use and problems. Three different outcome measures were used to assess alcohol use and related problems. First, participants rated the number of occasions (e.g.,

Table 1. Descriptive statistics for alcohol use and implicit associations for the whole sample and reported for the alcohol-available and alcohol non-available group separately, including difference testing

Variable	Whole sample (*N* = 262)	Alcohol available (*n* = 221)	Alcohol non-available (*n* = 41)	Difference testing
Boy	235	197	37	
Ethnicity (non-Islam)	208	**177**	**20**	ϕ = .31, *p* = .01
Cannabis users	42	37	5	ϕ = .04, *p* = .49
Illicit drug users	6	5	1	ϕ = .07, *p* = .86
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	
1. Implicit association 1	-0.19 (0.47)	-0.16 (0.48)	-0.28 (0.45)	
2. Alcohol frequency 1	1.58 (3.14)	**1.77** (3.33)	**0.58** (1.41)	*t* = -3.78, *p* = .01
3. QF 1	3.79 (8.80)	3.75 (8.32)	2.49 (11.20)	*t* = -0.69, *p* = .25
4. Problem drinking 1	0.85 (1.30)	**0.95** (1.32)	**0.30** (1.05)	*t* = -3.49, *p* = .01
5. Alcohol frequency 2	2.80 (6.27)	**3.61** (6.69)	**1.24** (3.19)	*t* = -3.53, *p* = .01
6. QF 2	4.29 (9.21)	5.19 (9.28)	2.58 (8.83)	*t* = -1.72, *p* = .09
7. Problem drinking 2	0.88 (1.37)	0.95 (1.40)	0.53 (1.21)	*t* = -1.99, *p* = .05
8. Alcohol frequency 3	3.15 (6.48)	3.35 (6.44)	2.89 (8.73)	*t* = -0.46, *p* = .76
9. QF 3	5.66 (11.02)	5.97 (10.53)	5.21 (14.73)	*t* = -0.31, *p* = .76
10. Problem drinking 3	0.96 (1.38)	1.07 (1.45)	0.58 (1.14)	*t* = -1.58, *p* = .11

Notes: QF = Quantity × Frequency measure of alcohol use. **Bold** mean scores for the alcohol measures represent significant differences between the two groups (available vs. non-available).

party, at home, going out) at which alcohol was consumed in the last month. Possible answer categories ranged from 0 to 40 times or more (*0–10, 11–19, 20–39,* or *40 or more;* O'Malley et al., 1983). In addition, participants were asked to report the drinking days during the week (Monday–Thursday) and weekend (Friday–Sunday) and the average number of alcoholic drinks they consumed on weekdays and weekends. Responses could range from 0 glasses to 20 glasses or more (Koning et al., 2009; Sobell & Sobell, 1995). A Quantity × Frequency (QF) score for alcohol use was computed by multiplying the number of drinking days (for composite categories we chose the center value) by the number of alcoholic drinks on each drinking day (Koning et al., 2009; Sobell & Sobell, 1995).

Problem drinking was assessed with an adapted version of the CRAFFT scale (Knight et al., 1999), a screening instrument used in clinical settings to identify adolescent problem drinkers (and other substance use). In the current study, only alcohol questions were included. The scale consists of six items ("Have you ever ridden in a **C**ar driven by someone [including yourself] who had been using alcohol? Do you ever use alcohol to **R**elax, feel better about yourself, or fit in? Do you ever drink alcohol when you are **A**lone? Do you ever **F**orget things you did while using alcohol? Does your family or **F**riends ever tell you that you should cut down on your drinking? Have you ever gotten into **T**rouble while you were using alcohol?) that are measured by "yes" or "no" responses.

Alcohol availability. Alcohol availability at home was assessed using a seven-item scale (Van Zundert et al., 2006) to determine the degree to which alcoholic beverages (wine, beer, mixed drinks, and distilled spirits) were available at home (e.g., "Do your parents have wine or beer at home?"). The response categories ranged from *never* to *always,* with higher scores indicating greater availability of alcohol at home. Internal consistency of the scale was good (Cronbach's α = .88). We created two groups—one group indicated no alcohol available at home ("alcohol non-available group"; *n* = 41, zero scores on all seven items), whereas participants in the second group gave a non-zero value at least to one item ("alcohol available group"; *n* = 221).

Implicit alcohol associations. Implicit associations were assessed with the SC-IAT, which is a modified version of the original Implicit Association Test (IAT; Greenwald et al., 1998) and includes only a single attribute category. The SC-IAT is an easier and shorter version of the IAT; therefore, it is ideal for this group of young adolescents. This task was successfully used with similar samples in the past (Thush & Wiers, 2007). The SC-IAT consisted of one practice block and two testing blocks that presented one attribute category (alcohol) and two valence categories (pleasant vs. unpleasant). Participants were asked to categorize the words that appeared in the middle of the screen. These words could be either pleasant (*funny, nice*), unpleasant (*mad, annoying*), or alcoholic (*beer, wine*).

In the first test block (20 trials), the attribute category "alcohol" was presented together with "pleasant." Participants were asked to categorize the words as fast as possible by pressing the key representing the right category. In the second test block (i.e., 20 trials), the attribute category "alcohol" was presented together with "unpleasant." Participants with positive attitudes toward alcohol more likely categorize the words faster in the "alcohol-pleasant" situation compared to the "alcohol-unpleasant" situation. Reaction time scores were calculated for each test block based on the D-algorithm (Greenwald et al., 2003), which incorporates penalty scores

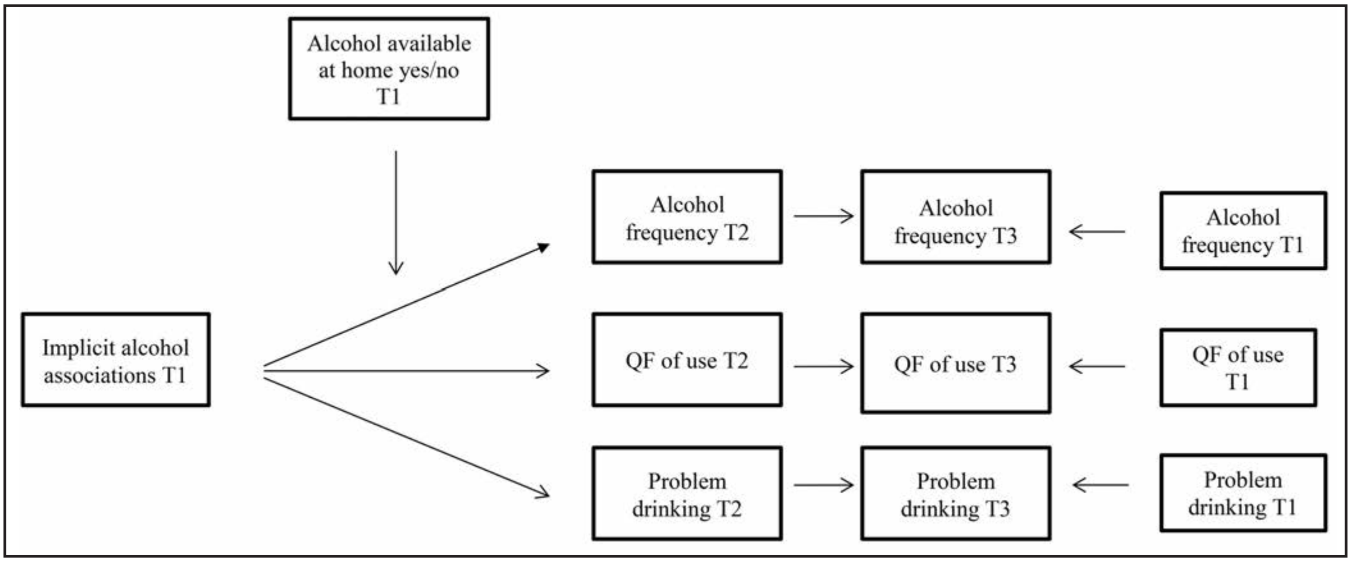

FIGURE 1. Structural model of implicit alcohol associations predicting alcohol use, moderated by alcohol availability at home. T = time; QF = Quantity × Frequency.

for incorrect trials and divides each block with its own standard deviation instead of the standard deviation across the two test blocks together. Higher scores indicated more positive implicit alcohol associations. The SC-IAT was completed before adolescents answered questions about alcohol use to avoid priming effects.

Strategy for analysis. First, descriptive statistics of the three alcohol measures (at T1 and T2) and the implicit associations (T1) were provided for the total sample and for the alcohol-available group and the alcohol non-available group separately (Table 1). Second, a confirmatory factor analysis was carried out to test whether there was a single underlying factor for the three alcohol indicators. Third, a multigroup analysis with the alcohol-available group and the alcohol non-available group was carried out with implicit alcohol association as predictor (T1) and alcohol use as outcome variable (T2 and T3), while controlling for alcohol use at T1 for the alcohol-available group and the alcohol non-available group.

Unfortunately, the multigroup model did not converge, and further analysis revealed that the alcohol non-available group was too small to run this complex model (e.g., estimated parameters increased by adding a latent factor for two groups). Thus, we decided to run a model for each alcohol indicator (frequency, QF, and problem drinking) separately. Because the two groups differed significantly in ethnic composition (ϕ = .31, p = .01), we examined whether ethnicity was a significant covariate. It is possible that parents or adolescents from countries with high percentages of Muslims (e.g., Turkey, Morocco) abstain from drinking for religious reasons (Amundsen et al., 2005). Therefore, we examined whether Islamic origin (e.g., one or both parents or adolescents being born in Turkey or Morocco) was a significant covariate; however, at a group level, this was not the case.

Figure 1 presents the final model. The findings of the main effect of implicit alcohol associations on alcohol use are described briefly before discussing the results of the multigroup analysis (Table 2). All analyses were conducted with Mplus Version 7 (Muthén & Muthén, 1998). Maximum likelihood with robust standard errors was chosen as an estimation method to control for nonnormality of the data. We used FIML to deal with missing data. Participants were nested within schools; therefore, we corrected for clustering effects using the CLUSTER option in Mplus.

Results

Descriptives

Descriptive statistics for the total sample and for the two groups separately are presented in Table 1. Adolescents in the alcohol-available group scored significantly higher on three of six alcohol use measures at T1 and T2 when compared with the alcohol non-available group. On T3, differences between the two groups with respect to alcohol use were no longer significant.

Multigroup model T1 > T2

A main effect of implicit alcohol associations at T1 predicting alcohol use at T2, while controlling for alcohol use at T1, was only found for alcohol frequency, β = 0.15, p = .02, $\chi^2(1)$ = 0.43, p = .51, and not for QF, β = .08, p = .12, $\chi^2(1)$ = 0.20, p = .66, or problem drinking, β = 0.11, p = 0.14,

TABLE 2. Regression analyses of implicit associations predicting future alcohol use (6 months [T2] and 1 year [T3]) for the two groups (i.e., alcohol-available vs. alcohol non-available) separately

	Alcohol outcome T2		Alcohol outcome T3	
Variable	Available β (*SE*)	Non-available β (*SE*)	Available β (*SE*)	Non-available β (*SE*)
Model 1				
Alcohol frequency T1	.54 (.11)***	.51 (.15)***	.31 (.11)**	.09 (.28)
Implicit associations T1	.17(.07)*	-.22 (.14)	.11 (.05)*	.16 (.10)
Model 2				
QF T1	.74 (.11)***	.92 (.05)***	.58 (.13)***	.81 (.16)***
Implicit associations T1	.07 (.05)	.08 (.05)	.05 (.12)	.09 (.08)
Model 3				
Problem drinking T1	.67 (.09)***	.67 (.07)***	.72 (.06)***	.26 (.14)
Implicit associations T1	.09 (.07)	.23 (.16)	.02 (.09)	.11 (.16)

Notes: T = time; QF = Quantity × Frequency measure of alcohol use.
**p* < .05; ***p* < .01; ****p* < .001, two tailed.

$\chi^2(1) = 0.08$, $p = .77$. This finding indicates that relatively more positive implicit alcohol associations at T1 predict a higher frequency of alcohol use at T2.

The differential effect of alcohol availability in the home setting on the predictive effect of implicit alcohol association on future alcohol use of adolescents is presented in Table 2. Model fit for all three models was good—alcohol frequency: $\chi^2(3) = 2.19$, $p = .53$; QF: $\chi^2(3) = 2.27$, $p = .52$; and problem drinking: $\chi^2(3) = 2.24$, $p = .52$.[1]

Differential effects across the two groups were found only for the frequency of drinking. For the alcohol-available group, more positive implicit alcohol associations predicted an increase in frequency of alcohol use 6 months later: $\beta = 0.17$, $p = .02$, Wald $\chi^2(1) = 8.82$, $p = .01$. No such effect was found for the alcohol non-available group: $\beta = -.22$, $p = .12$.

For both QF and problem drinking, no moderating effect was found—QF: Wald $\chi^2(1) = 0.01$, $p = .93$; and problem drinking: Wald $\chi^2(1) = 0.58$, $p = .45$.

Multigroup model T2 > T3

A main effect of implicit alcohol associations at T1 predicting frequency of use 1 year later (controlling for T1 use) was found ($\beta = .11$, $SE = .04$, $p = .02$). No such effect was present for QF ($\beta = .08$, $SE = .09$, $p = .40$) or problem drinking ($\beta = .03$, $SE = .09$, $p = .74$). Likewise, this effect was only significant for the alcohol-available group ($\beta = .11$, $SE = .05$, $p = .047$), and not for the alcohol non-available group ($\beta = .16$, $SE = .10$ $p = .13$), thus indicating a differential effect of alcohol in the home setting for implicit alcohol association predicting increase in alcohol use 1 year later. It should be noted that the Wald test for this model was not significant, Wald $\chi^2(1) = 0.28$, $p = .59$. No interaction effect was found for QF or problem drinking (Table 2).

[1] Comparative fit index (CFI) and root mean square error of approximation (RMSEA) were not reported because of the low number of free parameters. RMSEA is set to zero when the chi-square test is smaller than the degrees of freedom (Kenny, 2000).

Discussion

The present study examined the moderating effect of alcohol availability in the home context on the relationship between implicit alcohol associations and alcohol use in at-risk adolescents. Results revealed that implicit alcohol association predicted the frequency of alcohol use 6 months (T2) and 1 year later (T3), but only in adolescents who indicated availability of alcohol at home. No main effect of implicit alcohol associations or differential effect of alcohol availability on QF or problem drinking was found. These findings indicate that availability of alcohol at home influences the effect implicit alcohol associations have on adolescents' future drinking behavior. The predictive effect of implicit alcohol associations increases adolescents' alcohol use when alcohol is available at home. The Wald test for Wave 3 was not significant, suggesting that although the effect in the available group was significant, the strength of the coefficient did not differ from those in the alcohol non-available group. The alternating positive versus negative coefficient in the alcohol non-available group, the high standard deviations, and a nonsignificant predictive effect of frequency of use in the alcohol non-available group (Tables 1 and 2) suggest that this group of adolescents might have an unstable drinking pattern in which implicit alcohol associations are not an important predictor of increase in alcohol use over time.

The effect of implicit alcohol associations on the frequency of drinking was only found for adolescents who reported that alcohol was available at home. This finding can be understood in two non-exclusive ways. First, alcohol availability at home can activate memory associations about alcohol that guide behavior toward more frequent drinking, as supported by experimental research on the influence of alcohol primes (Krank et al., 2005). For example, alcohol in the refrigerator might activate positive associations about drinking beer, which increases the likelihood that alcohol will be consumed when the possibility to drink occurs. Similarly, Krank et al. (2005) found that when adolescents were primed with alcohol-related words, implicit alcohol associations were stronger, and these associations predicted current and future alcohol use in adolescents.

Thus, the alcoholic context itself may enhance the retrieval of positive associations about alcohol that subsequently predict more frequent drinking. Important to note is that implicit alcohol associations in the current study were assessed in the school context and not in the home context. It is therefore not possible to explain these findings in exactly the same manner as the findings of Krank et al. (2005). Nevertheless, it is possible that the availability of alcohol in the home context triggers (positive) alcohol associations and as such strengthens these associations. In addition, these positive associations (or negative associations) are perhaps transferred by parents or siblings through modeling or social learning (Whiteman et al., 2014). Subsequently, these alcohol associations might guide the behavior of adolescents toward more frequent drinking.

Second, alcohol availability at home could reflect the drinking behavior of parents who serve as role models for their offspring. Parents who have relatively more alcohol available at home might consume more alcohol. The effect of adolescents' implicit alcohol associations on drinking frequency might be strengthened through a process of social learning (Krank & Goldstein, 2006; Van Der Vorst et al., 2013). This suggests that parents can influence the development of implicit alcohol associations in their offspring unintentionally, for example through their parenting behaviors and own drinking. Van der Vorst et al. (2013) demonstrated that parental alcohol use predicted the onset of drinking in adolescents, and implicit alcohol associations mediated this relationship. Similarly, Pieters and colleagues (2012) found a positive association between automatic processes and adolescent alcohol use in families with a permissive alcohol-specific parenting style, but no such association was found for strict alcohol-specific parenting.

Nevertheless, although the availability of alcohol at home is strongly associated with the drinking behavior of parents (van den Eijnden et al., 2011; van Zundert et al., 2006), the availability is not directly a proxy measure of their alcohol consumption. Parents can drink in the absence of children, whereas the availability of alcohol reported by adolescents is a measure of what adolescents actually observe. Yet, the drinking behavior of parents could influence the direct accessibility of alcohol to adolescents. Moreover, genetics (e.g., family history of alcohol use; Pihl et al., 1990) could partly explain the difference in drinking behavior observed between the two groups. Genetics might affect the influence of implicit alcohol associations on alcohol use by reducing cognitive control performance (Pihl et al., 1990; Wiers et al., 2007).

Besides parents, siblings might also influence the drinking behavior of adolescents and the development of positive alcohol associations. The presence of older siblings may result in more alcohol availability in the home setting, and social learning principles might increase drinking behavior among adolescents (Whiteman et al., 2014). The findings of the present study provide no simple answer in favor of one of these processes (social learning, genetics, or parenting), and more research is needed to reveal the underlying process.

There are some limitations that should be addressed. First, because of the non-experimental nature of the study, we were unable to control for group size. Consequently, the alcohol non-available group was relatively small compared with the alcohol-available group (41 vs. 221), which may explain why relatively large regression coefficients did not reach significance level. Nevertheless, additional analyses using alcohol availability as a continuous interaction variable revealed similar results. The interaction among alcohol availability, frequency of alcohol use, and implicit alcohol associations was significant ($\beta = .30$, $SE = .13$, $p = .02$), suggesting that implicit alcohol associations predicted an increase in frequency of alcohol use, particularly in adolescents who indicated relatively more availability of alcohol at home. In relation to adolescents' implicit alcohol associations, by using a linear construct of alcohol availability, it would not be possible to actually test the priming of the availability of alcohol at home. That is, even when adolescents are sometimes exposed to alcohol at home, priming could already have taken place. Therefore, we decided to dichotomize the alcohol availability measure

Second, we used a fixed order in the SC-IAT, which is good for studying individual differences in prediction but not for determining the strength of adolescents' positive or negative alcohol associations. Third, unfortunately, for practical issues, we did not include any information about family, parental drinking, or parenting practices. This information would be very valuable to obtain a better understanding of the processes underlying the increased drinking behavior among adolescents who indicate that there is alcohol available in the home context. Future research could benefit from including such measures. Last, the generalizability of these results is restricted because of the specific characteristics of the at-risk sample (e.g., behavioral problems, few girls, 10%). Yet, it might be that implicit processes are particularly relevant for explaining the increased vulnerability to problematic alcohol use in these specific at-risk groups (Grenard et al., 2008; Peeters et al., 2012; Thush et al., 2008). Studying these adolescent populations might therefore contribute to increasing the knowledge of processes underlying problematic alcohol use among at-risk adolescents.

Conclusions

This study emphasizes the importance of considering the availability of alcohol in the home context. In addition to the fact that alcohol availability is strongly associated with adolescent alcohol use (Van den Eijnden et al., 2011; Van Zundert et al., 2006), we have also shown that it strengthens the effect of implicit alcohol associations on the frequency of adolescents' drinking. Krank and Goldstein (2006) argued that the effects of positive associations with alcohol need to be minimized to reduce drinking behavior. Prevention programs could benefit from increasing parents' awareness of the risk associated with the availability of alcohol at home. This aspect could be integrated within the existing evidence-based interventions targeting parenting (e.g., Prevention of Alcohol use in Students [PAS]; Koning et al., 2009).

Overall, these results indicate that the predictive effect of implicit alcohol associations on adolescent alcohol use is stronger in an alcohol-related setting. The current study demonstrates that not only priming with alcohol-related words enhances the accessibility of implicit alcohol associations, but also alcohol in the home setting appears to play a significant role in the prediction of future alcohol use by facilitating implicit alcohol associations among at-risk adolescents.

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