

School engagement, alcohol consumption and the role of parents

A longitudinal study on the reciprocal relationship between adolescents' school engagement and alcohol consumption and the role of parental support

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ABSTRACT

This study examines the reciprocal relationship between adolescents' school engagement and alcohol consumption. A second goal of this study is to examine if the degree of perceived parental support moderates this reciprocal relationship between school engagement and alcohol consumption. Data were obtained from Dutch high school students ($n = 906$, 52.5% boys, m age = 12.19) who filled in a questionnaire on four separate occasions. A cross-lagged autoregressive model showed that school engagement has a negative effect on alcohol consumption and that alcohol consumption has a negative effect on school engagement. Furthermore this study showed that this reciprocal relationship only accounts for adolescents who perceive high parental support. Future research and intervention programs should always keep the reciprocal nature of school engagement and alcohol consumption in mind.

INTRODUCTION

School engagement of Dutch adolescents is subject to change during the course of their high-school careers. Almost all (95%) 12-year old Dutch adolescents indicate that they either enjoy school a lot or a little. At age 16 this percentage has declined to almost 70%. Also students own judgment of their school performance changes as they get older. Among 12-year old Dutch adolescents 72% judges their own performance at school as either good or very good. By age 16 this percentage has dropped to 55% (Van Dorsselaer et al., 2010). As adolescents mature their positive school engagement tends to decline.

To date there has been plenty of debate as to how one should measure school engagement. Researchers have used a variety of concepts and definitions, but most frequently aspects such as: the feeling that students are part of school, whether students enjoy school, the degree of perceived teacher support, having close friends in school and school results are included (Libbey, 2004). In order to operationalize school engagement for this particular

study the degree of school joy and school results have been measured. In sum this study uses the definition of school engagement by asking students: are you doing well in school and are you enjoying school?

It's essential for adolescents to be highly engaged in school, as a low school engagement is an important risk factor for a variety of deviant behaviors (Li et al., 2011; Loukas, Ripperger-Suhler & Horton, 2009; Simons-Morton, Crump, Haynie & Saylor, 1999). For instance, adolescents who show a low degree of school engagement are at greater risk of engaging in delinquent behavior (Liljeberg, Eklind, Fritz & Af Klinteberg, 2011) and more likely to drink more alcohol (Li et al., 2011). However, it is unknown what the reciprocal relations are between school engagement and alcohol use among adolescents.

Dutch adolescents' alcohol consumption

Alcohol consumption of Dutch adolescents rapidly increases from the moment they enter high school. 35% of the 12-year old students indicate that they have consumed alcohol. This percentage increases to about 90% for 16-year old students (Verdurmen et al., 2012). In addition about 8% of the 12-year old and 77% of the 16-year old students indicate having consumed alcohol in the preceding month. Adolescents start drinking at an early age and the prevalence of drinking adolescents rises quickly once they enter high school.

When adolescents drink, they tend to drink a lot. For example, 3% of all 12-year old students indicate to have been engaged in binge drinking (≥ 5 glasses on a single occasion) in the previous month, which increases to 57% of the 16-year olds. Excessive alcohol consumption at a young age can cause psychical and psychological problems and can lead to a decrease in school performances (DeWit et al., 2000). Furthermore the earlier one starts drinking the greater the chances of alcohol abuse ten years later (Behrendt et al., 2009). The amount of Dutch students who drink rapidly increases the moment they enter high school and by the end of high school a majority of them drink frequently and substantially.

The relationship between school engagement and alcohol consumption

Different studies have shown that a high degree of school engagement serves as a protective factor against problem behavior in general and alcohol consumption in specific (Chiarella, 2003; Dever et al., 2012; Henry, Stanley, Edwards, Harkabus & Chapin, 2009; Simons-Morton et al., 1999; Wu, Chong, Cheng & Chen, 2007). A possible theoretical model that might explain these findings is the social development model (Catalano & Hawkins, 1996). This model states that adolescents learn behavior patterns from their primary socialization sources like parents, peers and school. A strong bond with pro-social sources, for instance school, can serve as a protective factor against deviant behavior. On the other hand a weak bond with pro-social sources and a strong bond with antisocial sources, for instance peers who engage in deviant behavior, can cause a risk factor for developing problem behavior. Adolescents with a strong school bond start drinking at a later age and have a smaller chance of becoming dependent upon alcohol (Maddox & Prinz 2003; Shears, Edwards & Stanley, 2006).

Relatively few studies have examined whether alcohol consumption has an effect on school engagement. Määttä, Stattin en Nurmi (2006) examined the effect of norm-breaking behavior, which also included alcohol consumption, on school engagement. They showed a negative effect of norm-breaking behavior on school engagement. Other research has shown negative correlations between alcohol consumption and school engagement (Tarter, Kirisci & Mezzich, 1996; Henry et al., 2009). Until now, previous studies have not been able to make a clear statement about the reciprocal nature of the relationship between alcohol consumption and school engagement. There seems to be a solid theoretical framework to substantiate the fact that a high degree of school engagement can serve as protective factor against alcohol consumption for adolescents. However there seems to be a lack of proof to verify a negative effect of alcohol consumption on school engagement. Most of the research on this topic has

been done by using a cross-sectional design, which makes it impossible to draw conclusions about the exact relationship between school engagement and alcohol consumption. This current study will gain new insights in the reciprocal relationship between adolescents' school engagement and alcohol consumption by making use of longitudinal data.

The role of parental support on school engagement and alcohol consumption

Parents play an important role in adolescents' school engagement and alcohol consumption. For instance parental support influences both school engagement and alcohol consumption (Chaplin et al., 2012). Adolescents that receive more warmth and support from their parents drink significantly less and hold a more positive attitude towards school in comparison to adolescents who feel less warmth and support from their parents (Bogenschneider, Wu, Raffaelli & Tsay, 1998; Chaplin et al., 2012; DeSantis King, Huebner, Suldo & Valois, 2007; Wills, Resko, Ainette & Mendoza, 2004). A supportive relationship with parents can serve as a protective factor against forming deviant peer relations which in turn can lead to a reduction in alcohol use (Wu et al., 2007). Parents also stimulate their children to do well in school. Wu et al. (2007) suggested that this could be a possible explanation why adolescents who have close bond with their parents show a higher degree of school engagement as compared to adolescents who have a weaker bond with their parents. Though parental support relates to higher levels of school engagement and lower levels of drinking, it is unknown whether the relationship between the later factors differ according to the level of parental support. Previous research has revealed the moderating effect of parental support on the relationship between adolescents' negative affect and subsequent alcohol use (Reimuller, Shadur & Hussong, 2011). This study will be the first to examine whether parental support moderates the relationship between school engagement and alcohol consumption.

Current study

This study aims to examine (1) the reciprocal nature of the relationship between school engagement and alcohol consumption and (2) whether this relation is moderated by the degree of parental support. We hypothesize that a higher degree of school engagement leads to less alcohol consumption and more alcohol consumption leads to a lower degree of school engagement. In addition, we expect that the relationship between alcohol consumption and school engagement is less strong among adolescents with more supportive parents. The investigation of the reciprocal relationship between alcohol use and school engagement and the role of parental support in this, may form an important new argument to implement more stringent alcohol-prevention programs for adolescents entering high school with a potential import role for parents.

METHOD

Procedure and participants

In April 2006 out of a list of all Dutch public secondary schools, 80 schools were randomly selected and invited to participate in the intervention study: "Preventing heavy alcohol use in adolescents" (PAS: Koning et al., 2009). Schools were allowed to participate if the following inclusion criteria were met: (i) at least 100 first-year students, (ii) less than 25% students from migrant populations, (iii) no special education was offered. Eventually 19 schools from different regions in the Netherlands participated in this study. From these schools 3490 students were asked to participate. Schools were randomly assigned to one of four conditions; three experimental conditions and one control group. Students in the experimental condition all received some form of intervention aiming to reduce alcohol use among these adolescents. Therefore, only students in the control condition were included in this study. Four schools consisting of 47 classes with a total of 935 students were selected for this study.

Data from the students were obtained by a trained research assistant. The data was collected in classrooms by means of an online-questionnaire that was made available on a secured website. The students who participated in this study filled in these questionnaires on a yearly basis ranging from 2006 up until 2009 (T1 to T4). Parents received a letter of consent and were given the opportunity to refuse their child's participation.

29 of the 935 students did not participate in this study because either their parents refused permission or because they were not present at school the day the first measurement took place. Of the 906 students that did participate at the first wave, 476 (52,5%) were boys, (60,2%) were into lower secondary education (vmbo). The average age at the first wave was 12,19 years old (SD = 0.51).

Loss to follow-up

Adolescents who did not participate at T2 (42: 4,6%), T3 (104: 11,5%) or T4 (123: 13,6%) differed as compared to completers, with higher amounts of alcohol consumption for those lost to follow-up at T3 ($t = 2.83$, $p = 0.006$) and T4 ($t = 2.29$, $p = 0.024$), with a lower degree of school engagement for those lost to follow-up at T2 ($t = -2.12$, $p = 0.035$), a lower level of education for those lost to follow-up at T3 ($X^2 = 18.24$, $p < 0.001$) and T4 ($X^2 = 16.67$, $p < 0.001$) and with a higher average age for those lost to follow-up at T3 ($t = 2.26$, $p = 0.025$) and T4 ($t = 2.52$, $p = 0.013$). No gender differences were found for those not participating at T2 ($X^2 = 0.09$, $p = 0.77$) T3 ($X^2 = 0.12$, $p = 0.73$) and T4 ($X^2 = 2.19$, $p = 0.139$) as compared to the completers.

Outcome measures

Weekly alcohol consumption

Students were asked at four time points on how many days during the week (i) and in weekends (ii) the student usually drink alcohol and, if the student drinks during week (iii) and weekend days (iv) how much alcohol (glasses, bottles or canes) he/she drinks on such a day.

The questions are part of the Quantity-Frequency index which is used to determine weekly alcohol consumption (Strauss & Bacon, 1953). The scores of item 1 and 2 are multiplied. The scores of item 3 and 4 are also multiplied. These two scores are then summed to represent the average weekly alcohol consumption. Some students reported unrealistically high average weekly alcohol consumption scores. These scores were all reduced to the mean plus three standard deviations (T1 = 12, T2 = 27, T3 = 40, T4 = 45).

School engagement

The degree of school engagement was also assessed at each wave. The following five statements were presented: (i) do you enjoy school, (ii) do you try your best at school, (iii) do you feel like you are forced to be in school, (iv) are you satisfied with your homework and (v) do you find schoolwork easy. These statements were to be answered on a five-point scale ranging from *almost never*, *mostly not*, *sometimes*, *mostly yes* and *(almost) always*. Items (i) up until (v) were calculated into a single average score for every student, on each consecutive time point, representing the average degree of school engagement. Scores ranged from 1 to 5, with a score of 1 indicating the lowest degree of school engagement and a score of 5 indicating the highest degree of school engagement. To increase the internal consistency of this scale item (iii) was removed from the analysis. The Cronbach's alfa's ranged from .68 to .72.

Parental Support

In order to assess the degree of parental support students perceive, the "easy to talk to" scale was used (Van Dorsselaer et al., 2010). Students were asked at T1 how easy is it for them to talk about things that worry them with: (i) their father, (ii) step-father (or mother's new partner), (iii) mother en (iv) step-mother (or father's new partner). Answers ranged on a five-point scale with the categories being, *very easy*, *easy*, *difficult*, *very difficult* or *don't have/never see*. This last category; *don't have/never see*, is scored as a missing value. For

every student a mean score was calculated (range 1 to 4); a higher score indicated more parental support. When a score of both father and mother was present, the mean was calculated with the use of these two scores. When a score for either father, mother or father and mother was missing, the score of the step-father and or step-mother was used when present to calculate the mean. The degree of parental support is dichotomized by means of a median-split (median = 3; ≤ 3 : 39,3%, ≥ 3 : 61,7%). The ρ for these two items is .61 ($p < 0.001$).

Analysis

In order to test the three different hypotheses structural equation modeling was conducted using AMOS (Figure 1). This model consisted of the following characteristics; (i) the value for time point T can be explained by the value of time point T-1, (ii) the correlations between the error terms that are generated by the depended en and independent variables will be controlled, (iii) the time-dependent pathways for both school engagement and alcohol consumption are added in order to control for the stability of each variable. AMOS handles missing values by making use of full information maximum likelihood estimates. This method makes an estimation for each missing value which is used in the analysis (Enders & Bandalos, 2001).

Frequency tables are used to present the means and standard deviations of the different variables of interest. The first analysis serves to test the first and second hypotheses. A cross-lagged model was used to test the reciprocal relationship between school engagement and alcohol consumption.

In order to test the third hypothesis, moderation by parental support, previous analyses were carried out for both the low and high support group.

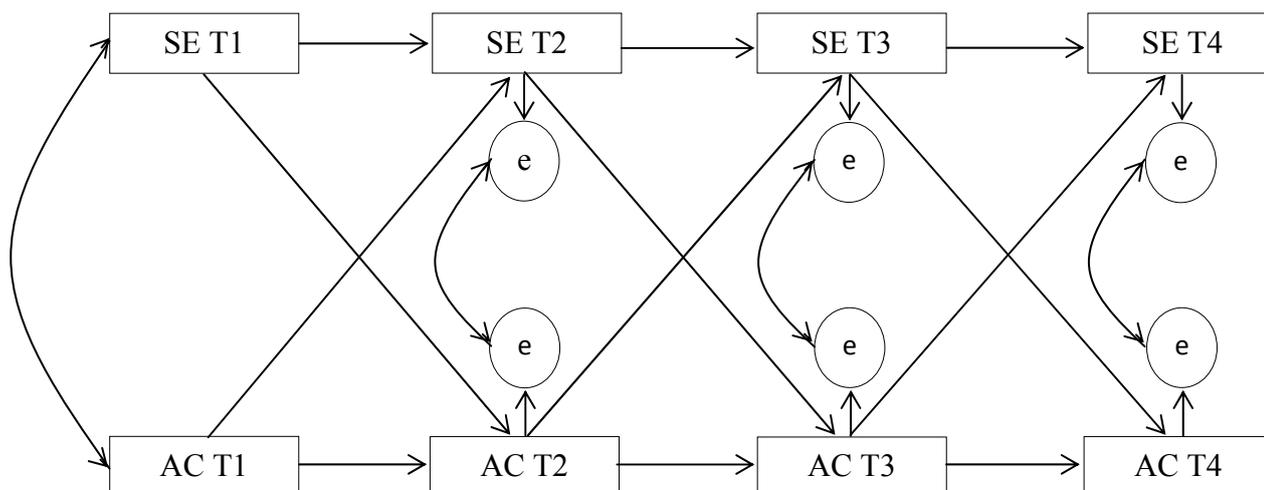


Figure 1. Theoretical Model that will be Investigated in this Study.

Note. SE = school engagement; AC = alcohol consumption.

RESULTS

Descriptive Data

The descriptive statistics of both school engagement and alcohol consumption are presented in Table 1. The average school engagement decreases over time. The average alcohol consumption strongly increases as adolescents get older.

Table 1

Means and Standard Deviations of School Engagement and Alcohol Consumption across all Four Time Points

	M (SD)	M (SD)
	School Engagement	Alcohol Consumption
T1	3.90 (0.65)	0.55 (1.80)
T2	3.81 (0.71)	1.43 (4.56)
T3	3.66 (0.71)	2.64 (7.29)

T4 3.64 (0.70) 5.44 (9.94)

Table 2 shows the significant correlations between school engagement and alcohol consumption across all four time points. School engagement at T2 and T3 and alcohol consumption at T1 and T3 show the strongest correlations. School engagement at T1 and alcohol consumption at T4 show the weakest correlation. School engagement is significantly negatively correlated to alcohol consumption across each of the time points.

Table 2

Correlations between School Engagement and Alcohol Consumption across the Four Time Points

	SE T1	SE T2	SE T3	SE T4	AC T1	AC T2	AC T3
SE T1	X						
SE T2	0.36**	X					
SE T3	0.32**	0.53**	X				
SE T4	0.24**	0.35**	0.44**	X			
AC T1	-0.23**	-0.21**	-0.10**	-0.15**	X		
AC T2	-0.17**	-0.34**	-0.18**	-0.14**	-0.56**	X	
AC T3	-0.16**	-0.25**	-0.21**	-0.16**	-0.28**	-0.42**	X
AC T4	-0.09**	-0.24**	-0.21**	-0.21**	-0.27**	-0.40**	-0.49**

** $p \leq 0.01$

The reciprocal relationship between school engagement and alcohol consumption

In order to demonstrate the reciprocal relationship between school engagement and alcohol consumption among adolescents, a cross-lagged autoregressive analysis was used. Figure 2 shows the results of this analysis along with the standardized regression coefficients

belonging to the different paths. This model fits the data reasonably well (CFI = .95, RMSEA = .08).

School engagement and alcohol consumption influence each other reciprocally in this model. School engagement has a negative effect on alcohol consumption across all three time points ($r = -.07, p = .019, r = -.13, p < 0.001$ and $r = -.08, p = .03$). Alcohol consumption has a negative effect on school engagement across two time points onto the next ($r = -.18, p < 0.001$ and $r = -.09, p = .014$) except from T2 on T3.

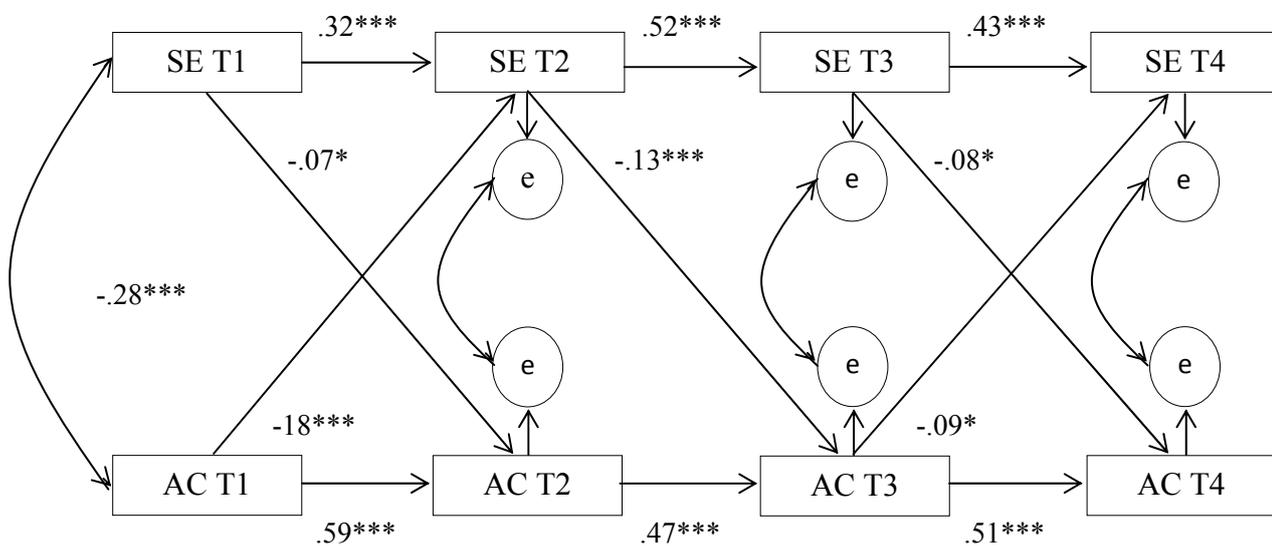


Figure 2. Cross-lagged, autoregressive model for the reciprocal influences between school engagement and alcohol consumption. * $p \leq 0.05$, *** $p \leq 0.001$. Correlation coefficients for the residuals were omitted.

Note. Only significant paths are depicted.

Moderation parental support

Table 3 presents the average school engagement and the average alcohol consumption for both adolescents who perceive a high degree and a low degree of parental support. School engagement among adolescents in the high support group is significantly higher at T1 ($t = -4.52, p < 0.001$), T2 ($t = -4.64, p < 0.001$), T3 ($t = -2.93, p = 0.03$) and T4 ($t = -2.43, p =$

0.015) compared to adolescents in the low support group. Alcohol consumption of adolescents in the high support group is significantly lower at T1 ($t = 2.90, p = 0.004$) and T2 ($t = 2.55, p = 0.011$) compared to adolescents in the the low support group.

Table 3

Means and Standard Deviations of School Engagement and Alcohol Consumption for both Low Support Group and the High Support Group across all Four Time Points

	M (SD)	M (SD)
	Low Support	High Support
SE T1	3.79 (0.62)	3.98* (0.63)
SE T2	3.69 (0.72)	3.92* (0.68)
SE T3	3.56 (0.72)	3.72* (0.72)
SE T4	3.56 (0.65)	3.69* (0.73)
AC T1	0.80 (2.34)	0.37* (1.33)
AC T2	1.96 (5.59)	1.00* (3.46)
AC T3	3.24 (7.84)	2.30 (7.02)
AC T4	6.12 (10.35)	4.96 (9.79)

Note. * = significantly different from the low support group.

In order to test whether the perceived degree of parental support moderates the relationship between school engagement and alcohol consumption the earlier introduced cross-lagged model was tested for the low support group (Figure 3) and high support group (Figure 4). Both models fit the data well (Figure 3; CFI = .94, RMSEA = .09 and Figure 4; CFI = .95, RMSEA = .07).

In the model for the low support group alcohol consumption at T1 has a negative effect on school engagement on T2 ($r = -.17, p < 0.001$). No other significant effects of alcohol use and school engagement are found.

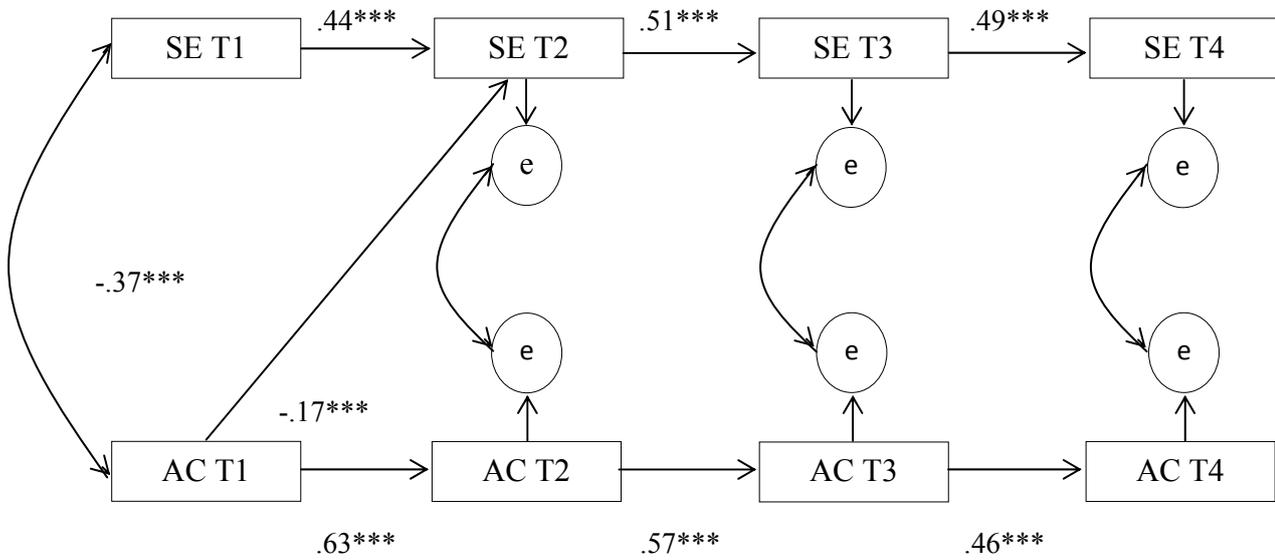


Figure 3. Cross-lagged, autoregressive model for the reciprocal influences between school engagement and alcohol consumption for the low support group. * $p \leq 0.05$, *** $p \leq 0.001$. Correlation coefficients for the residuals were omitted.

Note. Only significant paths are depicted.

The model for the high support group shows that alcohol consumption has a negative effect on school engagement across all three points in time ($r = -.10$, $p = .023$, $r = -.09$, $p = .04$ and $r = -.14$, $p = 0.001$). School engagement at T1 and T2 has a negative effect alcohol consumption one year later ($r = -.14$, $p < 0.001$ and $r = -.15$, $p = 0.001$).

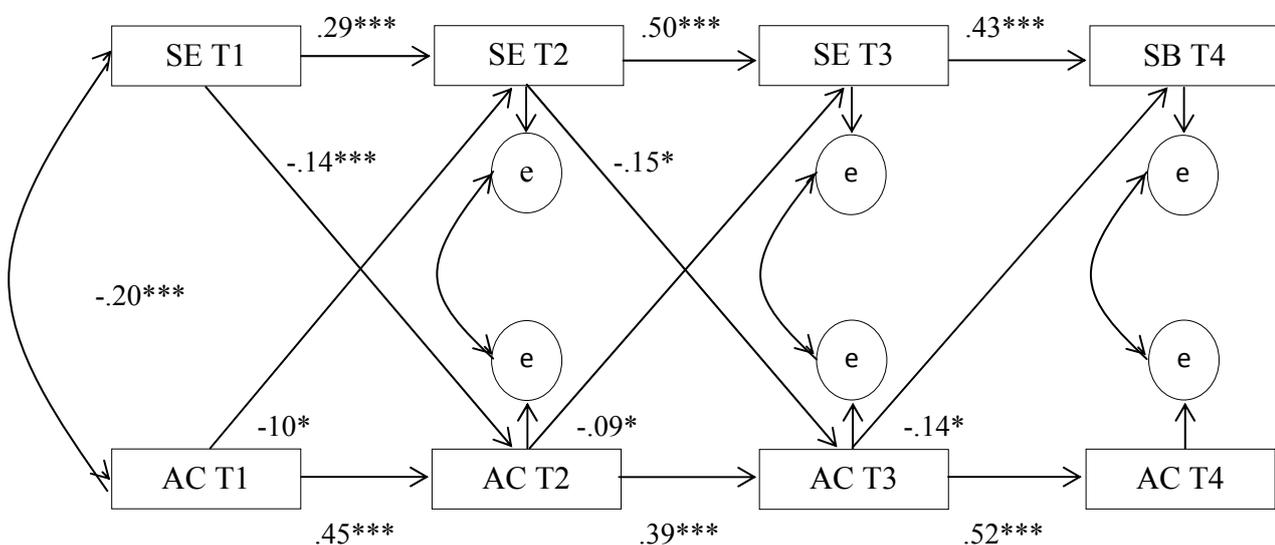


Figure 4. Cross-lagged, autoregressive model for the reciprocal influences between school engagement and alcohol consumption for the high support group. * $p \leq 0.05$, *** $p \leq 0.001$.

Correlation coefficients for the residuals were omitted.

Note. Only significant paths are depicted.

DISCUSSION

This is the first study that has examined the reciprocal relationship between adolescents' school engagement and alcohol consumption and the moderating effects of parental support. The results of this study confirm our expectancies for the most part. School engagement has a negative effect on alcohol consumption over time. Alcohol consumption has a negative effect on school engagement at two of the three points in time. This study shows that school engagement and alcohol consumption influences one another reciprocally. Yet this reciprocal relationship is only true for adolescents who experience a high degree of parental support.

The reciprocal influence between school engagement and alcohol consumption adds an import new insight to previous research. In line with previous research (Chiarella, 2003; Dever, et al., 2012; Henry et al., 2009; Simons-Morton et al., 1999; Wu, et al., 2007), the current study revealed that a lower school engagement predicts more alcohol use. There are however relatively less indications from previous research indicating a negative effect of alcohol consumption on school engagement. Määttä et al. (2006) showed a negative effect of norm-breaking behavior on school engagement. The results of current study are in line with the study of Määttä et al. (2006) by showing a negative effect of alcohol consumption on school engagement. Furthermore this result adds a crucial new insight by uncovering the reciprocal nature of the relationship between school engagement and alcohol consumption. Future research shouldn't focus on just the effects of school engagement on alcohol

consumption or vice versa like past research has done; rather it should focus on the reciprocal nature of these two variables.

The reciprocal relationship between school engagement and alcohol consumption only applies to adolescents who perceive a high degree of parental support. School engagement and alcohol consumption have little effect on one another among adolescents who perceive a low degree of parental support. One possible explanation could be the so called “ceiling effect”. When score distributions tend to be skewed, regression could lead to inaccurate predictions of a certain variable (Kennedy, 1998). As shown in Table 3 the low support group has a lower average school engagement and higher average alcohol consumption on all four time points when compared with the high support group. The effect of school engagement on alcohol consumption and vice versa could therefore be smaller because the degree of school engagement is rather low and alcohol consumption is high to begin with for this group of adolescents. This makes that there is less variance over time.

A second explanation for these results might be a difference in the degree of deviant peer relationships between adolescents who perceive a high and low degree of parental support. Wu et al. (2007) show that a good relationship with parents can serve as a protective factor against the formation of deviant peer relationships among adolescents, which in turn is associated with less alcohol consumption. Marschal and Chassin (2000) also show that parental support plays a pivotal role in the socialization processes among adolescents. Parental support strengthens the positive intrapersonal skills among adolescents which are vital in order to withstand the pressures of peers who encourage the use of alcohol and drugs. Adolescents who perceive a high degree of parental support might be more adept in withstanding the influences of deviant peers in comparison to adolescents who perceive a low degree of parental support. The latter might be more easily influenced by their peers because they lack the right intrapersonal skills to cope with peer pressure. Therefore these peers might

have a very strong influence on the development of the school engagement and alcohol consumption for the adolescents who perceive a low degree of parental support. More research is needed to examine whether the degree of (deviant) peer relationships may have an effect on the relationship between school engagement and alcohol consumption.

Strengths and limitations

This study has some limitations that need to be addressed. Firstly school engagement and alcohol consumption have been measured using self-report questionnaires which could lead to socially desirable answers. Previous research has shown that using self-report questionnaires is a reasonably reliable method for measuring alcohol consumption (Koning, Harakeh, Engels & Vollebergh 2010; Wagenaar, Komro, McGovern, Williams & Perry 1993). In order to guarantee a reliable measure of school engagement future research might consider using teacher assessments in combination with self-report questionnaire. Secondly this study doesn't provide an indisputable explanation why the degree of parental support moderates the reciprocal relationship between school engagement and alcohol consumption because possible covariates were not controlled for. Future research could for instance control for the socio-economic status of students' parents. Hartas (2011) showed that parental support serves as a pathway through which socio-economic factors influence children's competencies. Parental support might thus be part of latent variable like socio-economic status of the parents.

Despite these limitations this study examines the reciprocal nature of the relationship between school engagement and alcohol consumption by making use of longitudinal data and a large sample of adolescents. In particular the effects of alcohol consumption on school engagement are revealed which have been ignored in previous research. Furthermore this study is the first to show the moderating effects of parental support on the relationship between school engagement and alcohol consumption. In sum this study is first to show that school engagement has a negative effect on alcohol consumption and that alcohol

consumption has a negative effect on school engagement only for adolescents who perceive a high degree of parental support.

Implications

Both school engagement and alcohol consumption are associated with different risks. Excessive alcohol consumption at a young age for instance can cause psychical and psychological problems and can lead to a decrease in school performances (DeWit et al., 2000). Adolescents who become disengaged from school are more likely to experience a wide variety of cognitive, behavioral and emotional problems (Holt, Bry & Johnson, 2008). Therefore it is crucial to gain more insight into the reciprocal nature of the relationship between school engagement and alcohol consumption and how parental support influences this relationship.

These insights can contribute to improving future intervention programs that aim to reduce adolescents' alcohol consumption and try to improve their school engagement. An example of one such program is the school based life skill program IPSY (Information + Psychosocial Competence = Protection). Wenzel, Weichold and Silbereisen (2009) showed that this program has a positive effect on adolescents' school engagement. Furthermore, this program leads to a decrease in alcohol consumption among adolescents. The results of the current study show it is first of all important to prevent young adolescents who enter high school from starting drinking. Not just because an earlier onset of drinking increases the likelihood of alcohol abuse ten years later (Behrendt et al., 2008), also because drinking an earlier onset cause a decrease in school engagement which in turn leads to even more alcohol consumption. Furthermore these programs shouldn't just aim to inform adolescents about the risks of excessive alcohol consumption they should also make an effort to stimulate adolescents' school engagement from the moment they enter high school. Increasing their school engagement at the same time serves as a protective factor against the development of

alcohol consumption. Finally the role of parental support has to be taken into account. Adolescents who perceive a low degree of parental support might have more trouble resisting negative influences from deviant peers because they lack the right intrapersonal skills which are strengthened by parental support. Therefore these programs should also consider paying extra attention to the development of intrapersonal skills among young adolescents which are essential to effectively deal with peer pressure. Resisting peer pressure decreases the onset of alcohol consumption which as is shown by this study, has a positive effect on school engagement.

Literature

- Aunola, K., Stattin, H., & Nurmi, J. (2000). Adolescents' achievement strategies, school adjustment, and externalizing and internalizing problem behaviors. *Journal and Youth and Adolescence, 29*, 289-306.
- Behrendt, S., Wittchen, H.U., Höfler, M., Lieb, R., Low, N.C.P., Rehm, J., & Beesdo, K. (2008). Risk and speed of transitions to first alcohol dependence symptoms in adolescents: a 10-year longitudinal community study in Germany. *Addiction, 103*, 1638-1647.
- Bisset, S., Markham, W.A., & Aveyard, P. (2007). School culture as an influencing factor on youth substance use. *British Journal of Preventive & Social Medicine, 61*, 485-490.
- Bogensneider, K., Wu, M., Raffaelli, M., & Tsay, J.C. (1998). 'Other teens drink, but not my kid': Does parental awareness of adolescent alcohol use protect adolescents from risky consequences? *Journal of Marriage and the Family, 60*, 356-373.
- Bond, L., Butler, H., & Thomas, L. (2007). Social and school connectedness in early school as predictor of late teenage substance use, mental health, and academic outcomes. *Journal of Adolescent Health, 40*, 9-18.
- Catalano, R.F., & Hawkins, J.D. (1996). The social development model: A theory of antisocial behavior. In J. D. Hawkins (Ed.), *Delinquency and crime: Current theories* (pp. 149-197). New York: Cambridge University Press.
- Chiarella, M.C. (2003). Family and peer influences on Mexican American adolescent alcohol use: Moderating effects of school adjustment. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 63*, 4362.

- DeSantis King, A.L., Huebner, S., Suldo, S.M., & Valois, R.F. (2006). An ecological view of school satisfaction in adolescence: Linkage between social support and behavior problems. *Applied Research in Quality of Life, 1*, 279-295.
- Dever, B.V., Schulenberg, J.E., Dworkin, J.B., O'Malley, P.M., Kloska, D.D., & Bachman, J.G. (2012). Predicting risk-taking with and without substance use: The effects of parental monitoring, school bonding, and sport participation. *Prevention Science, 13*, 605-615.
- DeWit, 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. *The American Journal of Psychiatry, 157*, 745-750.
- Enders, C.K., & Bandalos, D.L. (2001). The relative performance of full information maximum likelihood estimates for missing data in structural equation models. *Structural Equation Modeling, 8*, 430-457.
- Hartas, D. (2011). Families' social backgrounds matter: socio-economic factors, home learning and young children's language, literacy and social outcomes. *British Educational Research Journal, 37*, 893-914.
- Henry, K.L., & Slater, M.D. (2007). The contextual effect of school attachment on young adolescents' alcohol use. *The Journal of School Health, 77*, 67-74.
- Henry, K.L., Stanley, L.R., Edwards, R.W., Harkabus, L.C., & Chapin, L.A. (2009). Individual and contextual effects of school adjustment on adolescent alcohol use. *Prevention Science, 10*, 236-247.
- Holt, L.J., Bry, B.H., & Johnson, V.L. (2008). Enhancing school engagement in at-risk, urban minority adolescents through a school-based, adult mentoring intervention. *Child & Family Behavior Therapy, 30*, 297-318.
- Kennedy, P.A. (1998). *Guide to Econometrics*. MIT Press, Cambridge, MA.

- Koning, I.M., Harakeh, Z., Engels, R.C.M.E., & Vollebergh, W.A.M. (2010). A comparison of self-reported alcohol use measures by early adolescents: Questionnaires versus diary. *Journal of Substance Use, 15*, 166-173.
- Koning, I.M., Vollebergh, W.A.M., Smit, F., Verdurmen, J.E.E., Van den Eijnden, R.J.J.M., Ter Bogt, T.F.M., Stattin, H., & Engels, R. C. M. E. (2009). Preventing alcohol use in adolescents (PAS): cluster randomized trial of a parent and student intervention offered separately and simultaneously. *Addiction, 104*, 1669-1678.
- Li, Y., Zhang, W., Liu, J., Arbeit, M.R., Schwartz, S.J., Bowers, E.P., & Lerner, R.M. (2011). The role of school engagement in preventing adolescent delinquency and substance use: A survival analysis. *Journal of Adolescence, 34*, 1181-1192.
- Libbey, H.P. (2004). Measuring student relationship to school: attachment, bonding, connectedness, and engagement. *The Journal of School Health, 74*, 274-283.
- Liljeberg, J.F., Eklund, J.M., Fritz, M.V., & Af Klinteberg, B. (2011). Poor school bonding and delinquency over time: Bidirectional effects and sex differences. *Journal of Adolescence, 34*, 1-9.
- Loukas, A., Ripperger-Suhler, K.G., & Horton, K.D. (2009). Examining temporal associations between school connectedness and early adolescent adjustment. *Journal of Youth and Adolescence, 38*, 804-812.
- Määttä, S., Stattin, H., & Nurmi, J.K. (2006). Achievement strategies in peer groups and adolescents' school adjustment and norm-breaking behavior. *Scandinavian Journal of Psychology, 47*, 273-280.
- Maddox, S.J., & Prinz, R.J. (2003). School bonding in children and adolescents: Conceptualization, assessment, and associated variables. *Clinical Child and Family Psychology Review, 6*, 31-49.

- Marschal, M.P., & Chassin, L. (2000). Peer influence on adolescent alcohol use: The moderating role of parental support and discipline. *Applied Developmental Science, 4*, 80-88.
- Mayberry, M.L., Espelage, D.L., & Koenig, B. (2009). Multilevel modeling of direct effects and interactions of peers, parents, school, and community influences on adolescents substance use. *Journal of Youth and Adolescence, 38*, 1038-1049.
- Reimuller, A., Shadur, J., & Hussong, A.M. (2011). Parental social support as a moderator of self-medication in adolescents. *Addictive Behaviors, 36*, 203-208.
- Samdal, O., Wold, B., Klepp, K.L., & Kannas, L. (2000). Students' perception of school and alcohol use: A cross-national study. *Addiction Research, 8*, 141-167.
- Shears, J., Edwards, R. W., & Stanley, L. R. (2006). School bonding and substance use in rural communities. *Social Work Research, 30*, 6-18.
- Simons-Morton, B.G. (2004). Prospective association of peer influence, school engagement, drinking expectancies and parent expectations with drinking initiation among sixth graders. *Addictive Behaviors, 29*, 299-309.
- Simons-Morton, B.G., Crump, A.D., Haynie, D.L., & Saylor, K.E. (1999). Student-school bonding and adolescent problem behavior. *Health Education Research, 14*, 99-107.
- Straus, R., & Bacon, S.D. (1953). *Drinking in College*. Yale University Press, New Haven, CT.
- Tarter, R.E., Kirisci, L., & Mezzich, A. (1996). The drug use screening inventory: School adjustment correlates of substance abuse. *Measurement and Evaluation in Counseling and Development, 29*, 25-34.
- Van Dorsselaer, S., De Looze, M.E., Vermeulen-Smit, E., De Roos, S., Ter Bogt, T., Verdurmen, J.E.E., & Vollebergh, W.A.M. (2010). HBSC 2009: gezondheid, welzijn en opvoeding van jongeren in Nederland [Health Behaviour in School-aged Children

- 2009: *Young People's Health, Well-Being and Education in the Netherlands*]. Utrecht: Trimbos-Instituut: 2010.
- Verdurmen, J.E.E., Monshouwer, K., Van Dorsselaer, S., Lokman, S., Vermeulen-Smit, E., & Vollebergh, W.A.M. (2012). *Jeugd en riskant gedrag 2011 [Adolescents and Risk-taking Behaviour 2011]*. Utrecht: Trimbos-Instituut: 2012.
- Wagenaar, A.C., Komro, K.A., McGovern, P., Williams, C.L., & Perry, C.I. (1993). Effects of a saliva test pipeline procedure on adolescents self-reported alcohol use. *Addiction*, 88, 199-208.
- Wenzel, V., Weichold, K., & Silbereisen, R.K. (2009). The life skill program (IPSY): Positive influences on school bonding and prevention of substance misuse. *Journal of Adolescence*, 32, 1391-1401.
- Wills, T.A., Resko, J.A., Ainette, M.G., & Mendoza, D. (2004). Role of parental support and peer support in adolescent substance use: a test of mediated effects. *Psychology of Addictive Behaviors*, 18, 122-134.
- Wu, G.H., Chong, M.Y., Cheng, A.T.A., & Chen, T.H.H. (2007). Correlates of family, school, and peer variables with adolescent substance use in Taiwan. *Social Science & Medicine*, 64, 2594-2600.