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**“The Longitudinal Impact of Parental Emotional Warmth on Adolescent Alcohol Use:
The Role of Impulsivity and Socioeconomic Status”**

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Abstract

Parenting style can either encourage or discourage adolescents' alcohol initiation. The current longitudinal study investigated the relationship between emotional warmth and alcohol use. 1,243 Dutch adolescents of 11.11 years old ($SD = .55$; 51.1% girls) participated in the first three waves of the TRAILS-study and reported on alcohol use, impulsivity, and parental emotional warmth. Hierarchical regression analyses, including only non-drinkers at baseline, showed a marginal negative effect of emotional warmth on alcohol use. This finding indicates that adolescents who experienced less emotional warmth at age 11 before drinking was initiated, were relatively more likely to drink alcohol at age 16. However, after controlling for impulsivity and SES, the effect of emotional warmth on alcohol use disappeared. Additionally, findings showed that adolescents who experienced less emotional warmth at age 11, were relatively more impulsive at age 16, which was associated with an increased risk for alcohol initiation at age 16. Whether adolescents came from low or high SES did not change the relationship between impulsivity and alcohol use. Since this study revealed that impulsivity and SES are stronger predictors of adolescents' alcohol use than emotional warmth, alcohol prevention strategies should focus on impulsive adolescents and adolescents from low socioeconomic backgrounds.

Keywords: adolescents, alcohol use, emotional warmth, impulsivity, SES

Samenvatting

Opvoedstijl kan de alcoholinitiatie van adolescenten bevorderen of ontmoedigen. Dit longitudinale onderzoek bekeek de relatie tussen emotionele warmte van ouders en alcoholgebruik. 1.243 Nederlandse adolescenten van 11,11 jaar oud ($SD = 0,55$; 51,1% meisjes) namen deel aan de eerste drie metingen van de TRAILS-studie en rapporteerden hun alcoholgebruik, impulsiviteit en emotionele warmte van de ouders. Hiërarchische regressieanalyses, waarbij alleen niet-drinkers waren meegenomen, tonen een zeer klein effect van emotionele warmte op alcoholgebruik. Dit betekent dat adolescenten die op 11-jarige leeftijd voor de start van het alcoholgebruik minder emotionele warmte ervoeren, meer kans hadden om te drinken op 16-jarige leeftijd. Dit effect verdween echter na controle voor SES en impulsiviteit. Dit onderzoek toont ook aan dat adolescenten die op 11-jarige leeftijd minder emotionele warmte ervoeren, eerder impulsief waren op 16-jarige leeftijd, wat geassocieerd was met een verhoogde kans op alcoholinitiatie op 16-jarige leeftijd. Verder was de relatie tussen impulsiviteit en alcoholgebruik niet verschillend voor adolescenten uit lage en hoge SES-gezinnen. Aangezien uit dit onderzoek blijkt dat impulsiviteit en SES sterkere voorspellers zijn van het alcoholgebruik van adolescenten dan ouderlijke emotionele warmte, zouden alcoholpreventiestrategieën zich moeten richten op impulsieve adolescenten en op adolescenten met een lage sociaaleconomische status.

Kernwoorden: adolescenten, alcoholgebruik, emotionele warmte, impulsiviteit, SES

Introduction

In the Netherlands, 18% of the 12-year-olds and 65% of the 15-year-olds have consumed alcohol (Van Dorsselaer et al., 2016). Drinking alcohol in early adolescence is associated with an increased risk of problematic alcohol use in mid-adolescence (Hawkins et al., 1997) and alcohol abuse or dependence in adulthood (Grant & Dawson, 1997). Early alcohol initiation is also associated with dropping out of school, delinquency, illicit drug use, and risky sexual behaviour (Donovan & Molina, 2011). Besides, early drinkers are at greater risk of neurotoxicity and harmful cognitive effects with implications for intellectual development, than those who initiate alcohol use later in life (Zeigler et al., 2004). Given these negative consequences of adolescents' alcohol use, it is crucial to prevent adolescents' early alcohol initiation by targeting the underlying risk factors.

Family functioning has been established as one of the strongest sources of risk and protection for adolescents' alcohol use (Hawkins, Catalano, & Miller, 1992; Vakalahi, 2001). When adolescents grow up in an environment characterised by parental hostility and rejection, alcohol initiation may be promoted (Johnson & Pandina, 1991; Sartor, Lynskey, Heath, Jacob, & True, 2007). Contrarily, positive role modelling by parents may be protective against alcohol initiation (Bandura, 1977; Roski et al., 1997). Since family functioning shows promise as a source of both positive and negative influence on adolescents' alcohol use (Vakalahi, 2001), the present study investigates how parenting style affects the development of adolescents' alcohol use.

Parenting styles and their relationship with adolescents' alcohol use

Baumrind (1966) was among the first to examine variation in parenting behaviours and categorised four parenting styles into the dimensions of warmth and strictness. The authoritative parenting style is characterised by high strictness and high warmth (Baumrind, 1966). Authoritative parents provide clear rules for the child in a warm and responsive manner (Lee, Daniels, & Kissinger, 2006). The authoritarian parenting style is characterised by high strictness and low warmth (Baumrind, 1966). These parents are less warm than authoritative parents and use punishment to obtain obedience. The permissive parenting style is characterised by low strictness and high warmth (Baumrind, 1966). Permissive parents, like authoritative parents, provide affection and dialogue, but fail to set appropriate boundaries. At last, the neglectful parenting style is characterised by low strictness and low warmth (Baumrind, 1966). These parents respond minimally to the child's needs (Lee et al., 2006). Baumrind (1966) suggests that the authoritative parenting style is protective of children's

psychosocial wellbeing, whereas the authoritarian, permissive, and neglectful style are associated with negative child outcomes, such as insecurity and hostility. As for alcohol use, the study of Bahr and Hoffmann (2010) showed that adolescents whose parents were authoritative were less likely to drink heavily than adolescents from the other three parenting styles.

Van der Vorst, Engels, Meeus, Deković, and Vermulst (2006) examined the effect of the dimension of parental strict control on alcohol use. Parental strict control was defined as monitoring and supervising the adolescent. It was found that parenting styles with more parental strict control (i.e. authoritative and authoritarian) prevent adolescents from drinking more heavily, compared to styles with less strict control (i.e. permissive and neglectful).

Visser, De Winter, Vollebergh, Verhulst, and Reijneveld (2013) investigated the effects of parental overprotection and rejection. Results showed that adolescents who perceived more parental overprotection had an increased risk of drinking six or more alcoholic beverages a week, whereas parental rejection did not affect adolescents' alcohol use. The association between overprotection and alcohol use was explained in both directions (Visser et al., 2013). On the one hand, adolescents may drink alcohol as a form of protest against parental meddling, because it conflicts with the adolescent's autonomy. On the other hand, parents may become overly controlling, after noticing that their adolescent drinks alcohol, to protect the child. This way, parental overprotection is a reaction to adolescents' alcohol use. These results, combined with the results of Van der Vorst et al. (2006), suggest that strict controlled parenting might decrease adolescents' alcohol use, however when parents are too controlling and become overprotective, adolescents' alcohol use might increase.

Other studies examined the dimension of parental emotional support, which was operationalised as the amount of time parents spent communicating (Cohen, Richardson, & LaBree 1994; Hung, Yen, & Wu, 2009) and time spent in joint family activities (Garmienė, Žemaitienė, & Zaborskis, 2006; Hawkins et al., 1997). When parents communicated more frequently with their children, spent more time in joint activities, and gave them more encouragement and affection, adolescents were less prone to try alcohol, thereby delaying the onset of alcohol use (Cohen et al., 1994; Hawkins et al., 1997).

Based on these findings, it is expected that certain parenting behaviours, such as a lack of parental emotional support, affect the development of adolescents' alcohol use negatively, suggesting that adolescents start drinking earlier and drink more heavily.

The role of personality

In addition to parenting style, adolescents' personality traits might have an impact on their alcohol use as well (Patoock-Peckham & Morgan-Lopez, 2006). An important trait that has been associated with alcohol use is impulsivity. Impulsivity is defined as a tendency for risk-taking and liveliness, and involves no prior thought about the consequences of actions (Baker & Yardley, 2002).

Impulsivity could act as a mediator in the relationship between parenting style and alcohol use and could explain the relationship between a lack of emotional warmth and an increased risk for early onset of alcohol use (Nye, Zucker, & Fitzgerald, 1999). The findings of Patoock-Peckham and Morgan-Lopez (2006) showed that when parents were more permissive, their children were more impulsive. Moreover, this study found that when fathers were more authoritative, their sons were less impulsive. Conversely, when mothers were more authoritarian, their daughters were more impulsive. This study showed that variations of parental warmth and strictness from the father and mother had different effects on adolescents' impulsivity. As for parental emotional warmth, it was found that emotionally warm parents are better able to show adequate self-regulation, than less emotionally warm parents (Nye et al., 1999), and can act as a role model for self-regulatory skills in adolescents (Baker and Hoerger, 2012). Self-regulatory skills are reflected in lower levels of impulsivity (Patoock-Peckham, Cheong, Balhorn, & Nagoshi, 2001).

Furthermore, multiple studies have concluded that impulsive adolescents drink alcohol in larger amounts and more frequently (Baker & Yardley, 2002; Fernie et al., 2013; Peeters et al., 2015). Thus, a lack of parental emotional warmth may increase adolescents' impulsive behaviour, since these parents display less self-regulation. A lack of self-regulation of appropriate behaviours, as reflected in impulsive behaviour, may in turn increase the risk of problematic alcohol use. To get more insight in the relationship between parental emotional warmth and adolescents' alcohol use, the mediating effect of impulsivity in this relationship will be investigated.

The role of socioeconomic differences

The relationship between adolescents' impulsivity and alcohol use can only be fully understood when considering the socioeconomic environment as well (Dick et al., 2010). The theory of strong and weak situations assumes that situations can restrict the expression of personality traits in behaviour (Lynam et al., 2000). In strong situations, the expression of individual traits is suppressed, because of strong pressure for everyone to behave similarly. In

weak situations, individual traits shape people's behaviour, since the behavioural norms are less clear. A common example is the colour of a traffic light (Cooper & Withey, 2009). A red light indicates a strong situation, because of its strict behavioural rule to stop. A yellow traffic light can be argued a weak situation, as it includes a more inconsistent norm. In this weak situation, personality traits are more accentuated in behaviour, causing cautious people to stop, while daring people are more likely to run a yellow light.

Lynam et al. (2000) studied the interaction between impulsivity and neighbourhood context on juvenile offending. Since juvenile offending and alcohol use arise from the same risk factors (Fergusson, Lynskey, & Horwood, 1996), the theoretical mechanism that underlies offending may apply to alcohol use as well. The results revealed that the relationship between impulsivity and offending was non-significant in the highest SES neighbourhoods, and strongly significant in the lowest SES neighbourhoods (Lynam et al., 2000). It was argued that a low SES neighbourhood is a weak situation, because the rules on how to behave in these neighbourhoods are less clear, since low SES neighbourhoods are characterised by less informal social control (Jensen, Chassin, & Gonzales, 2017). In consequence of less explicit behavioural norms, the influence of personality traits such as impulsivity on adolescents' behaviour is accentuated. To investigate whether the expression of impulsivity is stronger in low SES neighbourhoods, the moderating effect of SES on the relationship between adolescents' impulsivity and adolescents' alcohol use will be studied.

Present study

The present study investigates the relationship between parental emotional warmth, as a dimension of parenting style, and adolescents' alcohol use. Moreover, the mediating role of impulsivity in the relationship between emotional warmth and adolescents' alcohol use is examined. Furthermore, this study investigates the moderating role of SES in the relationship between adolescents' impulsivity and adolescents' alcohol use. Based on previous research, it is hypothesised that (1) a lack of parental emotional warmth is associated with more impulsivity, which in turn is associated with an increased risk for early onset of alcohol use; and (2) low SES strengthens the relationship between impulsivity and alcohol use (Figure 1).

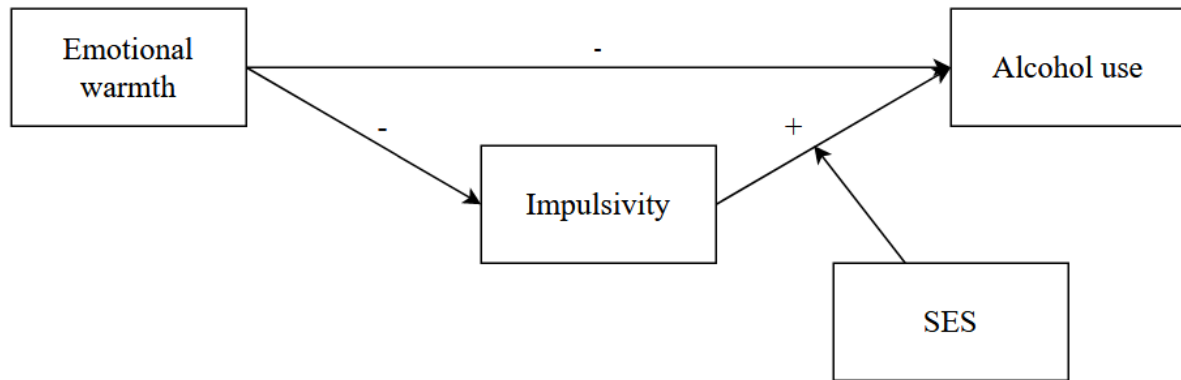


Figure 1. Research model.

Method

Design and Procedure

This longitudinal study includes participants of the Tracking Adolescents' Individual Lives Survey (TRAILS), a prospective cohort study of Dutch adolescents. TRAILS-participants were recruited from primary schools within five municipalities in the north of the Netherlands. When parents agreed to participate after receiving information brochures, an interview was scheduled, during which they signed an informed consent form (De Winter et al., 2005).

During the first measurement wave, well-trained interviewers interviewed one of the parents at home. At each assessment, the adolescents completed the questionnaires at school under the supervision of one or more TRAILS-assistants. During the second and third waves, the adolescent and the parent again completed questionnaires. Teachers were also asked to fill out a questionnaire for all TRAILS-participants in their class (Huisman et al., 2008).

Participants

Only participants who indicated that they had never consumed alcohol at T1 were selected, since alcohol use was assessed differently at T1 and T3. Of the 2,229 TRAILS-participants, 68.1% reported no alcohol use at T1. Response rates were 96.0% at T2 ($N = 1,457$) and 81.9% at T3, resulting in a total sample of 1,243 adolescents. The mean age of the participants was 11.11 years at T1 ($SD = .55$, 51.1% girls). At T2 and T3 the mean ages were, respectively, 13.57 ($SD = .53$, 51.6% girls) and 16.28 years old ($SD = .71$, 52.6% girls).

An attrition analysis was conducted to compare the adolescents that participated in the third wave ($N = 1,243$) with the adolescents that dropped out ($N = 275$). The analysis checked differences in gender, age, SES, and emotional warmth. Significant differences in gender,

SES, and emotional warmth were found. The drop-out consisted of more boys, $t(405) = -2.60, p = .01$, scored lower on SES, $t(1488) = 7.86, p < .001$, and experienced less emotional warmth, $t(368) = 4.00, p < .001$.

Measures

Parental emotional warmth. Parental emotional warmth at T1 was measured using the self-report EMBU-C questionnaire, which assesses children's perception of the rearing practices of their parents (Markus, Lindhout, Boer, Hoogendijk, & Arrindell, 2003). The scale contained 17 items (e.g. 'Do you think your father/mother loves you?'), which could be answered with (1) 'no, never', (2) 'yes, sometimes', (3) 'yes, often', or (4) 'yes, almost always'. The scores for perceived emotional warmth from fathers and mothers were combined by taking the mean scores of the items. Cronbach's alpha was .91 for both fathers and mothers. Higher scores on this scale indicated more emotional warmth.

Alcohol use. Alcohol use at T1 was measured by asking the adolescents whether they ever consumed alcohol in their lives. A 5-point scale ranging from (0) 'never' to (4) '7 times or more' was used. Adolescents who indicated that they had never consumed alcohol were selected. At T3, adolescents' alcohol use was assessed with questions on frequency and quantity. Frequency was measured by asking the number of days the adolescent usually drinks on weekdays (Monday to Thursday) and weekend days (Friday to Sunday). Quantity was measured by asking how many alcoholic beverages the adolescent usually drinks on weekdays and weekend days. Scales ranging from (0) 'I never drink on a weekday' to (9) '11 glasses or more per weekday' and from (0) 'I never drink on a weekend day' to (10) '20 glasses or more per weekend day' were used. The frequency scores for the weekdays and the weekend days were multiplied by the quantity scores and then both scores were summed, resulting in a score for the number of alcoholic drinks in a usual week. Higher scores indicated more alcohol use.

Impulsivity. Impulsivity was measured at T3 with the self-report Revised NEO Personality Inventory (NEO-PI-R), consisting of 7 items (e.g. 'I rarely give in to my impulses') on a 5-point scale ranging from (1) 'completely disagree' to (5) 'completely agree' (Costa & McCrae, 2008). After recoding the negatively formulated items, the scores were summed to one total score. Cronbach's alpha was .51. Higher scores indicated more impulsivity.

Socioeconomic Status (SES). SES was measured at T1, based on family income, educational level of both parents, and occupational level of both parents based on the

International Standard Classification of Occupations (e.g. ‘What was your last occupation?’ and ‘What is the highest level of education that you completed?’). The average of these five standardised variables was taken as a measure of SES (Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006). Cronbach’s alpha was .84. Higher scores indicated higher SES.

Data-analysis

First, descriptive statistics and Pearson correlations are provided. Second, the relationship between emotional warmth and alcohol use is examined by performing a hierarchical regression analysis. After controlling for gender, the main effects of emotional warmth, impulsivity, and SES are tested.

The mediating role of impulsivity is examined according to the method of Baron and Kenny (1986). In step 1, the main effect of emotional warmth on alcohol use was tested. In step 2, the effect of emotional warmth on impulsivity was tested. In step 3, it was tested whether impulsivity affects alcohol use, and in step 4, whether this effect is still present when controlling for emotional warmth.

The moderating role of SES in the relationship between impulsivity and alcohol use is tested with a hierarchical regression analysis by using interaction terms, which are computed by multiplying impulsivity with the dummy variables of SES (Field, 2013). High SES is compared to middle and low, and low to middle and high.

Alcohol use was not normally distributed (Shapiro-Wilk Test, $W(1233) = .51$, $p < .001$). The assumptions of linearity and homoscedasticity, which were explored by Normal Probability Plots, scatterplots, and Standardised Residual Plots, were not met either. The assumption of independent errors was met (Durbin-Watson value = 1.87). Detected outliers were included in the analyses as they were within the range of realistic scores. Cases with missing values were excluded.

Results

Descriptive statistics

Table 1 presents the descriptive statistics for SES, emotional warmth, impulsivity, and alcohol use. An independent sample t-test showed significant differences between boys and girls on emotional warmth, impulsivity, and alcohol use. Boys experienced less emotional warmth, $t(1501) = 3.60$, $p < .001$, were less impulsive, $t(1122) = 2.94$, $p = .003$, and drank more alcohol, $t(1043) = -2.07$, $p = .039$, than girls.

Table 1

Descriptive statistics of the variables for boys and girls.

	Boys (48.9%)		Girls (51.1%)		Total		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
SES (T1)	-.07	.82	-.04	.79	.05	.80	.83
Emotional warmth (T1)	3.16	.51	3.25	.48	3.21	.50	3.60**
Impulsivity (T3)	22.94	3.52	23.57	3.65	23.28	3.60	2.94*
Alcohol use (T3)	3.04	6.84	2.33	4.96	2.66	5.92	-2.07*

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

Correlations

Table 2 shows the correlations between the variables. A negative correlation was found between alcohol use and emotional warmth, indicating that less emotional warmth was associated with more alcohol use. Alcohol use was also negatively correlated with SES, suggesting that a low SES was associated with more alcohol use. In contrast, alcohol use was positively correlated with impulsivity, indicating that the more impulsive the adolescent was, the more alcoholic drinks he/she consumed. Further, emotional warmth correlated positively with SES, indicating that adolescents with a higher SES experienced more emotional warmth. A negative correlation was found between emotional warmth and impulsivity, implying that impulsive adolescents reported less emotional warmth.

Table 2

Pearson correlations of the variables.

	1	2	3	4
1. Age (T1)				
2. SES (T1)	-.04			
3. Emotional warmth (T1)	-.02	.15**		
4. Impulsivity (T3)	.04	-.01	-.07**	
5. Alcohol use (T3)	.02	-.07*	-.06*	.09**

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

Table 3

The effect of gender, emotional warmth, impulsivity, and SES on alcohol use.

	<i>B</i>	<i>SE</i>	β	<i>R</i> ²	<i>R</i> ² change
				.004 ^a	.004*
Gender (T1) ¹	.80	.38	.06*		
				.008 ^b	.004*
Emotional warmth (T1)	-.82	.40	-.06*		
				.026 ^c	.018**
Impulsivity (T3)	.17	.05	.10**		
SES (T1)	-.77	.24	-.10**		

Note. ¹ Reference category = girls. * $p < .05$. ** $p < .001$. ^a Model 1 including only covariate,

^b Model 2 including main effect emotional warmth, ^c Model 3 including main effects impulsivity and SES.

Main effects

Table 3 reveals the main effect of emotional warmth on alcohol use, after controlling for gender. In Model 1, gender explained 0.4% of the variance in alcohol use ($p < .05$). In Model 2, emotional warmth negatively predicted alcohol use and explained an additional 0.4% of the variance in alcohol use ($p < .05$). This main effect is marginal. It indicates that adolescents who experienced relatively less emotional warmth at age 11, drank more alcohol at age 16. The addition of impulsivity and SES in Model 3 resulted in a better model fit and explained an additional 1.8% of the variance in alcohol use ($p < .001$). Impulsivity predicted alcohol use positively, indicating that impulsive adolescents drank relatively more alcohol. SES predicted alcohol use negatively, implying that adolescents with a low SES at age 11, drank relatively more alcohol at age 16. After adding impulsivity and SES to the model, emotional warmth did not significantly predict alcohol use anymore ($p = .188$).

Mediating effect of impulsivity

Four steps were conducted to test whether impulsivity mediated the relationship between emotional warmth and alcohol use (Figure 2). In step 1, the effect of emotional warmth on alcohol use was tested. In this step, after controlling for gender, emotional warmth did not predict alcohol use ($\beta = -.05$, $p = .061$), while emotional warmth significantly predicted alcohol use in the main analysis ($\beta = -.06$, $p = .039$).

In step 2, the effect of the emotional warmth on impulsivity was tested without controlling for gender. Emotional warmth negatively predicted impulsivity ($\beta = -.07, p < .05$) and explained 0.5% of the variance in impulsivity ($p < .05$). Adolescents who experienced less emotional warmth at age 11, were relatively more impulsive at age 16.

In step 3, the effect of impulsivity on alcohol use was tested. After controlling for gender, impulsivity positively predicted alcohol use ($\beta = .10, p < .001$) and explained an additional 1.0% of the variance in alcohol use ($p < .001$). This indicates that impulsive adolescents drank relatively more alcohol.

In step 4, it was tested whether the effect of emotional warmth on alcohol use was still present when controlling for impulsivity. Impulsivity and emotional warmth explained an additional 1.3% of the variance in alcohol use ($p < .001$), after controlling for gender. When controlling for impulsivity, emotional warmth did not significantly predict alcohol use anymore ($\beta = -.06, p = .067$).

These analyses showed significant relationships between emotional warmth and alcohol use, between emotional warmth and impulsivity, and between impulsivity and alcohol use. After controlling for impulsivity, the relation between emotional warmth and alcohol use became non-significant. This indicates that the relationship between emotional warmth and alcohol use was fully mediated by impulsivity, although the effect appeared small in the Sobel test ($t = -1.97, p = .049$).

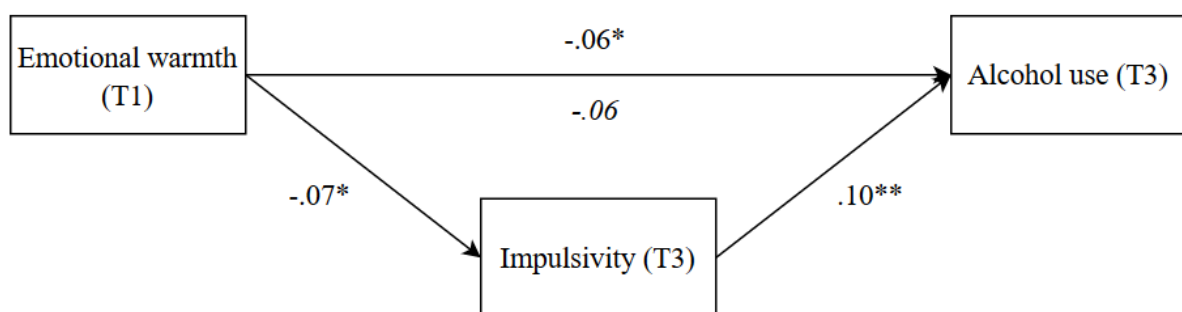


Figure 2. Standardised regression coefficients for the relationship between emotional warmth and alcohol use as mediated by impulsivity. The standardised regression coefficient between emotional warmth and alcohol use, controlling for impulsivity, is italicised. * $p < .05$. ** $p < .001$.

Table 4

The moderating effect of SES on the relationship between impulsivity and alcohol use.

	<i>B</i>	<i>SE</i>	β	<i>R</i> ²	<i>R</i> ² change
				.004 ^a	.004*
Gender (T1) ¹	.80	.38	.07*		
				.025 ^b	.021**
Impulsivity (T3)	.17	.05	.10**		
SES (T1)	-.82	.24	-.10**		
				.025 ^c	.000
Low SES × Impulsivity	-.05	.15	-.01		
High SES × Impulsivity	-.02	.12	-.01		

Note. ¹ Reference category = girls. * $p < .05$. ** $p < .001$. ^a Model 1 including only covariate, ^b Model 2 including main effects, ^c Model 3 including interaction effects.

Moderating effect of SES

Table 4 shows the moderating role of SES on the relationship between impulsivity and alcohol use. In Model 1, the effect of gender on alcohol use was tested. This model explained 0.4% of the variance in alcohol use ($p < .05$). In Model 2, the main effects of impulsivity and SES were added. This model explained an additional 2.1% of the variance in alcohol use ($p < .001$). In Model 3, the interaction terms were added. The model fit did not improve ($p > .05$). Therefore, high SES and low SES did not moderate the relationship between impulsivity and alcohol use.

Discussion

The present study investigated the relationship between emotional warmth and adolescents' alcohol use, and whether impulsivity mediated this relationship. Additionally, it was investigated whether adolescents came from low or high SES families changed the relationship between adolescents' impulsivity and alcohol use. The first hypothesis was corroborated, suggesting that a lack of emotional warmth is associated with more impulsivity, which in turn is associated with an increased risk for early onset of alcohol use. The second hypothesis, concerning low SES strengthening the relationship between impulsivity and alcohol use, was not substantiated.

The impact of emotional warmth

The results showed that, after controlling for gender, the experienced emotional warmth of adolescents at age 11 negatively predicted adolescents' alcohol use at age 16. This indicates that adolescents who experienced low emotional warmth from their parents at age 11 before alcohol use was initiated, were more likely to drink alcohol at age 16, compared to adolescents who experienced high emotional warmth. However, it should be noted that the effect was marginal, and after controlling for impulsivity and SES, the effect of emotional warmth on alcohol use disappeared.

These findings are consistent with other studies that concluded that parental emotional warmth is a buffer against early onset of adolescents' alcohol use (Cohen et al., 1994; Garmienè et al., 2006; Hawkins et al., 1997; Hung et al., 2009). The results concerning controlling for SES are in line with the results by Visser et al. (2013), who found that after controlling for SES, parental divorce, parental alcohol use, and adolescents' educational level, the effect of emotional warmth decreased and became non-significant. The study of Monshouwer et al. (2011) demonstrated that inserting potentially confounding parental factors, such as family SES, weakened the associations between parental factors and adolescents' alcohol use.

The findings of the present study are in line with previous research, revealing an association between parental emotional warmth and adolescents' alcohol use. Although, previous studies and the current study point to an important role of confounding factors, such as SES, that predict the onset of adolescents' alcohol use better than emotional warmth.

The role of impulsivity

The results showed a positive relationship between adolescents' impulsivity and adolescents' alcohol use. This finding is coherent with previous studies, concluding that more impulsive adolescents, drink in larger amounts and more frequently (Baker & Yardley, 2002; Fernie et al., 2013; Peeters et al., 2015). It should be noted, however, that the relationship between impulsivity and alcohol use is cross-sectional, as both variables were measured at age 16. This implies that the direction of the relationship in this study is unclear. Therefore, it may be that alcohol use at younger ages results in more impulsivity at age 16 (Squeglia, Spadoni, Infante, Myers, & Tapert, 2009).

Even though the relationship between emotional warmth and adolescents' alcohol use was marginal, the relationship was fully mediated by impulsivity. This indicates that adolescents who experienced less emotional warmth at age 11, were more likely to be

impulsive at age 16, which in turn was associated with an increased risk for alcohol initiation at age 16. This finding is in line with the results of Patock-Peckham and Morgan-Lopez (2006), showing that a lack of parental emotional warmth, as a dimension of parenting style, is associated with more impulsive behaviour of the adolescent. The mediating effect of impulsivity can be explained by emotionally warm parents being better able to model self-regulation (Baker & Hoerger, 2012; Nye et al., 1999). By parents reinforcing self-regulating skills in their offspring, adolescents display less impulsive behaviour. Consequently, adolescents' self-regulation results in less alcohol use (Patock-Peckham et al., 2001). Therefore, the impact of parental emotional warmth on adolescents' alcohol use depends upon adolescents' impulsivity.

The role of socioeconomic status

The results showed a negative relationship between SES and adolescents' alcohol use, which is in line with previous research (Duncan, Duncan, & Hops, 1998; Lemstra et al., 2008). Adolescents from less educated and more economically disadvantaged families, drink more alcohol and develop faster in their use of alcohol than adolescents with higher parental SES (Duncan et al., 1998).

Interestingly, the results of the present study revealed that the relationship between emotional warmth and alcohol use disappeared after controlling for SES. This indicates that SES is a stronger predictor of adolescents' alcohol use than emotional warmth. The results of Belsky, Bell, Bradley, Stallard, and Stewart-Brown (2007) showed that socioeconomic variables were associated with parenting variables, such that living in a low-income neighbourhood was associated with less maternal warmth (Klebanov, Brooks-Gunn, & Duncan, 1994). An explanation for this association might be that having a low SES causes parents stress, which in turn might negatively influence parenting behaviours, expressed for instance in less emotional warmth (Belsky et al., 2007). This suggests that parenting style might be a mediator of the impact of SES on the development of adolescents' alcohol use (Marsman et al., 2012). The role of emotionally warm parenting in the relationship between SES and adolescents' alcohol use deserves further study.

As for the second hypothesis, assuming that low SES strengthens the relationship between impulsivity and alcohol use, no evidence was found for the moderating effect of SES. This means that whether adolescents came from low or high SES families did not change the relationship between impulsivity and alcohol use. One explanation for not finding support for the theory of strong and weak situations, in contrast to the study of Lynam et al.

(2000), is that the present study examined the moderating effect of SES on alcohol use instead of juvenile offending. Therefore, a significant effect may be absent. A second explanation is that the study sample of Lynam et al. (2000) consisted solely out of boys to maximize the number of offenders. The researchers did not know if the same effects will hold for boys and girls simultaneously. A third explanation is that, while there is evidence that personality matters most in weak situations (Caspi & Moffit, 1993), it is argued that only the most challenging situations allow the accentuation of personality traits (Cooper & Withey, 2009). Thus, high and low family SES may not be, respectively, strong and weak enough to allow for the expression of impulsivity. To assess whether the theory of strong and weak situations can be corroborated, further research into the strength of the effect of SES in the relationship between personality traits and theoretically relevant behaviour is needed.

Limitations

Besides the strengths of the present study, such as the longitudinal design and the substantial sample size, some limitations should be acknowledged. The first limitation is that the adolescents that remained included in the study scored higher on SES and experienced more emotional warmth, than the adolescents that dropped out during the study. This attrition bias resulted in a more homogenous study sample, which might have led to range restriction and attenuated effect sizes (Fern & Monroe, 1996). Future research could replicate this study with other at-risk adolescents with an overrepresentation of low SES to observe whether similar results are found. Second, the assumptions of normality, linearity, and homoscedasticity for hierarchical regression analyses were not met. Violation of these assumptions might have influenced the results and interpretation of the results (Mitchell & Shaw, 1987). Third, data was collected from only five municipalities in the north of the Netherlands. Since the sample is not representative of the whole Dutch adolescent population in terms of demographics, the generalisability of the study is threatened (Miller & Wright, 1995). Fourth, alcohol use was measured with self-report questionnaires filled in by the adolescents. This might have caused a socially desirable response bias, which might have resulted in an underestimation of drinking levels (Welte & Russell, 1993). However, Del Boca and Darkes (2003) have shown that a self-report is a reliable and valid method to assess alcohol use. Fifth, parental emotional warmth was reported by the adolescent and not by the parent, which may have resulted in measurement bias (Bahr & Hoffmann, 2010). Although, a self-report may be preferred to a parent-report, as adolescents are influenced by parenting behaviours through their mental representations of them (Main, Kaplan, & Cassidy, 1985). Lastly, the present study did not

control for confounding factors that might influence the relationship between parenting style and adolescents' alcohol use, such as alcohol-specific parenting (Van der Vorst, Engels, Deković, Meeus, & Vermulst, 2007). For instance, providing clear alcohol-specific rules reduces the likelihood of drinking initiation. Therefore, the influence of parental emotional warmth might depend upon its translation into alcohol-specific parenting (Visser et al., 2013). To examine which parenting behaviours predict the onset of adolescents' alcohol use better than emotionally warm parenting, further research should incorporate more predictors of family functioning, such as alcohol-specific parenting.

Conclusion & Implications

The present study found weak evidence for the relationship between parental emotional warmth in early adolescence (age 11) and the onset of alcohol use in mid-adolescence (age 16). Adolescents who experienced less emotional warmth in early adolescence before drinking was initiated, were relatively more likely to drink alcohol in mid-adolescence. This effect, however, disappeared after controlling for impulsivity and SES. Additionally, support was found for previous studies, showing that adolescents who experienced less parental emotional warmth in early adolescence, were more likely to be impulsive in mid-adolescence, which in turn was associated with an increased risk for alcohol initiation in mid-adolescence. Furthermore, it was found that whether adolescents came from low or high SES families did not change the relationship between impulsivity and alcohol use, implying that no support was found for the theory of strong and weak situations.

Prevention strategies for early alcohol initiation are important because of the negative consequences of early drinking in several domains of life (Donovan & Molina, 2011). Since the present study revealed that SES and impulsivity are stronger predictors of adolescents' alcohol use than parental emotional warmth, prevention strategies should focus on adolescents who come from less educated and more economically disadvantaged families, and on adolescents with impulsive personality traits. An existing Dutch alcohol prevention programme that focuses, among other personality traits, on impulsivity is Preventure (Lammers et al., 2011). However, this programme fails to exclusively target adolescents from low socioeconomic backgrounds. Assumption is likely that prevention strategies for adolescents that do not address SES would have limited success (Lemstra et al., 2008). By preventing early onset of alcohol use through a personality targeted programme that addresses socioeconomic backgrounds, problematic alcohol use in later adolescence may be prevented.

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Appendix A: Interdisciplinarity of the research

According to the Ecological Model of Bronfenbrenner (1979), different levels of influence need to be taken in to account when trying to understand the development of a child. These levels include the microsystem, mesosystem, exosystem, and macrosystem.

The microsystem is the most proximal environment in which children live, and implies the parents of the child, the school or daycare, the classmates and the peer group (Bronfenbrenner, 1979). An example of the microsystem is the relationship between the traits of the child and parenting style. If parents display a permissive parenting style, an impulsive child will react with more impulsiveness, due to a lack of parental control (Patock-Peckham & Morgan-Lopez, 2006).

The mesosystem involves the interaction between the people present in the microsystem (Bronfenbrenner, 1979). Wood, Read, Mitchell, and Brand (2004) investigated the parental influences and peer influences on drinking behaviour. The researchers showed that parental involvement moderated peer influence, meaning that higher levels of parental involvement were associated with weaker relations between peer influences and adolescent alcohol use.

The exosystem is about the people and places that children may not directly interact with, but still have an impact on the developing child (Bronfenbrenner, 1979). It consists of the parents' workplaces, extended family members, and the neighbourhood. The socioeconomic status is located in this system as well. To illustrate, research of Whitbeck et al. (1997) concluded that fathers whose work allows a high degree of autonomy are more likely to adopt parenting styles that contribute to a greater sense of control in their children.

The macrosystem is the largest and most distal environment (Bronfenbrenner, 1979). This system influences the child indirectly, and involves the cultural norms and values, and political and economic systems. For example, Vazsonyi, Trejos-Castillo, and Huang (2006) discovered that there are differences in the effect of self-control on risk behaviour among Western European and Eastern European countries. This difference in effect seems to be related to the cultural differences in what influences risk behaviour.

The proposed research model involves the impulsivity and alcohol use of the adolescent in the individual context. In addition, it investigates the parenting style and socioeconomic status of the parents. Therefore, this research model captures the microsystems of the child and the parents and the surrounding exosystem. The mesosystem and macrosystem lie outside the scope of the proposed research model.

Appendix B: Contract data-use agreement (TED)

Utrecht, 2019

This letter constitutes formal confirmation of the fact that the data from the Utrecht University Youth Studies 2019-2020 have been made available to Kari Winter of Utrecht University.

These data will not be made available to others, and the data may be used only for analysis and reporting on topics for the thesis, about which agreement has been reached with Margot Peeters.

Kari Winter will receive access to the data from the dataset in order to answer the following research questions within the framework of the thesis:

Research question:

What is the mediating effect of impulsivity and moderating effect of SES on the relationship between parenting style and alcohol use of adolescents?

The following variables will be used:

Dependent variable:

- Alcohol (RADS) (T3): c3rad5a, c3rad5ab, c3rad5c, c3rad6, c3rad57, c3rad8, c3rad9

Independent variables:

- Warmth (EMBU-C) (T1): C1em1a/b, C1em4a/b, C1em7a/b, C1em11a/b, C1em16a/b, C1em17a/b, C1em21a/b, C1em22a/b, C1em24a/b, C1em26a/b, C1em27a/b, C1em31a/b, C1em35a/b, C1em39a/b, C1em44a/b, C1em46a/b, C1em47a
- Rejection (EMBU-C) (T1): C1em2a/b, C1em3a/b, C1em5a/b, C1em9a/b, C1em13a/b, C1em14a/b, C1em18a/b, C1em19a, C1em32a/b, C1em34a/b, C1em36a/b, C1em37a/b, C1em38a/b, C1em40a/b, C1em41a/b, C1em42a/b, C1em45a

Other variables:

- Impulsivity (NEO-PI-R) (T3): C3NE3, C3NE9, C3NE15, C3NE21, C3NE27, C3NE3, C3NE39, C3NE45

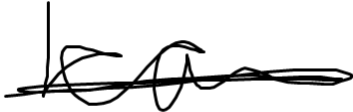
- Beroep, opleiding, inkomen ouders (T1): P10A10, P10A10A, P10A10B, P10A11, P10A12, P10A13, P10A13A, P10A13B, P10A14, P10A15, P10A16, P1INCOME

No report based on the data from the project entitled TRAILS may be made public, unless permission has been obtained in advance from the Project Coordinator for the TRAILS.

After the expiration of this contract, dated 26-06-2020, Kari Winter shall delete the TRAILS data.

Date and signature:

Kari Winter

A handwritten signature in black ink, appearing to be 'Kari Winter', written over a horizontal line.

28-01-2020

Appendix C: Digital Thesis Archive form

Student number: *	6874231
Initials & prefixes: *	K. A.
Surname: *	Winter
Degree programme: *	Youth Studies

Supervisor

Name of supervisor: *	Margot Peeters
Name of second supervisor, if applicable:	Gonneke Stevens

Thesis

Thesis title: *	The Longitudinal Impact of Parental Emotional Warmth on Adolescent Alcohol Use: The Role of Impulsivity and Socioeconomic Status
Thesis language: *	English
Abstract:	Parenting style can either encourage or discourage adolescents' alcohol initiation. The current longitudinal study investigates the relationship between emotional warmth and alcohol use. 1,243 adolescents of 11.11 years old ($SD = .55$; 51.1% girls) participated in the first three waves of the TRAILS-study and reported on alcohol use, impulsivity, and parental emotional warmth. Hierarchical regression analyses, including only non-drinkers at baseline, showed a marginal negative effect of emotional warmth on alcohol use. This finding indicates that adolescents who experienced less emotional warmth at age 11 before drinking was initiated, were relatively more likely to drink alcohol at age 16. However, after controlling for impulsivity and SES, the effect of emotional warmth on alcohol use disappeared. Additionally, findings showed that adolescents

	<p>who experienced less emotional warmth at age 11, were relatively more impulsive at age 16, which was associated with an increased risk for alcohol initiation at age 16.</p> <p>Whether adolescents came from low or high SES did not change the relationship between impulsivity and alcohol use. Since this study revealed that impulsivity and SES are stronger predictors of adolescents' alcohol use than emotional warmth, alcohol prevention strategies should focus on impulsive adolescents and adolescents from low socioeconomic backgrounds.</p>
Keywords: (separated by ;)	Adolescents; alcohol use; emotional warmth; impulsivity; SES
Make public: *	Yes
Or, only make public after this date:	

Form filled in on: *	01-07-2020
By: *	Kari A. Winter