

Does alcohol availability at home predict the onset of alcohol use in adolescents?



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Dankwoord

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Abstract

Early onset of alcohol use in adolescents causes several problems, such as health and social problems. A predictor of the onset of adolescents' alcohol use might be alcohol availability at home. Therefore, this study researched the relation between alcohol availability at home and the onset of alcohol use. 381 adolescents (335 boys, 42 girls, 4 unknown) from 17 different special education schools were included in a longitudinal study, where they filled out questionnaires about their alcohol use. Data of two measurement waves (mean age T1 = 13.57 years, mean age T2 = 14.14 years) was used to examine the effect of alcohol availability at home on the onset of alcohol use, checking for moderation effects of impulsivity and sensation seeking. Higher alcohol availability rates significantly predicted early onset of alcohol use. No significant effects were found for the moderation of impulsivity or sensation seeking. Thus, alcohol availability at home does increase the likelihood that adolescents start drinking alcohol early, however this relation is not stronger for adolescents with impulsive and sensation seeking characteristics. To decrease the problems of adolescents who start drinking alcohol at an early age, alcohol availability at home should be minimized.

Key words: alcohol availability, alcohol use, early onset, adolescence, impulsivity, sensation seeking

Vroegtijdig alcohol gebruik in de adolescentie kan verschillende problemen opleveren, zoals gezondheids- en sociale problemen. De thuisomgeving kan een belangrijke rol spelen in het starten met alcohol gebruik bij adolescenten. Deze studie onderzoekt de relatie tussen alcohol beschikbaarheid thuis en het starten met alcohol gebruik. 381 adolescenten (335 jongens, 42 meisjes en 4 onbekend) van 17 verschillende speciaal-onderwijs scholen zijn geïncludeerd in een longitudinale studie, waarbij ze vragenlijsten hebben ingevuld over hun alcohol gebruik. Data van 2 meetmomenten (gemiddelde leeftijd T1 = 13.57 jaar, gemiddelde leeftijd T2 = 14.14 jaar) is gebruikt om de effecten van alcohol beschikbaarheid thuis op het starten met alcohol gebruik te onderzoeken, waarbij moderatie effecten van impulsiviteit en sensatie zoeken bekeken zijn. Hogere waarden van alcohol beschikbaarheid thuis voorspelde significant vroegtijdig alcohol gebruik. Er zijn geen significante effecten gevonden voor de moderatie effecten van impulsiviteit en sensatie zoeken. Dus alcohol beschikbaarheid thuis vergroot de kans dat adolescenten vroegtijdig starten met alcohol gebruik, echter is deze relatie niet sterker voor adolescenten met impulsieve en sensatie zoekende karakteristieken.

Om de problemen van adolescenten die vroegtijdig starten met alcohol drinken te verminderen zou alcohol beschikbaar thuis geminimaliseerd moeten worden.

Trefwoorden: alcohol beschikbaar, vroegtijdig alcohol gebruik, adolescentie, impulsiviteit, sensatie zoeken.

Introduction

Drinking alcohol during teenage years or young adulthood is seen as a common social phenomenon (De Wit, Adlaf, Offord, & Ogborne, 2000), but alcohol use during adolescence can cause several health and social problems. For example, (heavy) alcohol use is associated with an increased risk of coronary and liver diseases, risky sexual behaviour, increased risk of committing crimes, and an increased risk of suicide and traffic crashes (Komro, Maldonado-Molina, Tobler, Bonds, & Muller, 2007; Shield, Parry, & Rehm, 2014). The younger adolescents are when they first start drinking, the higher the likelihood that they drink heavy later in life (Liang & Chikritzhs, 2013). Furthermore, when adolescents start to drink alcohol before the age of 15-16 years old, they have a higher risk of both problem drinking in adolescence, and alcohol disorders later in life (De Wit et al., 2000; Donovan & Molina, 2011). Moreover, early onset of alcohol use is associated with many other problematic outcomes later in adolescence and early adulthood, such as academic problems, dropping out of school, and driving while drunk (Donovan & Molina, 2011). Therefore, it is important to prevent that adolescents start drinking alcohol at an early age.

It is already known that several factors are related to the early onset of alcohol use (Colder, Shyhalla, & Frndak, 2018; Donovan & Molina, 2011; Elkins, King, McGue, & Iacono, 2006; Kaufman et al., 2007), including availability of alcohol at home (Komro et al., 2007). However, it is unclear how the availability of alcohol at home is related to the onset of drinking alcohol in adolescence. Therefore, this study will examine the relation between alcohol availability at home and the onset of alcohol use in adolescence.

Availability of alcohol at home

The role of alcohol availability at home on adolescents' drinking behaviour is ambiguous, as study results are mixed (Komro et al., 2007). Some studies indicate that getting alcohol from parents at home is protective against underage (heavy) drinking (Iong Foley, Altman, & Wolfson, 2004), while other studies indicate that availability of alcohol at home might be a risk factor for adolescents' alcohol use (Peeters, Koning, Monshouwer, Vollebergh, & Wiers, 2016; Ryan, Jorm, & Lubman, 2010; Swahn & Hammig, 2000; Van den Eijnden, Van de Mheen, Vet, & Vermulst, 2011). Nevertheless, getting alcohol from parents is different from alcohol availability at home. Receiving alcohol from parents is directly related to adolescents' alcohol consumption, while alcohol availability at home could reflect the drinking behaviour of parents. So, alcohol availability does not necessarily mean that the adolescent will consume the alcohol that is available at home. Besides, drinking behaviour of

adolescents could be influenced through modelling of parental behaviour (Ryan et al., 2010) or by activation of implicit associations by observing alcohol at home (Houben & Wiers, 2009; Peeters et al., 2016). The present study will focus on the relation between adolescents' drinking behaviour and the availability of alcohol at home.

Alcohol availability at home refers to the degree that alcohol is visible for adolescents in the home setting. When alcohol is visible at home, this could act as a trigger for adolescents to automatically activate implicit alcohol associations, for example thinking about drinking alcohol. According to the dual process theory, there are two ways to respond to these associations: an automatic, impulsive response and a reflective, controlled response (Houben & Wiers, 2009; Strack & Deutsch, 2004). Alcohol availability can trigger an automatic, impulsive response and as such activate drinking behaviour (Houben & Wiers, 2009; Peeters et al., 2016). This effect especially appears to be present in adolescents who have problems with impulse control, because they have more difficulties in controlling their drinking behaviour. Furthermore, alcohol availability at home can especially lead to more alcohol use when there are no strict rules about alcohol use between parents and adolescents (Van den Eijnden et al., 2011). No parental monitoring could also lead to more alcohol use, because this means that adolescents can drink as much alcohol as they want without the notice of parents (DiClemente et al., 2001; Ryan et al., 2010; Van der Vorst, Engels, Meeus, & Deković, 2006). However, it is unknown if alcohol availability at home has a similar effect on the onset of alcohol use in adolescents.

Personality factors

Next to availability of alcohol at home, personality factors can also influence the onset of alcohol use in adolescents (Chassin, Flora, & King, 2004; Donovan & Molina, 2011; Elkins et al., 2006; Labouvie & McGee, 1986; MacPherson, Magidson, Reynolds, Kahler, & Lejuez, 2010; Peeters et al., 2014). The two personality styles that could moderate the relation between alcohol availability and the onset of (heavy) drinking are an overcontrolled and an undercontrolled personality style. The present study focuses on the undercontrolled personality style which includes impulsivity and sensation seeking (Elkins et al., 2006; Shin, Hong, & Jeon, 2012; Magid, MacLean, & Colder, 2007; Wong et al., 2006).

Impulsivity is characterized by having difficulties with controlling impulsive reactions in response to environmental stimuli (Logan, Schachar, & Tannock, 1997), and rapid decision-making. This is caused by a lack of reflective thinking and planning, which can be a result of difficulties with controlling responses (Magid et al., 2007). Castellanos-Ryan,

Parent, Vitaro, Tremblay, and Séguin (2013) and Wong et al. (2006) report about impulsivity levels; adolescents who start drinking alcohol early report higher levels of impulsivity. Magid et al. (2007) and Peeters et al. (2014) also report higher levels of impulsivity in early onsetters compared to non-drinkers, but these differences did not reach significance, which could be the results of an already high level of impulsivity in their study sample. As described above, alcohol availability at home activates implicit alcohol associations (Peeters et al., 2016), which impulsive adolescents find more difficult to control and therefore could increase the alcohol use of impulsive adolescents (Logan et al., 1997; Magid et al., 2007). Thus, the relation between alcohol availability and the onset of alcohol use would be stronger for adolescents with higher levels of impulsivity.

Sensation seeking is the strong need to seek out different and varied sensations and experiences. Sensation seeking adolescents search for novel and exiting situations and are willing to take risks for such experiences (Hittner & Swickert, 2006; Magid et al., 2007). Several studies found that adolescents who start drinking alcohol at an early age report significantly more sensation seeking tendencies than non-drinking adolescents (Hittner & Swickert, 2006; Magid et al., 2007; Peeters et al., 2014). This implies a positive relation between sensation seeking and early onset of alcohol use in adolescents. Searching for new exciting sensations and experiences thus increases the likelihood that adolescents start drinking alcohol. Therefore, availability of alcohol at home might affect adolescents with strong sensation seeking tendencies more strongly in their drinking behavior. So, the relation between alcohol availability and the onset of alcohol use would be stronger for adolescents with higher levels of sensation seeking.

Thus, personality factors are not only related to alcohol availability and alcohol use, but the relation between alcohol availability and alcohol use could be stronger for individuals with high sensation seeking and impulsivity levels, because individuals with an undercontrolled personality style might have more difficulties with controlling impulses with respect to drinking in a context where alcohol is available.

Aim of the present study

This study will answer the following research questions: “*Does availability of alcohol at home increase the likelihood that adolescents start drinking alcohol? And is this relation stronger for adolescents with impulsive and sensation seeking characteristics?*” Based on the current literature, the hypotheses are that availability of alcohol at home increases the likelihood that adolescents start drinking alcohol and that this relation is stronger for

adolescents with impulsive and sensation seeking characteristics. It is expected that early onsetters (adolescents who already drink alcohol at T1) report more availability of alcohol at home. The relationships that will be researched in the present study are described in figure 1.

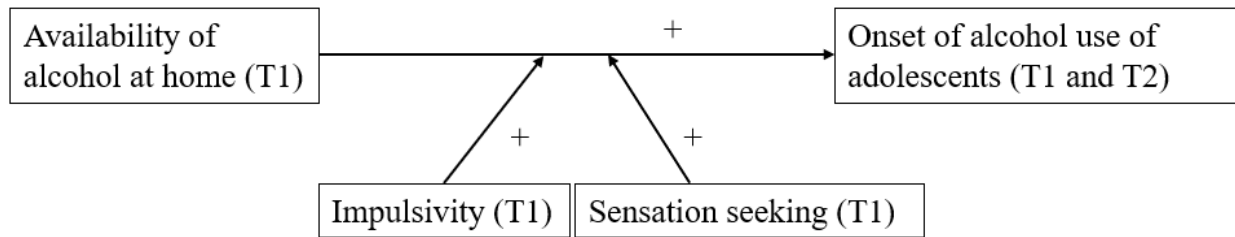


Figure 1. Relationships of the variables that are researched in the present study

Method

Sample

Participants were 381 (335 boys, 42 girls, 4 unknown) adolescents from 17 different secondary Special Education Schools in the Netherlands. Adolescents are referred to those schools when it is no longer possible to attend mainstream education because of behavioural or attention problems. The participants were followed over a period of two years with 6-8 months between measurement waves. One participant had missing data on all variables and is therefore excluded from the sample, resulting in a sample of 380 adolescents. At baseline (T1), 355 participants were included (mean age = 13.57, SD = .87), 312 boys (87,9%), 40 girls (11,3%), and 3 participants of which gender is unknown (0,8%). The second measurement wave (T2) included, 273 adolescents (mean age = 14.14, SD = .88), of which 243 boys (89,0%), 27 girls (9,9%), and again 3 participants of which gender is unknown (1,1%). The third and fourth measurement waves were not included in the present study.

Parental permission was obtained through passive consent. Parents and adolescents were notified that the study included questions about alcohol use. Adolescents were informed about the voluntary nature and confidentiality of the study. Participants could decline participation in the study or decline participation in a single wave. At each wave, participants completed a questionnaire under the guidance of a trained research assistant. If possible, some adolescents completed the questionnaire under guidance of a teacher when they were not present at the initial time of assessment.

With conducting an attrition analysis, several possible predictors (at T1) of dropout at T2 were examined. There were no significant differences found between dropouts and non-dropouts for impulsivity ($t(352) = -0.09, p = .93$), sensation seeking ($t(352) = 1.18, p = .24$),

and alcohol use ($t(351) = -1.93, p = .06$), therefore can be concluded that these factors did not predict dropout. Alcohol availability did differ significantly between the dropout group ($M = 1.97, SD = 0.95$) and the non-dropout group ($M = 2.27, SD = 1.00$), dropouts were more likely to score lower on availability of alcohol at home than the non-dropouts ($t(349) = 2.72, p < .01$).

Measurement

Availability of alcohol at home. The availability of alcohol at home was measured by 7 items on a 5-point Likert answer scale ranging from never to always (Van Zundert, Van Der Vorst, Vermulst, & Engels, 2006). The mean scores of these 7 items were used; a higher score means a higher availability of alcohol at home. A sample item of availability of alcohol at home was “Do your parents have wine or beer in stock?”. Internal consistency of the alcohol availability scale was high at both waves ($\alpha = .87$ at T1, $\alpha = .88$ at T2).

Alcohol use and onset. Alcohol use was measured by the quantity-frequency measure. Frequency was measured by asking adolescents on how many weekend days (Friday till Sunday) and on how many weekdays (Monday till Thursday) they consumed alcohol (Engels & Knibbe, 2000). Quantity was measured by asking the adolescents to indicate the number of glasses of alcohol they consumed on weekend- and on weekdays (0, 1, ..., 6, 7-10, 11-14, 15-19, and 20 glasses or more; Engels, Knibbe, & Drop, 1999). Quantity-frequency was measured by multiplying quantity with frequency. For range ratings, values were used that represent the mean of the range. The higher the quantity-frequency score, the higher the alcohol use of the adolescent.

The onset of alcohol use was measured by combining the quantity-frequency measure and the question whether adolescents used alcohol in the past 12 months. They were combined to make sure that adolescents did or did not drink alcohol the past year. Adolescents had to rate the occasions where they drank alcohol in the past 12 months on a 14-point rating scale (ranging from ‘never’ to ‘ten times’, and three ratings consisting of aggregate scores; ‘11-19’, ‘21-39’, ‘forty times or more’; O’Malley, Bachman, & Johnston, 1983). Answers were recoded into ‘1 = did drink alcohol last 12 months’ or ‘0 = did not drink alcohol last 12 months’. The quantity-frequency rate was recoded into ‘1 = drinking alcohol’ and ‘0 = not drinking alcohol’. The recoded variables were combined, resulting in three groups of adolescents. Adolescents were considered to be a member of the ‘non-drinkers’ group when they scored 0 on both rates at both measurement waves. Adolescents were considered to be a member of the ‘onsetters’ group when they scored 0 on both alcohol

variables at T1 and scored 1 at T2. Adolescents who already initiated drinking (scored 1 at T1) were identified as a member of the 'early onsetters' group.

Impulsivity and sensation seeking. Both impulsivity and sensation seeking were measured with the Substance Use Risk Profile Scale (SURPS) developed by Woicik, Stewart, Pihl, and Conrod (2009). A translated Dutch version of the SURPS was used (Malmberg et al., 2010). The SURPS included 23 items with four response categories from strongly disagree to strongly agree. The different subscales reflect patterns of traits that are related to an increased risk for substance misuse in adolescence (Castellanos-Ryan et al., 2013; Peeters et al., 2014). A sample item of sensation seeking was "I enjoy new and exciting experiences even if they are unconventional". A sample item of impulsivity was "I usually act without stopping to think". Mean scores of both impulsivity and sensation seeking were used; the higher the scores, the higher the impulsivity and sensation seeking levels. The internal reliability of the subscales was acceptable (sensation seeking, $\alpha = .62$ at T1 and $\alpha = .69$ at T2; impulsivity $\alpha = .74$ at T1 and $\alpha = .71$ at T2), and comparable with Woicik et al. (2009).

Data analysis

Descriptive research was used to report about age, alcohol indicators, and personality. Pearson correlation was used to examine if there are correlations between the study variables. The young adolescents are categorized in three groups: (1) the non-drinkers, who do not drink alcohol at both waves; (2) the onsetters, who started drinking alcohol at T2; (3) the early onsetters, who already started drinking alcohol at T1. An ANOVA was performed to compare the three drinking groups and observe differences between the groups. In case of a significant main effect of group, a Tukey post hoc test was performed to report which groups differed significantly. Multinomial logistic regression was used to analyse the relation between alcohol availability at T1 and the onset of alcohol. Age at T1 was added as possible confounder in the analysis and assumptions of multinomial logistic regression were checked. The moderation effect of impulsivity and sensation seeking at T1 on the relation between alcohol availability at T1 and alcohol use at T1 and T2 was analysed by using interaction terms in the regression analysis. The data were analysed using IBM SPSS Statistics 25. In all statistical analyses, $p < .05$ was considered to be significant.

Results

Descriptives

Descriptive statistics of age, alcohol use and personality are presented per wave in Table 1.

Alcohol use increased at T2 and a higher percentage of adolescents started drinking, the other factors remained relatively stable. Table 2 presents descriptive statistics for each group separately (non-drinkers, onsetters, and early onsetters). Early onsetters scored higher on all variables at T1, compared to the non-drinkers and onsetters.

A one-way ANOVA was conducted to examine if differences between the three groups were significant. There was a significant difference between groups for alcohol availability ($F(3, 347) = 17.02, p < .01$). The Tukey post hoc test revealed that alcohol availability was significantly higher for the early onsetters group ($2.51 \pm 1.06, p < .01$), compared to the onsetters group ($1.91 \pm 0.79, p < .01$) and the non-drinkers group ($1.87 \pm 0.83, p < .01$). There was no significant difference between the onsetters group and the non-drinkers group ($p = 1.00$). There were also significant differences between the non-drinkers group and the early onsetters group for sensation seeking ($F(3, 350) = 8.45, p < .01$), alcohol use at T1 ($F(3, 349) = 19.40, p < .01$), alcohol use at T2 ($F(3, 266) = 7.84, p < .01$) and age at T1 ($F(3, 351) = 3.07, p = .03$). Tukey post hoc tests revealed that all variables were significantly higher in the early onsetters group (sensation seeking: $2.88 \pm 0.74, p < .01$, alcohol use T1: $5.77 \pm 9.75, p < .01$; alcohol use T2: $5.11 \pm 8.49, p < .01$; age T1: $13.68 \pm 0.85, p = .01$), compared to the non-drinkers group (sensation seeking: 2.50 ± 0.70 ; alcohol use T1: 0.00 ± 0.00 ; alcohol use T2: 0.00 ± 0.00 ; age T1: 13.33 ± 0.83). Lastly, a significant difference was found between the early onsetters group and the onsetters group on alcohol use at T1, the early onsetters group scored significantly higher ($5.77 \pm 9.75, p < .01$) on alcohol use than the onsetters group (0.00 ± 0.00).

Pearson correlations of alcohol use (T1 and T2), alcohol availability (T1), and personality (T1) are presented in Table 3. All measures included are correlated, except impulsivity and alcohol use at T1.

Table 1. Descriptive statistics for alcohol use, alcohol availability, and personality for each wave. Means and SD's are reported for observed cases.

	Wave 1		Wave 2	
	N = 355		N = 273	
Onset of alcohol use	52,7 % started drinking		55,2% started drinking	
	M	SD	M	SD
Age	13.57	0.87	14.14	0.88
Alcohol use	3.04	7.64	3.43	8.30
Alcohol availability	2.18	0.99	2.21	0.99
Impulsivity	2.23	0.74	2.22	0.68
Sensation seeking	2.72	0.75	2.73	0.78

Table 2. Descriptive statistics for alcohol use, alcohol availability, and personality for each group. Means and SD's are reported for observed cases.

	Non-drinkers N = 84		Onsetters N = 30		Early onsetters N = 186	
	M	SD	M	SD	M	SD
Wave 1						
Age	13.33 ^a	0.83	13.57 ^{a,b}	0.94	13.68 ^b	0.85
Alcohol use	0 ^a	0	0 ^a	0	5.77 ^b	9.75
Alcohol availability	1.87 ^a	0.83	1.91 ^a	0.79	2.51 ^b	1.06
Impulsivity	2.22 ^a	0.73	2.26 ^a	0.68	2.29 ^a	0.73
Sensation seeking	2.50 ^a	0.70	2.79 ^{a,b}	0.76	2.88 ^b	0.74
Wave 2						
Age	13.98 ^a	0.96	14.37 ^a	0.85	14.20 ^a	0.80
Alcohol use	0 ^a	0	3.70 ^{a,b}	11.21	5.11 ^b	8.50

Note. Similar superscripts indicate that these means do not differ significantly. Different superscripts indicate that these means do differ significantly.

Table 3. Pearson correlation matrix for alcohol use, alcohol availability, and personality.

	1	2	3	4	5
1 Impulsivity T1	-	.22**	.06	.22**	.18**
2 Sensation seeking T1		-	.14**	.21**	.16*
3 Alcohol use T1			-	.21**	.24**
4 Alcohol availability T1				-	.15*
5 Alcohol use T2					-

Note. *p < .05, **p < .01

Main effects

Table 4 includes the odds ratios (OR) and confidence intervals (CI) of the multinomial logistic regression analysis with onset of alcohol use (non-drinkers, onsetters, early onsetters) as outcome variable, while controlling for age, alcohol availability, and personality. The non-drinkers group was the reference group. Age was analysed in a multivariate model ($\chi^2 = 58.26$, $df = 6$, $p < .01$), similar as alcohol availability and personality were analysed in a multivariate model ($\chi^2 = 64.97$, $df = 9$, $p < 0.01$). Higher scores at baseline availability of alcohol significantly predicted early onset group membership (OR = 1.93, CI = 1.40 – 2.67, $p < 0.01$), compared to non-drinkers group membership and onsetters group membership (OR = 0.50, CI = 0.31 – 0.83, $p < 0.01$). Higher alcohol availability scores at baseline significantly predicted early onset group, thus early onsetters have more alcohol available at home.

Furthermore, higher scores on age (OR = 1.58, CI = 1.14 – 2.19, $p < 0.01$) and sensation seeking (OR = 1.86, CI = 1.27 – 2.72, $p < 0.01$) significantly predicted early onset group membership compared to non-drinkers membership. This means that early onsetters are older and have more sensation seeking characteristics compared to non-drinkers. No significant results were found for the prediction of onsetters group membership compared to non-drinkers group membership.

Moderation effects

Table 4 includes the interaction effects of impulsivity and sensation seeking on the relation between alcohol availability and alcohol use. The moderators were analysed in a multivariate model (impulsivity: $\chi^2 = 0.56$, $df = 3$, $p = 0.91$, sensation seeking: $\chi^2 = 2.74$, $df = 3$, $p = 0.43$) to research the influence of each moderator separately. No significant results were found for moderation of impulsivity or sensation seeking for the early onsetters or onsetters compared to non-drinkers. An additional analysis was conducted with early onsetters as reference group, however no significant moderation effects of personality were found in this analysis either.

Table 4. Multinomial logistic regression predicting alcohol use (reference group is the non-drinking group), with age as control variable, alcohol availability and personality as predictors, and interaction terms for the moderation of personality.

	Predictors	B	SE	OR	95% CI
Onsetters	Age T1	0.28	0.26	1.33	0.80 – 2.20
	Alcohol availability T1	-0.03	0.28	0.97	0.56 – 1.68
	Impulsivity T1	-0.12	0.31	0.89	0.48 – 1.63
	Sensation seeking T1	0.54	0.31	1.71	0.93 – 3.14
	Alcohol availability x impulsivity	- 0.10	0.23	0.91	0.58 – 1.41
	Alcohol availability x sensation seeking	0.09	0.25	1.10	0.67 – 1.78
Early onsetters	Age T1	0.46	0.17	1.58**	1.14 – 2.19
	Alcohol availability T1	0.66	0.17	1.93**	1.40 – 2.67
	Impulsivity T1	-0.16	0.20	0.85	0.58 – 1.26
	Sensation seeking T1	0.62	0.20	1.86**	1.27 – 2.72
	Alcohol availability x impulsivity	- 0.04	0.14	0.96	0.74 – 1.26
	Alcohol availability x sensation seeking	0.08	0.15	1.08	0.81 – 1.45

Note: * $p < .05$, ** $p < .01$.

Discussion

This study researched the relation between alcohol availability at home and the onset of alcohol use in adolescence, whereby impulsivity and sensation seeking were possible moderators. It was expected that availability of alcohol at home increases the likelihood that adolescents start (early) with drinking. The results of the present study indicate that alcohol availability indeed increases the likelihood of being an early onsetter (starting to drink before the baseline assessment), but not of being an onsetter (started drinking between T1 and T2). Sensation seeking predicted alcohol use directly, but impulsivity and sensation seeking did not significantly moderate the relation between alcohol availability and alcohol use. So, the relation between alcohol availability and the onset of alcohol use is not stronger for adolescents with impulsive and sensation seeking characteristics in this study.

Alcohol availability and the onset of alcohol use

The risk of alcohol availability at home for the early onsetters group is in line with several studies that describe alcohol availability as risk factor for early alcohol use in adolescence (Peeters et al., 2016; Ryan et al., 2010; Swahn & Hammig, 2000). Ryan et al. (2010) and Swahn and Hammig (2000) researched the direct relation of alcohol availability on alcohol use and Peeters et al. (2016) researched implicit alcohol associations in combination with alcohol availability and the onset of alcohol use. Swahn and Hammig (2000) retrieved their results in a cross-sectional study using data from 1995. Data from 1995 could differ from the situation in the present, because age limits on buying and drinking alcohol and attitudes towards drinking alcohol early could have changed. However, it could also mean that alcohol availability always is a risk factor for drinking alcohol at an early age, regardless of time. Peeters et al. (2016) researched alcohol availability as moderator in the relation between implicit alcohol associations and alcohol use. They revealed that implicit alcohol associations only increased alcohol use when there was alcohol available at home. It could be that alcohol availability at home activates the implicit associations about alcohol use, which increases the likelihood that adolescents start drinking. Besides, it could be that alcohol availability at home reflects the drinking patterns of parents, and parents can influence the development of implicit alcohol associations in their children unintentionally by modelling. Because alcohol availability only increases the risk to be an early onsetter in the present study, modelling seems to influence the early onsetters group, but not the onsetters group. The non-significant finding for the onsetters group could be explained by the sample size of the onsetters group, which was relatively small ($N = 30$) compared to the early onsetters group ($N = 186$), results

might have been different in a large group of onsetters. Thus, the results of the present study imply that alcohol availability only seems to be a risk factor for the early onsetters, which is in line with earlier research (Peeters et al., 2016; Ryan et al., 2010; Swahn & Hammig, 2000).

Limiting alcohol availability at home is important to reduce the early onset of alcohol use (Ryan et al., 2010; Swahn & Hammig, 2000; Van den Eijnden et al., 2011). Furthermore, Van den Eijnden et al. (2011) suggested that the risk for early alcohol use could be further decreased when there are strict rules about alcohol between parents and children. Parental monitoring could also reduce the risk of an early onset of alcohol use (DiClemente et al., 2001; Ryan et al., 2010; Van der Vorst et al., 2006). In addition, Ryan et al. (2010) revealed that parental modelling influences the risk of an early onset of alcohol use. When parents drink a lot of alcohol, this seems normal for adolescents, resulting in a higher risk to start drinking. Thus, parents should give a good example and not drink (much) alcohol at home. The influence of strict rules, parental monitoring, and parental modelling is not researched in this study, however, it would be interesting to include these factors in future studies about alcohol availability and the onset of alcohol use.

Sensation seeking, impulsivity and the onset of alcohol use

It was expected that the relation between alcohol availability and the onset of alcohol use was stronger for adolescents with sensation seeking characteristics. The present study revealed that sensation seeking did significantly predict early onset group membership, however no significant results were found for the moderation of sensation seeking on the relation between alcohol availability and alcohol use. The direct effect of sensation seeking on alcohol use is in line with literature, as several studies found a similar result (Hittner & Swickert, 2006; Magid et al., 2007; Peeters et al., 2014). Both Peeters et al. (2014) and Hittner and Swickert (2006) used a similar method of self-report questionnaire compared to the present study, and Peeters et al. (2014) used a study sample similar to the sample of the present study. These two studies found an effect of sensation seeking on the onset of alcohol use; higher levels of sensation seeking at baseline predicted onsetters group membership and early onsetters group membership. The prediction of early onsetters group membership is in line with the present study, however the present study did not find a significant relation between sensation seeking and onsetters group membership. This could again be due to the small sample size of the onsetters group. Magid et al. (2007) also found an effect of sensation seeking on alcohol use, however they deleted the non-drinkers from their sample, so the results cannot be generalized to the study sample of the present study. Besides, Magid et al. (2007) only researched the

frequency of alcohol use, not the onset. A moderation effect of sensation seeking was not found in the present study, which could be due to the small differences between the groups.

Similar as with sensation seeking, it was expected that impulsivity would strengthen the relation between alcohol availability and the onset of alcohol use. Castellanos-Ryan et al. (2013), Magid et al. (2007), Peeters et al. (2014), and Wong et al. (2006) found a relation between impulsivity and alcohol use, however only Wong et al. (2006) found a significant relation. Peeters et al. (2014), Magid et al. (2007), and Castellanos-Ryan et al. (2013) probably did not find significant results because their study sample included individuals with relatively high impulsivity scores or their results were influenced by other factors that also could influence alcohol use of adolescents. Corresponding to Castellanos-Ryan et al. (2013), Magid et al. (2007) and Peeters et al. (2014), the present study revealed no significant effect of impulsivity on the onset of alcohol use, and no significant effect of moderation of impulsivity. The study sample of the present study could be an explanation why no significant results were found for the moderation of impulsivity. The participants of the study sample attend special education schools. Adolescents who attend special education show relatively more problem behaviours, such as an impulsive behaviour style, compared to peers in mainstream education. This could have resulted in relatively high impulsivity scores in the study sample, and therefore limited variation in impulsivity between the drinking groups. Because all groups included many adolescents with high impulsivity rates, it could be that impulsivity did not significantly predict group membership (e.g. no variation between groups) in the present study. Besides, these already high levels of impulsivity could have affected the absence of a moderating relation in all groups. Furthermore, impulsivity correlates with the onset of alcohol use at T2 (table 3), but not with the onset of alcohol use at T1. Future research could conduct a similar research including mainstream education as well.

Impulsivity and sensation seeking could be indicators for the onset of alcohol use for all groups, but the small differences between the groups could explain why no significant results were found for moderation effects. This does not mean that the factors do not predict alcohol use onset, only the results of the present study do not reveal this prediction. For example, Houben and Wiers (2009) and Peeters et al. (2016) described that the implicit alcohol associations of alcohol availability increase the frequency of alcohol use. Alcohol availability triggers these associations, when adolescents have high levels of impulsivity and sensation seeking they could be more triggered to start drinking alcohol. The implicit alcohol associations are not researched in this study, but it would be interesting to include them in future research. Furthermore, future studies could conduct similar research with a more

representative sample of adolescents or could continue to follow alcohol use later in adolescence such that the onset group will be bigger.

Limitations & Strengths

Besides several strengths, such as the longitudinal design of this study, the present study also has some limitations. As mentioned before, the study sample included adolescents with problem behaviour characteristics; adolescents in this sample probably score higher on impulsivity compared to peers in the general population. Next to this, relatively little girls participated in this study. These factors influence the external validity, making the results less generalizable to the general adolescent population. Furthermore, the onsets group was a relatively small group compared to the early onsets group. This could be an explanation for the non-significant differences between the non-drinkers and the onsets. Lastly, dropouts at T2 were more likely to have reported lower levels of alcohol availability at T1, meaning a group dropped out with lower levels of alcohol availability, which could have affected the results.

Future research could take these limitations into account and use a more representative and perhaps older sample of adolescents in the Netherlands. This could result in a better boys-girls distribution in the sample. Furthermore, it could lead to better distributed groups of non-drinkers, onsets and early onsets, making it more likely to find significant results. Using a more representative sample could affect the outcomes with respect to main differences and moderation effects between the drinking groups.

Conclusion & implications

The results of this study reveal that alcohol availability at home increases the likelihood that adolescents start early with drinking alcohol, however this relation is not stronger for adolescents with impulsive and sensation seeking characteristics. To decrease the likelihood of an early onset of alcohol use in adolescents, and thereby decrease the problems related to an early onset, alcohol availability at home should be decreased. Parents should be made aware of the risk of alcohol availability at home in relation to the alcohol use of their adolescent child. Several recommendations for parents to decrease the risk of an early onset of alcohol use are mentioned, such as limiting the alcohol availability at home and setting strict rules about alcohol use.

Reference List

- Castellanos-Ryan, N., Parent, S., Vitaro, F., Tremblay, R. E., & Séguin, J. R. (2013). Pubertal development, personality, and substance use: A 10-year longitudinal study from childhood to adolescence. *Journal of Abnormal Psychology, 122*(3), 782-796.
- Chassin, L., Flora, D. B., & King, K. M. (2004). Trajectories of alcohol and drug use and dependence from adolescence to adulthood: The effects of familial alcoholism and personality. *Journal of Abnormal Psychology, 113*(4), 483-498.
- Colder, C. R., Shyhalla, K., & Frndak, S. E. (2018). Early alcohol use with parental permission: Psychosocial characteristics and drinking in late adolescence. *Addictive Behaviors, 76*(1), 82-87.
- De Wit, D. J., Adlaf, E. M., Offord, D. R., & Ogborne, A. C. (2000). Age at first alcohol use: a risk factor for the development of alcohol disorders. *American Journal of Psychiatry, 157*(5), 745-750.
- DiClemente, R. J., Wingood, G. M., Crosby, R., Sionean, C., Cobb, B. K., Harrington, K., ... & Oh, M. K. (2001). Parental monitoring: Association with adolescents' risk behaviors. *Pediatrics, 107*(6), 1363-1368.
- Donovan, J. E., & Molina, B. S. (2011). Childhood risk factors for early-onset drinking. *Journal of Studies on Alcohol and Drugs, 72*(5), 741-751.
- Elkins, I. J., King, S. M., McGue, M., & Iacono, W. G. (2006). Personality traits and the development of nicotine, alcohol, and illicit drug disorders: Prospective links from adolescence to young adulthood. *Journal of Abnormal Psychology, 115*(1), 26-39.
- Engels, R. C. M. E., & Knibbe, R. A. (2000). Alcohol use and intimate relationships in adolescence: When love comes to town. *Addictive Behaviors, 25*(3), 435-439.
- Engels, R. C. M. E., Knibbe, R. A., Drop, M. J. (1999). Why do late adolescents drink at home? A study on psychological well-being, social integration and drinking context. *Addiction Research and Theory, 7*(1), 31-46.
- Hittner, J. B., & Swickert, R. (2006). Sensation seeking and alcohol use: A meta-analytic review. *Addictive Behaviors, 31*(8), 1383-1401.
- Houben, K., & Wiers, R. W. (2009). Response inhibition moderates the relationship between implicit associations and drinking behavior. *Alcoholism: Clinical and Experimental Research, 33*(4), 626-633.
- Long Foley, K., Altman, D., & Wolfson, M. (2004). Adults' approval and adolescents' alcohol use. *Journal of Adolescent Health, 35*(4), 17-26.

- Kaufman, J., Yang, B. Z., Douglas-Palumberi, H., Crouse-Artus, M., Lipschitz, D., Krystal, J. H., & Gelernter, J. (2007). Genetic and environmental predictors of early alcohol use. *Biological Psychiatry*, *61*(11), 1228-1234.
- Komro, K. A., Maldonado-Molina, M. M., Tobler, A. L., Bonds, J. R., & Muller, K. E. (2007). Effects of home access and availability of alcohol on young adolescents' alcohol use. *Addiction*, *102*(10), 1597-1608.
- Labouvie, E. W., & McGee, C. R. (1986). Relation of personality to alcohol and drug use in adolescence. *Journal of Consulting and Clinical Psychology*, *54*(3), 289-293.
- Liang, W., & Chikritzhs, T. (2013). Age at first use of alcohol and risk of heavy alcohol use: a population-based study. *BioMed Research International*, *2013*(1) 1-5.
- Logan, G. D., Schachar, R. J., & Tannock, R. (1997). Impulsivity and inhibitory control. *Psychological Science*, *8*(1), 60-64.
- MacPherson, L., Magidson, J. F., Reynolds, E. K., Kahler, C. W., & Lejuez, C. W. (2010). Changes in sensation seeking and risk-taking propensity predict increases in alcohol use among early adolescents. *Alcoholism: Clinical and Experimental Research*, *34*(8), 1400-1408.
- Magid, V., MacLean, M. G., & Colder, C. R. (2007). Differentiating between sensation seeking and impulsivity through their mediated relations with alcohol use and problems. *Addictive Behaviors*, *32*(10), 2046-2061.
- Malmberg, M., Overbeek, G., Monshouwer, K., Lammers, J., Vollebergh, W. A., & Engels, R. C. (2010). Substance use risk profiles and associations with early substance use in adolescence. *Journal of Behavioral Medicine*, *33*(6), 474-485.
- O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (1983). Reliability and consistency in self-reports of drug use. *Substance Use and Misuse*, *18*(6), 805-824.
- Peeters, M., Koning, I., Monshouwer, K., Vollebergh, W. A., & Wiers, R. W. (2016). Context effects of alcohol availability at home: implicit alcohol associations and the prediction of adolescents' drinking behavior. *Journal of Studies on Alcohol and Drugs*, *77*(5), 749-756.
- Peeters, M., Monshouwer, K., van de Schoot, R., Janssen, T., Vollebergh, W. A., & Wiers, R. W. (2014). Personality and the prediction of high-risk trajectories of alcohol use during adolescence. *Journal of Studies on Alcohol and Drugs*, *75*(5), 790-798.
- Ryan, S. M., Jorm, A. F., & Lubman, D. I. (2010). Parenting factors associated with reduced adolescent alcohol use: a systematic review of longitudinal studies. *Australian and New Zealand Journal of Psychiatry*, *44*(9), 774-783.

- Shield, K. D., Parry, C., & Rehm, J. (2014). Chronic diseases and conditions related to alcohol use. *Alcohol Research: Current Reviews*, 35(2), 155-171.
- Shin, S. H., Hong, H. G., & Jeon, S. M. (2012). Personality and alcohol use: the role of impulsivity. *Addictive Behaviors*, 37(1), 102-107.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, 8(3), 220-247.
- Swahn, M. H., & Hammig, B. J. (2000). Prevalence of youth access to alcohol, guns, illegal drugs, or cigarettes in the home and association with health-risk behaviors. *Annals of Epidemiology*, 10(7), 452.
- Van den Eijnden, R., Van de Mheen, D., Vet, R., & Vermulst, A. D. (2011). Alcohol-specific parenting and adolescents' alcohol-related problems: The interacting role of alcohol availability at home and parental rules. *Journal of Studies on Alcohol and Drugs*, 72(3), 408-417.
- Van der Vorst, H., Engels, R. C., Meeus, W., & Deković, M. (2006). Parental attachment, parental control, and early development of alcohol use: A longitudinal study. *Psychology of Addictive Behaviors*, 20(2), 107.
- Van Zundert, R. M., Van Der Vorst, H., Vermulst, A. A., & Engels, R. C. (2006). Pathways to alcohol use among Dutch students in regular education and education for adolescents with behavioral problems: the role of parental alcohol use, general parenting practices, and alcohol-specific parenting practices. *Journal of Family Psychology*, 20(3), 456-467.
- Woicik, P. A., Stewart, S. H., Pihl, R. O., & Conrod, P. J. (2009). The substance use risk profile scale: A scale measuring traits linked to reinforcement-specific substance use profiles. *Addictive Behaviors*, 34(12), 1042-1055.
- Wong, M. M., Nigg, J. T., Zucker, R. A., Puttler, L. I., Fitzgerald, H. E., Jester, J. M., ... & Adams, K. (2006). Behavioral control and resiliency in the onset of alcohol and illicit drug use: a prospective study from preschool to adolescence. *Child Development*, 77(4), 1016-1033.
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