

The longitudinal impact of depressive symptoms on
adolescent alcohol use; the role of peer alcohol use and
parental warmth

MSc Thesis Youth Studies

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June 2020



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Abstract

Background Adolescent alcohol use induces multiple public health challenges such as poor physical and mental health, decreasing life expectancy, unemployment, and alcohol abuse. Drinking alcohol can operate as a coping mechanism for depressive symptoms. Previous research shows that peers and parents play a vital role in adolescent alcohol use. In this study the moderating role of peers and parents on the relationship between depressive symptoms and adolescent alcohol use is investigated longitudinally. **Methods** 1818 participants from the TRAILS study were included. A multiple regression analysis was conducted to test the effect of depressive symptoms at baseline on adolescent alcohol use after 5 years. Subsequently, a moderation analysis was conducted to test the moderating role of peer alcohol use and parental warmth. **Results** Significant predictors of alcohol use after 5 years were sex, adolescent alcohol use at T2 and peer alcohol use. Age, depressive symptoms and parental warmth were not. No interaction effects were found for peer alcohol use and parental warmth. **Conclusion** This study highlights the importance of contextual factors when examining adolescent alcohol use. Peer alcohol use appears to make adolescents more likely to drink themselves. Future research should lead to more insight into the mechanism of peer influence on adolescent alcohol use.

Keywords: adolescent alcohol use, depressive symptoms, peer alcohol use, parental warmth

Samenvatting

Achtergrond Alcoholgebruik door adolescenten veroorzaakt meerdere uitdagingen voor de volksgezondheid, zoals een slechte lichamelijke en geestelijke gezondheid, een afnemende levensverwachting, werkloosheid en alcoholmisbruik. Alcoholgebruik kan dienen als een coping-mechanisme voor depressieve symptomen. Eerder onderzoek toont aan dat leeftijdsgenoten en ouders een cruciale rol spelen bij alcoholgebruik van adolescenten. In deze studie wordt longitudinaal de modererende rol van peers en ouders onderzocht op de relatie tussen depressieve symptomen en alcoholgebruik bij adolescenten. **Methode** 1818 deelnemers uit de TRAILS-studie werden geïncludeerd. Een multiple regressieanalyse werd uitgevoerd om het effect te testen van depressieve symptomen bij aanvang op alcoholgebruik bij adolescenten na 5 jaar. Vervolgens werd een moderatie-analyse uitgevoerd om de modererende rol van alcoholgebruik door peers en warmte van ouders te testen. **Resultaten** Significante voorspellers van alcoholgebruik na 5 jaar waren seks, adolescent alcoholgebruik op T2 en peer alcoholgebruik. Leeftijd, depressieve symptomen en ouderlijke warmte waren dat niet. Er zijn geen interactie-effecten gevonden voor peer alcoholgebruik en ouderlijke warmte. **Conclusie** Deze studie benadrukt het belang van contextuele factoren bij het onderzoeken van alcoholgebruik bij adolescenten. Peer alcoholgebruik lijkt de kans groter te maken dat adolescenten zelf gaan drinken. Toekomstig onderzoek zou moeten leiden tot meer inzicht in het mechanisme van peer-invloed op alcoholgebruik van adolescenten.

Kernwoorden: alcohol gebruik van adolescenten, depressieve symptomen, alcoholgebruik van peers, ouderlijke warmte

Introduction

It is well known that the prevalence of alcohol consumption is significantly higher during adolescence, compared to other life phases (Jernigan, Noel, Landon, Thornton, & Lobstein, 2017). In 2017, more than 50% of the Dutch 16-year olds reported being drunk one or more times in their lives (HBSC, 2017). In addition, the Dutch Youth Institute (2018) reported that more than 10% of the adolescents between 16 and 20 years old are heavy alcohol consumers. In 2011, the WHO reported that alcohol accounted for 7% of the Disability-Adjusted Life Years (DALYs) for adolescents, defined as the loss of one year of healthy life, (WHO, 2011).

Although the rates of adolescent alcohol consumption seem to have dropped in recent years (Looze et al., 2015), multiple public health risks remain present. Examples of these risks are poor physical and mental health, decreasing life expectancy, unemployment and even suicide (Henkel, 2011; WHO, 2014). This demonstrates that adolescent alcohol use is a comprehensive phenomenon with major impact on both the adolescent's own wellbeing and health and on the social environments (WHO, 2014).

Early onset of alcohol use is found to be associated with short-term consequences such as alcohol abuse, tobacco use, the use of other addictive substances, incautious sexual behavior with the risk for sexually transmitted infections (STI's) and unplanned pregnancies. Not only short-term but also long-term consequences are proven to be related to early onset of alcohol use, for instance, alcohol dependency, psychopathology, brain damage, neuro-cognitive problems, depression and suicide (Grant & Dawson, 1997; Marshall, 2014; Stautz & Cooper, 2013).

When studying risk factors for adolescent alcohol use, depressive symptoms show an association with alcohol use (Diego, Field, and Sanders, 2003). Studying drinking motives, Martens, Cox and Beck (2003) found that for some adolescents, drinking alcohol appears to operate as a coping mechanism for depressive symptoms. To cope with negative emotions and induce more positive affect adolescents may start to drink alcohol to deal with their depressive thoughts (Allan, Albanese, Norr, Zvolensky, & Schmidt, 2015).

Even though the relationship between depressive symptoms and adolescent alcohol use has been established in previous literature, the underlying mechanisms of this relationship are studied less often. Two underlying mechanisms that are addressed in this study are peer alcohol use and parental warmth. Since alcohol use among adolescents often takes place among other peers (Teunissen et al., 2012) and parents are a vital factor in this life phase (Zuquette et al., 2019), the role of peer alcohol use and parents is elaborated in the next paragraphs.

Depressive symptoms and adolescent alcohol use

According to the American Psychiatric Association (2019), depression is a common and serious medical illness that negatively affects feelings, thoughts and behavior. Depression causes feelings of sadness, hopelessness and/or a loss of interest in activities once enjoyed. It can lead to a variety of emotional and physical problems and can decrease a person's ability to function at work and at home (Isaksson, Sjöblom, Schwab-Stone, Stickley, & Ruchkin, 2020; Stewart et al., 2011).

When developing a framework for drinking motives, Cooper (1994) adopted the negative reinforcement theory and argued that adolescents use alcohol as a coping strategy to escape from depressive feelings and emotions (i.e. drink alcohol to cope with depressive feelings and emotions). In line with this, Kuntsche, Knibbe, Gmel and Engels (2005) examined drinking motives and posed that coping motives are associated with heavy drinking in young people. Hogarth, Hardy, Mathew and Hitsman (2018) found that depressive symptoms were associated with a higher sensitivity to drink alcohol to cope with negative emotions. The above described literature findings imply that depressive symptoms induce adolescent alcohol use. However, to further establish the nature of this relationship, including proxy measures such as the role of peers and parents, more in depth research is essential.

The role of peers

As adolescents develop, the role of peers becomes more and more important (Thompson, Wojciak, & Cooley, 2016). Adolescents value peer norms and opinions and adjust to their peers' behaviors to fit in and avoid rejection. By highly prioritizing peer acceptance, adolescence is a period in which sensitivity to peer influence and risk behavior seem to increase (Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Maxwell, 2002).

Bandura's social learning theory proposes that adolescents model their peers' behavior (Bandura, 1977). According to this theory, adolescents select their peers in desire for social reinforcement, which results in peers having a socializing role in adolescent behavior (Kiuru, Burk, Laursen, Salmela-Aro, & Nurmi, 2010). This socializing role may have a negative influence on adolescent alcohol use. As adolescents observe drinking behavior of their peers, they may learn that peers who show signs of depression and drink alcohol, acquire more social skills. So, adolescents might interpret the alcohol use of their peers as a contribution to a reduction in depressive feelings.

A study by Engels & Ter Bogt. (2001) that examined socialization processes, found that adolescent alcohol use is very likely to occur in the presence of peers. So, having peers around them who drink may make adolescents more likely to choose alcohol as a coping strategy than when they have peers in their surroundings who do not drink.

A study that examined predictors of adolescent substance use found that the alcohol use of peers was related to adolescent alcohol use (Curran, Stice, & Chassin, 1997). By conducting an experiment, Teunissen et al. (2012) examined adolescents' willingness to drink when they are exposed to peer alcohol norms. The results showed that adolescents adapt their willingness to drink to their peer norms. That's why they considered peer alcohol use to be a strong predictor of adolescent alcohol. However, they state that further research is needed to gain insight in this relationship.

So far, various studies have examined peer alcohol use as a possible predictor of adolescent alcohol use. Affiliation with peers may increase the likelihood that adolescents start to experiment to drink themselves. As such experience helps them to cope with their depressive feelings, it is likely that adolescents start to drink when they feel depressed. In this way, peers provide an example for a coping strategy for adolescents to deal with their depressive feelings. Nevertheless, it is unclear to what extent this peer alcohol use influences the relationship between depressive symptoms and adolescent alcohol use. That's why this study investigated the moderating role of peer alcohol use on the relationship between depressive symptoms and adolescent alcohol use.

The role of parents

Research shows that parenting styles influence adolescent behavior (Kuntsche & Kuntsche, 2016). In general, studies use a classification of 4 specific parenting styles; authoritative, authoritarian, permissive, and neglectful parenting. Authoritative parenting is characterized by high parental involvement and control and low restrictiveness. Authoritarian parents have clear and strict rules, however in contrast to an authoritative style, show poor affiliation and responsiveness with their children. Unlike authoritarian parenting, the permissive parenting style is known for parental warmth and affiliation, but parental control is low. Parents who are neglectful show no support for their children and reveal low parental responsiveness (Aunola, Stattin, & Nurmi, 2000).

When looking at the role of parenting styles and adolescent alcohol use, authoritative and permissive parenting are associated with a decreased risk to engage in substance use (Hinnant, Erath, Tu, & El-Sheikh, 2016). This suggests that warmth and responsiveness in the

family environment is contributory for adolescents to abstain from drinking alcohol. Examining the longitudinal relationship between parenting styles and alcohol, Martínez-Loredo et al. (2016) concluded that relative low levels of warmth and control (neglectful parenting) are significant risk factors for adolescents to develop an alcohol use disorder.

Based on these findings, it can be assumed that the authoritative and permissive parenting styles may serve a protective factor for adolescent alcohol use due to their relatively high levels of parental warmth. Possibly, parental warmth may act as a buffer in the relationship between depressive symptoms and alcohol use. In contrast, adolescents who do not feel supported by their parents may seek for approval by peers and as such are more susceptible for the influence of peers.

The present study examines the moderating role of peer alcohol use and parental warmth on the relationship between depressive symptoms and alcohol use (figure 1).

Based on the existing literature, the following hypotheses are formulated:

Hypothesis 1: Depressive symptoms predict adolescent alcohol use.

Hypothesis 2: Peer alcohol use moderates the relationship between depressive symptoms and adolescent alcohol use.

Hypothesis 3: Parental warmth moderates the relationship between depressive symptoms and adolescent alcohol use.

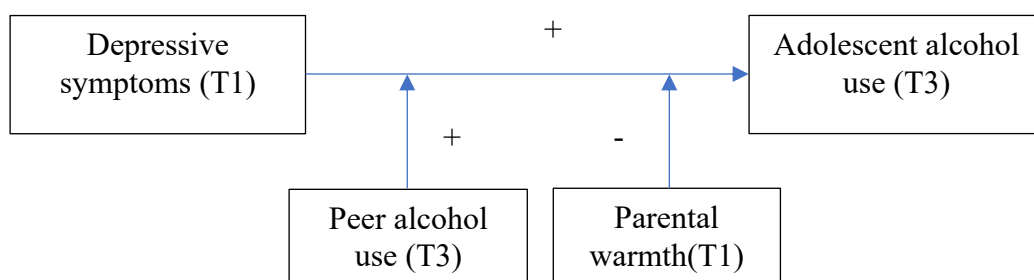


Figure 1: Research model

Method

Procedure

Data used in this study is part of the TRAILS study (Tracking adolescents' individual lives survey) which is a Dutch longitudinal study investigating psychological, social and physical development in adolescence based on interviews, questionnaires and (physical) tests and measurements. The study started in 2000 and measurements are performed every two years, starting when the participants were 10 to 12 years and they will be followed at least to the age of 30 (Trails, 2020).

Data was gathered by trained interviewers. In the first measurement (T1) they interviewed (one of) the parents and afterwards the parents were asked to fill in a questionnaire. The children who were assessed also filled in a questionnaire. In the third measurement (T3), both the child, the parents and the teachers of the children filled in another questionnaire (Huisman et al., 2009)

Participants

TRAILS recruited participants by selecting 5 municipalities, who shared names of all registered inhabitants. In addition, TRAILS also used schools that were located in these municipalities to gather data. Parents were requested to give permission for their children to participate (if children were mentally or physically not capable to participate, they were not included). Parents or children who spoke a different language than Dutch were also excluded.

In total 2229 adolescents participated at T1, mean age 11.1 years ($SD=0.55$), 50.7% was female, 49.3% male. Response rates at T3 were 1818, mean age 16.3 ($SD=.71$) which indicates a dropout of 411 adolescents (18,4%). The dropout consisted of 180 females and 231 males. Attrition analysis between T1 and T3 revealed that males were more likely to drop out than females ($X^2(1, N = 2229) = 9.723, p=.002$). Age was not statistically significant between the 1818 responders and 411 non-responders ($t(2227)=-1.576, p=.115$). Alcohol use was also not significant ($t(2057)=-1.413, p=.158$). Parental warmth was statistically significant between the responders and non-responders ($t(557) = 3.785, p<.05$). Responders experienced more parental warmth ($M=3.234, SD=.488$) than non-responders ($M=3.124, SD=.538$).

Measures

Alcohol use. The dependent variable in this study is adolescent alcohol use. At T3 (mean age 16.3) alcohol use was measured using self-reports based on the frequency and quantity of alcohol consumption. Questions on frequency revealed on how many days from Monday to Thursday the adolescents had drunk alcohol and on how many days from Friday to Sunday. Questions on quantity, with a 10-point scale for weekdays, ranged from ‘I never drink during weekdays’ to ‘11 or more glasses per day’. For weekend days the scale ranged from ‘I never drink during weekends’ to ‘20 glasses or more per day’. Scale creation resulted in a new variable; the number of drinks per week (weekdays and weekend days). Higher scores on this scale indicate more alcohol use.

Depressive symptoms. The independent variable in this study is ‘depressive symptoms’ which is measured at T1 (mean age 11.1) using the Revised Child Anxiety and Depression Scale (RCADS) (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000). The following items for depressive symptoms were assessed; feeling sad, having trouble sleeping, don’t feel like eating, no energy, feeling tired, can’t think properly, feeling worthless and feeling restless. These were scored (1) never, (2) every now and then, (3) often, (4) almost all the time or (5) not applicable. Higher scores on this scale indicated more depressive symptoms ($\alpha = 0.71$).

Peer alcohol use. The first moderator is peer alcohol use. This variable was measured at T3. Questions like ‘How many of your friends drink alcohol at least once a week?’ and ‘How many of your friends get drunk’ were scored ‘nobody, a few, half of them, most of them or all of them’. Higher scores indicate more peer alcohol use.

Parental warmth. The second moderator in this study is the parental warmth, which is measured with the EMBU-C scale at T1. 18 items were measured about the children’s perception of parental warmth. Examples of a question are: ‘Do you feel like your father/mother loves you?’, ‘Does your father/mother ever hug you?’ and ‘Is your father / mother trying to help and understand you when you are sad?’. Higher scores indicate more parental warmth ($\alpha = 0.91$ for both father and mother).

Analyses

First, to assess if the data met the assumptions for multiple linear regression, Mahalanobis distances, VIF scores, Durbin-Watson statistics and a histogram of standardized residuals were inspected. Second, descriptive statistics and Pearson and Spearman correlation tables were computed for all variables using IBM SPSS statistics 26. Third, an analysis of

covariance was conducted, and regression analysis was used to test the effect of depressive symptoms on adolescent alcohol use. Subsequently, a moderation analysis was conducted to test the moderating role of peer alcohol use and parental warmth on the relationship between depressive symptoms and adolescent alcohol use. Interaction terms were created to test the effect of multiple independent variables. Finally, to check for covariation, control variables (sex, age at T3, and adolescent alcohol use at T3) were included.

Several analyses were performed to test if the data met the assumptions for linear regression. The data approximately meets the assumption of normality. Mahalanobis distances were used to detect outliers in the data which indicated that the data contained no values beyond the answer options. The data met the assumption of independent errors (Durbin-Watson=2.030). No evidence was found that the assumption of multicollinearity was violated ($VIF < 5$).

Results

Preliminary analyses

In table 1, the means and standard deviations of the control variables, study variables and the Spearman and Pearson correlations are presented. Based on the results of the Spearman's Rho analysis, only parental warmth ($r_s = -.10$, $p < .001$) and adolescent alcohol use at T3 ($r_s = .12$, $p < .001$) indicate a significant correlation with sex. Females report higher parental warmth compared to males. Adolescent alcohol use was higher for males compared to females.

Results of the Pearson correlation indicated that there was a negative significant association between depressive symptoms and parental warmth ($r = -.22$, $p < .001$), indicating that adolescents, who report more warmth, also report fewer depressive symptoms. There was a significant correlation between depressive symptoms and adolescent alcohol use at T2. This correlation was positively significant ($r = 0.10$, $p < .001$) whereas the correlation between depressive symptoms and adolescent alcohol use at T3 was not significant ($r = .03$, $p = .10$). No correlation was found between depressive symptoms and peer alcohol use ($r = .03$, $p = .15$, Table 1). Peer alcohol use showed a significant association with adolescent alcohol use at T3 ($r = .44$, $p < .001$). The positive association indicates that higher peer alcohol use is associated to higher adolescent alcohol use.

Table 1. *Descriptive statistics and Pearson and Spearman correlations for all study variables*

	M (SD)	1 ^a	2	3	4	5	6	7
1. Sex (female) ^a	50.7%	1						
2. Age in years T3	16.23 (0.673)	.01	1					
3. Adolescent alcohol use T2	1.42 (4.005)	-.00	.12**	1				
4. Depressive symptoms T1	0.62 (0.322)	-.02	-.04	.10**	1			
5. Peer alcohol use T3	2.28 (1.129)	.02	.18**	.19	.03	1		
6. Parental warmth T1	3.24 (0.484)	-.10**	-.01	-.06	-.22**	-.02	1	
7. Adolescent alcohol use T3	6.76 (9.286)	.12**	.10**	.28**	.03	.44**	-.06	1

Note. ^a Spearman correlation. * $p < .05$, ** $p < .001$

Regression analysis

Main effect depressive symptoms on alcohol use

A multiple linear regression was carried out to predict adolescent alcohol use by depressive symptoms, peer alcohol use and parental warmth (Table 2). When adolescent alcohol use was included as an independent variable, sex ($\beta = .15$, $SE = .30$, $p < .05$) and adolescent alcohol use at

T2 ($\beta=.21$, $SE=.04$, $p<.05$) were significant covariates for adolescent alcohol use at T3 (model 1). This implies that both male gender and higher alcohol use at T2 predict higher alcohol use at T3. Age was not a significant covariate ($\beta=.01$, $SE=.22$, $p=.74$). The control variables (sex, age at T3 and adolescent alcohol use at T2) explain 10.9% of the variance in adolescent alcohol use. In model 2 (sex, age T3, alcohol use T2, and depressive symptoms), the main effect of depressive symptoms was explored. Depressive symptoms ($\beta=-.00$, $SE=.46$, $p=.88$) was not a significant predictor for an increase in adolescent alcohol use.

Interaction effects of peers and parents on alcohol use

In model 3 (including sex, age T3, alcohol T2, and depressive symptoms) peer alcohol use and parental warmth were added to test for their main effect on adolescent alcohol use. This model accounted for significantly more variance (R^2 change=.149, $p<.05$) than the model that merely included depressive symptoms. Only peer alcohol use ($\beta=0.40$, $SE=.13$, $p<.05$) was found to be a significant predictor of adolescent alcohol use, whereas parental warmth ($\beta=-.03$, $SE=.31$, $p=.25$) was not. Adolescents who reported to have more friends who drink alcohol, also drank more themselves. For the interaction between depressive symptoms and peer alcohol use ($\beta=.01$, $SE=.40$, $p=.86$) and the interaction between depressive symptoms and parental warmth ($\beta=-.03$, $SE=.81$, $p=.21$) in model 4, no significant effects were found. Adding these interaction effects did not significantly account for more explained variance in alcohol use (R^2 change=.00, $p=.61$) than model 3.

Table 2. *Regression analysis of adolescent alcohol use (T3) on sex, age, adolescent alcohol use (T2) peer alcohol use and parental warmth*

	B	SE	β	95% CI		ΔR^2
				Lower	Upper	
Model 1 ($R^2 = .109^{**}$)						-
Sex	1.97	.30	.15^{**}	1.40	2.55	
Age T3	.07	.22	.01	-.36	.51	
Adolescent alcohol use T2	.34	.04	.21^{**}	.27	.41	
Model 2 ($R^2 = .109$)						.000
Depressive symptoms T1	-.07	.46	-.00	-.98	.84	
Model 3 ($R^2 = .258^{**}$)						.149
Peer alcohol use T3	2.33	.13	.40^{**}	2.07	2.59	
Parental warmth T1	-.36	.31	-.03	-.96	.25	
Model 4 ($R^2 = .258$)						.000
Depressive symptoms * peer alcohol use	.20	.40	.01	-.58	.98	
Depressive symptoms * parental warmth	-1.03	.81	-.03	-2.62	.57	

Note. * $p < .05$, ** $p < .001$. Different models refer to different steps in the regression analysis.

Discussion

This study investigated the moderating role of peer alcohol use and parental warmth on the relationship between depressive symptoms and adolescent alcohol use. First, it was hypothesized that depressive symptoms predict adolescent alcohol use. However, the results of the regression analysis did not support previous findings in the literature (Hogart et al., 2018; Kuntsche et al., 2005). Depressive symptoms at age 11 did not predict adolescent alcohol use at age 16. Perhaps, the age range, with including relatively young adolescents in the current study, contributed to the absence of a significant effect for depressive symptoms. Considering the depression scores at age 11 were relatively low, it is not very likely that the high depression scores from a small part of the sample have a significant effect on alcohol consumption.

Secondly, it was hypothesized that peer alcohol use moderates the relationship between depressive symptoms and adolescent alcohol use. This hypothesis was not supported, indicating that the effect of depressive symptoms on adolescent alcohol use is not affected by the presence of peer alcohol use. However, the study did reveal a main effect for peer alcohol use, meaning that peer alcohol use is a significant predictor for adolescent alcohol use. This finding is consistent with previous literature, revealing that peer alcohol use is associated with enhanced adolescent alcohol use (Teunissen et al., 2012). Presumably, this is due to mechanism of peer influence (D'Amico et al., 2020; Trucco, Colder, & Wieczorek, 2011). Adolescence is a vulnerable period in which peer socialization arises. During this period adolescents are possibly influenced by their peers with regard to their drinking behavior (Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Maxwell, 2002; Thompson, Wojciak, & Cooley, 2016). Also, this finding provides evidence for the aforementioned theory of social learning from Bandura. Peers can play a modelling role in adolescents drinking behavior. Adolescents observe peers drinking and may start experimenting with drinking themselves to fit in or feel accepted by other peers (Bandura, 1977).

Thirdly, the study did not find support for the hypothesis that parental warmth moderates the relationship between depressive symptoms and adolescent alcohol use. There was no main effect of parental warmth, nor an interaction between depressive symptoms and parental warmth. This implies that receiving parental warmth does not attenuate the effect of depressive symptoms on adolescent alcohol use, as was assumed by previous literature (Martínez-Loredo et al., 2016). As discussed in the introduction, peer influence increases during adolescents (Thompson, Wojciak, & Cooley, 2016). It might be that peers have a more

prominent role in the adolescent life phase than parents. The role of parents could be weak or absent during this phase of development.

Finally, a main effect for sex as a predictor for adolescent alcohol use was found. Males compared to females appear to drink more alcohol. It is possible that the effect of depressive symptoms on alcohol use is stronger for boys. This indicates that perhaps sex should have been included in the model as a predictor. Future research could therefore investigate the moderating role of sex within the relationship between depressive symptoms and adolescent alcohol use in more detail.

Strengths and limitations

Strengths of the present study include the use of longitudinal data. The longitudinal design allows to infer directionality of the relationships. In addition, the relatively large sample reduced the margins of error and increased the external validity of the study.

Despite the strengths of this study, there are also several limitations. First, a possible explanation for not finding an effect for depressive symptoms is that the control variable adolescent alcohol use was measured at T2, after depressive symptoms were assessed. Alcohol use at T2 was strongly correlated with adolescent alcohol use at T3 indicating high stability between alcohol use at age 14 and age 16. Due to the young age at the start of the TRAILS study a different measure of alcohol use at age 11 was used in comparison to the subsequent waves. For that reason, alcohol use at T2 was included as control variable. The contribution of depressive symptoms may be stronger for alcohol use at age 14 compared to age 16, an assumption supported by the significant correlation between depressive symptoms at age 11 and adolescent alcohol use at age 14. Secondly, the data from TRAILS is based on a sample from the total Dutch population. This is a general population and compared to a more clinical- or at-risk sample, the level of depressive symptoms may be relatively low, possibly contributing to the absence of an effect between depressive symptoms and adolescent alcohol use in this particular sample. In addition, only the parenting style ‘parental warmth’ was included. The specific focus on merely one parenting style can distort the results. Parental warmth is often assumed to be the opposite parenting style to parental rejection (Hoffmann & Bahr, 2014). For future research it could be interesting to test if more parental rejection does moderate the relationship between depressive symptoms and adolescent alcohol use.

Conclusion and implications

The results of the current study revealed a significant contribution of contextual factors in explaining differences in adolescent alcohol use. Adolescents who indicated that they have friends who drink alcohol, were more likely to drink themselves. However, it is unclear whether peers influence the drinking behavior of adolescents (influence principle) or whether it are the adolescents themselves who drink alcohol, that select deviant friends (selection principle) (Osgood et al., 2013) because alcohol use and peer alcohol use were both assessed at the same wave. This has implications for future research aiming to further investigate the nature of the relationship between peer influence and adolescent alcohol use. To really understand the impact of the peer selection-influence principle, researchers will have to assess this more specifically. Also, emphasizing the importance of contextual factors when intervening on alcohol use, this study shows that individually targeted interventions are probably insufficient. Studies support this claim by proposing that contextual factors emerge as a proximal risk factor for adolescent alcohol use (Brown, Anderson, Ramo, & Tomlinson, 2005). For intervention programs targeted at reducing adolescent alcohol use, it is recommended to focus on the peer context. Specifically, including peer process (such as selection and influence) could create possible efficient strategies (Hale, Fitzgerald-Yau, & Viner, 2014). This might help adolescents in the future to refrain from alcohol.

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Appendix 1: interdisciplinarity

When investigating the relationship between depressive symptoms and adolescent alcohol use and the role of peer alcohol use and parental warmth in this relationship, multiple disciplines come to light. To get a good understanding of the problem that is researched, theoretical insights from those disciplines can be helpful (for example the negative reinforcement theory when understanding drinking behavior of adolescents). This theory is used in behavioral sciences but also in psychology (cognitive psychology) because it describes the processes that take place in the brain that make an adolescent perform a certain behavior. So, this implies an interplay between multiple disciplines.

Using theoretical insights from these disciplines may be useful because it provides information from different point of views which can lead to different conclusions. Different disciplines study human behavior, in my case adolescent alcohol use, from different levels; micro, meso, exo and macro, as Bronfenbrenner labels them. These different levels can lead to new and innovatory insights during this research.

Due to the limited time that stands for this thesis, it is not possible to collect data, so existing data from the TRAILS study is used. However, if there was enough time to collect data, it would have been useful to use different research methods. For example, both surveys and interviews so that the answered questions in the surveys can be elucidated during the interviews.

Appendix 2: Contract data use (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 Moniek Hartman 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

Moniek Hartman 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 moderating role of peer alcohol use and parental warmth on the relationship between depressive symptoms and alcohol use.

The following variable will be used:

Dependent variable: adolescent alcohol use

Independent variable: depression

Other variables: peer alcohol use and parental warmth

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 July 2020, Moniek Hartman shall delete the TRAILS data.

Dates and signature:



Name student: Moniek Hartman

Name of project coordinator