

Parental problem drinking, parenting, and adolescent alcohol use

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Accepted: December 17, 2007 / Published online: 12 January 2008
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Abstract The present study examined whether parental problem drinking affected parenting (i.e., behavioral control, support, rule-setting, alcohol-specific behavioral control), and whether parental problem drinking and parenting affected subsequent adolescent alcohol use over time. A total of 428 families, consisting of both parents and two adolescents (mean age 13.4 and 15.2 years at Time 1) participated in a three-wave longitudinal study with annual waves. A series of path analyses were conducted using a structural equation modeling program (Mplus). Results demonstrated that, unexpectedly, parental problem drinking was in general not associated with parenting. For the younger adolescents, higher levels of both parenting and parental problem drinking were related to lower engagement in drinking over time. This implies that shared environment factors (parenting and modeling effects) influence the development of alcohol use in young adolescents. When adolescents grow older, and move out of the initiation phase, their drinking behavior may be more affected by other factors, such as genetic susceptibility, and peer drinking.

Keywords Problem drinking · Parenting · Adolescent · Alcohol

Introduction

Time trends in Dutch epidemiological research show a significant increase in frequency and intensity of alcohol consumption among 12–15 year olds (Poelen et al. 2005). Alarming high numbers of Dutch adolescents (75%) also report problem drinking behaviors such as binge drinking (consuming more than 5 amounts of alcohol on one occasion), when compared to their American counterparts (19%; Newes-Adeyi et al. 2005; Van Dorsselaer et al. 2007). In addition, previous studies show that high levels of alcohol-related problems such as social consequences of alcohol use (e.g., family problems) and dependence symptoms (e.g., loss of control) occur frequently in Western societies, with approximately 10% of both American and Dutch populations reporting 3 or more alcohol-related problems (Cornel et al. 1994; NIAAA 1997; Van Dijck and Knibbe 2005; Wallitzer and Connors 1999).

Parental problem drinking increases risk for alcohol use in children (e.g., Chassin et al. 1996; Hawkins et al. 1992; Sher et al. 1991). Children of alcoholics are not only at a higher risk for early alcohol initiation (Hill et al. 2000), they also show a greater increase in alcohol consumption over time than adolescents without alcoholic parents (Chassin and Barrera 1993). In addition, children with a family history of alcoholism show more escalation of alcohol use (Lieb et al. 2002), and more often develop alcohol disorders and dependence (Hill et al. 2000) than children without a family history of alcoholic parents.

In an attempt to explain these associations, social theorists suggested a modeling effect (Bandura 1977) that causes youngsters to imitate their parents. Others have proposed that parental substance abuse may impair parenting (Sher 1991; Van der Vorst et al. 2006; Van Zundert et al. 2006), which subsequently may affect adolescent alcohol consumption.

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As Mayes and Truman (2002) pointed out, personality characteristics, disabilities, or impairments accompanying an addiction may affect the ability to raise a child. In addition, substance use alters the state of consciousness, memory, affect, and impulse control, each of which may impair the adult's parenting capacities. Indeed, empirical studies have shown that children of alcoholic parents receive less discipline (King and Chassin 2004) and less emotional support from their parents (Rutherford et al. 1997). In addition, Chassin et al. (1993) found that parental alcoholism decreased the amount of parental monitoring. This is all the more problematic, since discipline and rule setting, in turn, reduce the likelihood of youngsters' drunkenness (Engels and Van der Vorst 2003), and more parental monitoring is related to less heavy drinking in adolescents (Kerr and Stattin 2000; Van der Vorst et al. 2006). In addition, parental support appears to prevent early onset of alcohol use, as well as frequent and heavy alcohol use among adolescents (Barnes et al. 1994). Thus, numerous cross-sectional studies have demonstrated associations between parental alcohol use, parenting, and adolescent alcohol consumption (e.g., Chassin et al. 1993; Kerr and Stattin 2000). However, with the exception of two prospective studies that showed that monitoring by fathers and parental discipline mediated between parental alcoholism and adolescents' alcohol use (Chassin et al. 1996; King and Chassin 2004), longitudinal studies are lacking. In addition, to allow generalization of findings and to examine effects in potentially less severe cases, it is necessary to investigate community-based samples (Russell et al. 1990). Accordingly, the central aim of the present study was to longitudinally examine the nature of the relations between parental problem drinking, parenting, and adolescent alcohol use in a three-wave community-based sample.

Alcohol-specific parenting

Although studies on parenting and adolescent alcohol use have been informative, two important issues have hardly been addressed. First, most studies on the link between parenting and adolescent alcohol use have focused on general parenting. However, alcohol-specific socialization, which refers to the actions parents undertake to discourage or prevent their offspring from drinking (Jackson et al. 1999; Van der Vorst et al. 2005), has received less attention in relation to parental drinking and adolescent alcohol use. Wood et al. (2004) found that late adolescents drank less alcohol when their parents disapproved of drinking. In addition, imposing strict rules prevented youngsters from heavy drinking (Jackson et al. 1999; Van der Vorst et al. 2005; Yu 2003). However, whether parental problem drinking affects alcohol-specific parenting has not yet been examined. From studies on smoking we know that parents

who smoke are less frequently engaged in anti-smoking socialization practices than parents who do not smoke (Harakeh et al. 2005). A similar process might be at work regarding alcohol-specific socialization, suggesting that parents with alcohol problems may engage less frequently in alcohol-specific socialization, and as such provide fewer alcohol-specific rules, are more permissive towards alcohol use and exert less alcohol-specific control.

Second, it is crucial to acknowledge that the association between parenting and adolescent problem behavior may be bidirectional: Parents do not only influence their children, but children's behavior also exerts an effect on parents. Indeed, recent longitudinal studies showed a bidirectional relation between parenting and adolescent substance use. Adolescent drinking, smoking or deviant behavior decreased the level of parental monitoring and rule setting (Huver et al. 2006; Stice and Barrera 1995; Van der Vorst et al. 2006). This implies that when these child effects are not taken into account, this may lead to an overestimation of parental influences (Kerr and Stattin 2003; Van der Vorst et al. 2006).

Current study and expectancies

We longitudinally investigated the direct effect of parental problem drinking on adolescent alcohol use, the role of alcohol-specific and general parenting practices in this relationship, and the reciprocal effects of adolescent alcohol use on parenting (see Fig. 1). It was expected that parental problem drinking would have a direct positive effect on adolescent alcohol use, with more parental alcohol-related

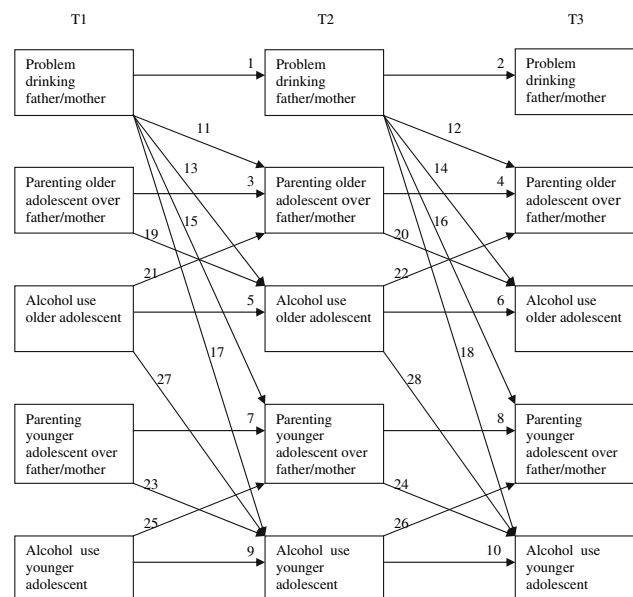


Fig 1 Longitudinal Model of Parental Problem Drinking, Parenting, and Adolescent Alcohol Use

problems leading to more adolescent alcohol use. In addition, an indirect relationship was expected via parenting; more specifically, higher levels of parental problem drinking were thought to have a negative effect on both general and alcohol-specific parenting practices, which in turn would lead to more adolescent alcohol use. Moreover, the drinking behaviors of the adolescents were expected to influence parenting, with more adolescent drinking resulting in less parental discipline and monitoring.

Methods

Participants and recruitment

The data were derived from an ongoing Dutch longitudinal survey called ‘Family and Health’, which examines different socialization processes in relation to various health behaviors in adolescence (see Harakeh et al. 2005; Van der Vorst et al. 2005). A total of 428 Dutch families, consisting of mother, father, and two adolescent children, participated in our study in the first wave (2002–2003). Families were included when the parents were married or living together, and when all family members were biologically related. Families with twins, or with mentally or physically disabled offspring were excluded. Numbers of drop-outs were extremely low in the second (2003–2004) and third wave (2004–2005), with 416 (97%) and 404 (94%) participating families, respectively.

The majority of the families were of Dutch origin (>95%). The mean age of the participants at Time 1 was 15.2 years ($SD = .60$) for the older adolescents, 13.4 years ($SD = .50$) for the younger adolescents, 46.2 years ($SD = 4.00$) for the fathers, and 43.8 years ($SD = 3.57$) for the mothers. Of the older adolescents, 47% were girls, compared to 52% in the younger group. Concerning educational level, an equal distribution was realized, with about one third of the adolescents following low education, one third following intermediate general education, and one third following the highest level of secondary school. The different levels of the Dutch secondary school system are comparable with the different tracks within a middle class public high school in the USA, although they may not be completely interchangeable. In our sample, when compared to national Dutch figures, the intermediate general education is slightly underrepresented, while the low and high levels are slightly overrepresented (CBS 2007).

Procedure

The families were visited at home by a trained interviewer. In his or her presence all four family members individually filled out an extensive questionnaire, which took about 2 h to

complete. The participants were not allowed to consult each other or to discuss the answers. When all family members had completed the questionnaire, each family received 30 € (39 \$). In addition, after completion of the first three waves of the project, 5 traveler cheques of 1,000 € (1,300 \$) each were raffled among all participating families. Approval was obtained from the Central Committee on Research Involving Human Subjects on collecting the data.

Measure

Self-reports were used to measure parental problem drinking and adolescent alcohol use. The four parenting practices were based on adolescents’ reports, reflecting how they perceived their parents’ behaviors. The questions regarding the parenting variables were asked in such a way that the adolescents were able to discriminate between the parenting practices of their mothers and fathers.

Problem drinking

To measure the severity of fathers’ and mothers’ alcohol-related problems, both parents completed the problem drinking list of Cornel et al. (1994). The original scale was based on three commonly used instruments to measure problem drinking: CAGE (Cut down, Annoyed, Guilty, Eye-opener, CAGE is an acronym formed by taking the first letter of key words from each of the following questions; Mayfield et al. 1974), Short Michigan Alcohol Screening Test (SMAST; Selzer et al. 1975), and a shortened version of the Self-Administered Alcohol Screening Test (SAAST; Davis et al. 1987). Seriousness of problem drinking was developed as a Rasch scale with items arranged in order of increasing severity. The more severe the items, the less frequently they are scored positively. Since all requirements of the Rasch model were met, the items form a reliable and unidimensional scale (Cornel et al. 1994). Examples of items were ‘Do you ever drink alcohol to forget your concerns?’ (item 2) and ‘Have you ever lost your job because of your drinking’ (item 18). Respondents could respond 0 ‘no’, or 1, ‘yes’. Severity of problem drinking was reflected by the aggregated score with a maximum score of 18. Because of the skewness of the summed variable’s distribution, scores were categorized into 3 meaningful groups: 1 = never had problems due to alcohol; 2 = has had problems due to alcohol a couple of times, 3 = problem drinkers (see Cornel et al. 1994).

General parenting

To measure parental behavioral control, we used a Dutch translation of the scale developed by Kerr and Stattin (2000). The scale consisted of 5 items with response

categories ranging from 1 ‘no, never’ to 5 ‘yes, always’. Examples of items were: ‘Do you need to have your mother’s permission to stay out late on a weekday evening?’ and ‘Before you go out on a Saturday night, does your father require you to tell them where you are going and with whom?’. Internal consistencies as measured with Cronbach’s alphas ranged from .71 to .90 for the reports of both adolescents, about their mothers and fathers over the three waves.

To measure parental support, we used the Relationship Support Inventory (RSI; Scholte et al. 2001) tapping several aspects of emotional and instrumental support. Examples of items were ‘My mother shows me that she loves me’ and ‘My father supports me in what I do’. The adolescents had to answer 12 items on a scale from 1 ‘absolutely untrue’ to 5 ‘absolutely true’. The amount of support was the mean score on 12 items. Cronbach’s alpha coefficients were between .76 and .88 across the three waves.

Alcohol-specific parenting

Van der Vorst et al. (2005) developed a 10-item scale to measure the degree to which parents permit their children to consume alcohol. Examples of items were: ‘I am allowed to drink alcoholic consumptions when my mother/father is at home’ and ‘I am allowed to drink alcohol on weekdays’. Participants had to respond on a 5-point scale that ranged from 1 ‘completely applicable’ to 5 ‘not applicable at all’. The internal consistency was high, with Cronbach’s alphas between .89 and .92 over the three waves.

In addition, the general behavioral control scale of Kerr and Stattin (2000) was adapted to measure behavioral control aimed at affecting adolescents’ alcohol consumption. Examples of the 5 items were ‘Do you need your mother’s permission to drink alcohol on weekdays?’ and ‘Does your mother want to know whether your friends drink alcohol?’. As in the original scale, the response categories ranged from 1 ‘never’ to 5 ‘always’. Cronbach’s alpha coefficients were between .74 and .88 across the three waves.

Adolescent alcohol use

Intensity of drinking was assessed by questions that asked about the number of glasses consumed in the previous week, during weekdays and weekends, both outside and inside the house (Engels et al. 1999). The aggregated score on these four questions was used as an indication of the adolescents’ intensity of alcohol use (Van der Vorst et al. 2005). Because of the skewness in the distribution of this variable, total scores were categorized into 7 groups (0 = 0 glasses, 1 = 1–2 glasses, 2 = 3–5 glasses, 3 = 6–10 glasses, 4 = 11–20 glasses, 5 = 21–30 glasses, 6 = 31 glasses and above).

Strategy of analyses

For the descriptive part of the analyses we applied *t* tests, Pearson correlations and general linear modeling with repeated measures (the latter to test changes over time in alcohol-related problems and alcohol use). We performed cross-lagged path analyses (see Fig. 1), using version 4.1 of the Mplus statistical package (Muthén and Muthén 1998–2006), to test (a) to which degree parental alcohol-related problems, parental practices and alcohol use of adolescents were stable over time, (b) whether parental problem drinking was related to parental practices and alcohol use of the adolescent over time and (c) whether parental practices and alcohol use of the adolescent were cross-related over time (Finkel 1995).

Cross relations over time allow to test causal predominance: Are specific parenting practices the ‘cause’ of adolescent alcohol use, or does adolescent alcohol use provoke specific parenting practices (Byrne 1998)? Structural regression models are generally somewhat more sophisticated than the path models used in our study because they correct for measurement error (Kline 1998, p. 211). This controlling for error variance by means of latent variables that are measured by multiple manifest indicators plus their error variance, however, also increases the number of parameters to be estimated. In addition, more complex models, i.e., models with more parameters, require larger sample sizes than do more parsimonious models in order for the estimates to be comparably stable (Kline 1998, p. 111). Kline (1998) recommends a parameter—subjects ratio of 1:10. As such, we used path models in which one manifest parameter represented all the individual items of one scale by means of the mean or sum score. The model depicted in Fig. 1 was tested for each of the four parenting variables separately. A total of 4 (parenting variables) × 2 (fathers and mothers) = 8 models were tested. The variables at T1 and the disturbance terms of the variables at T2 and T3 were free to correlate. Because adolescent alcohol consumption and parental problem drinking were relatively skewed and the measurement level was ordered more categorical (ordinal) than interval, maximum likelihood estimation methods (demanding multivariate normal distributed variables) were less suited. We used the weighted least square method with adjusted mean- and variance chi-square (WLSMV) estimator, an estimation method specifically developed for ordered categorical dependent variables (Muthén and Muthén 1998–2006). To test model fit, standard chi-square tests as well as the number of degrees of freedom (df) were replaced by robust chi-square tests (mean- and variance-adjusted chi-squares) and estimates of df (Muthén and Muthén 1998–2004, pp. 19–20). The latter estimates are dependent on sample information and this explains why df with identical models can vary across different groups.

Together with the robust chi-square tests we used two fit measures: the Root Mean Square Error of Approximation (RMSEA; Byrne 1998; Steiger and Lind 1980), and the Comparative Fit Index (CFI) of Bentler (Bentler 1990). RMSEA is utilized to assess approximate fit preferably with values less than or equal to .05, but values between .05 and .08 are indicative of fair fit (Browne and Cudeck 1993). CFI is a comparative fit index, values above .95 are preferred (Kaplan 2000), but should not be lower than .90 (Kline 1998, see also Hu and Bentler 1999, and, for commentary on existing guidelines Marsh et al. 2004). Mplus has several possibilities to handle missing values depending on the estimation method used. In our case (using the WLSMV-estimator) all available information in the data was used by means of pair-wise information of each combination of two variables.

Results

Descriptives on alcohol consumption and problem drinking

Table 1 shows the means, standard deviations, and percentages of parental problem drinking. Fathers reported higher levels of problem drinking than mothers at all three waves, as was tested with separate *t* tests. (T1: $t(424) = 8.11$, $p < .001$; T2: $t(426) = 8.13$, $p < .001$; T3: $t(424) = 7.93$, $p < .001$). With general linear modeling repeated measures we tested whether maternal and paternal problem drinking differed over time (within factor). Both paternal and maternal problem drinking showed significant differences over time (for fathers: $F(2, 421) = 23.18$, $p < .001$, partial eta squared (PES) = .10, and for mothers: $F(2, 424) = 59.10$, $p < .001$, and $PES = .22$).¹ Subsequently carried out repeated contrasts revealed significant differences over time only from T1 to T2, for both parents ($p < .001$), but not from T2 to T3. At T1, the older adolescents consumed on average 4.36 glasses in the past week ($SD = 6.81$; T2: $M = 7.78$, $SD = 10.86$; T3: $M = 9.75$, $SD = 12.35$), compared to 1.23 glasses ($SD = 3.41$) consumed in the past week by the younger siblings (T2: $M = 3.70$, $SD = 8.99$; T3: $M = 6.22$, $SD = 10.32$). Older adolescents reported significantly higher

levels of alcohol consumption than younger adolescents at all three waves (T1: $t(417) = 9.30$, $p < .001$; T2: $t(414) = 6.85$, $p < .001$; T3: $t(405) = 5.09$, $p < .001$). Repeated measures showed a significant increase in alcohol consumption over time for both adolescents, for T1–T2, and T2–T3 (for older adolescents: $F(2, 394) = 34.15$, $p < .001$, $PES = .15$, and for younger adolescents: $F(2, 414) = 42.64$, $p < .001$, $PES = .17$).

Correlations between cross-sectional and longitudinal variables

Maternal and paternal problem drinking correlated positively, but marginally with adolescents' alcohol consumption ($.02 \leq r \leq .19$). Parental problem drinking correlated negatively with support ($-.18 \leq r \leq -.02$), and alcohol-specific behavioral control ($-.22 \leq r \leq -.01$), and positively with permissiveness ($.03 \leq r \leq .24$), while both positive and negative correlations were found between parental problem drinking and general behavioral control ($-.13 \leq r \leq .15$). Adolescent alcohol use correlated low to moderately with general behavioral control ($-.24 \leq r \leq -.05$), support ($-.15 \leq r \leq -.02$) and alcohol-specific behavioral control ($-.29 \leq r \leq -.03$), and positively with permissiveness ($.18 \leq r \leq .46$). General behavioral control correlated positively with support ($.11 \leq r \leq .40$) and negatively with permissiveness ($-.29 \leq r \leq -.02$). Moderate correlations existed between the general behavioral control scale and the alcohol-specific behavioral control scale ($.19 \leq r \leq .55$), indicating that they share the same basis, but can be seen as separate constructs. Correlation tables are available upon request.

Structural equation models

All models showed an acceptable fit (Table 2), with all Comparative Fit Indices (CFI) at least above .90 and all Root Mean Square Errors of Approximation (RMSEAs) below .08.

Alcohol-specific parenting: permissiveness and alcohol-specific behavioral control

Standardized regression weights (β) of parental problem drinking, permissiveness, alcohol-specific behavioral control, and adolescent alcohol consumption showed a strong stability over time, with values between .36 and .88 (see Table 3).

Regarding both the older and younger adolescents, no significant associations were found between parental problem drinking and parental permissiveness, with the exception of problem drinking of both fathers and mothers at T1 which was significantly and positively related to

¹ In trying to explain the significant increase in parental problem drinking from T1 to T2, while one would expect adult behavior to remain relatively stable, we examined whether Dutch national trends in alcohol use could account for this increase. However, the percentage of alcohol drinkers remained stable after 2000, and heavy use of alcohol (consuming more than six glasses of alcohol at least once a week) decreased with approximately 0.5% per year between 2000 and 2005 (CBS 2006). An alternative hypothesis refers to the effect that adolescent alcohol use may exert on parents. It might be that when adolescents start drinking on a more or less regular basis, this affects parents who in turn increase their alcohol consumption.

Table 1 Means, standard deviations and percentages of parental problem drinking (PD) and adolescent alcohol use (A) at Time 1 (T1), Time 2 (T2), and Time 3 (T3)

	T1			T2			T3		
	<i>M</i> *	<i>SD</i>	%**	<i>M</i> *	<i>SD</i>	%**	<i>M</i> *	<i>SD</i>	%**
PD father	1.84 ^a	2.18	19.4	2.33 ^b	1.99	25.5	2.21 ^b	2.00	22.7
PD mother	.87 ^a	1.57	5.6	1.44 ^b	1.51	8.4	1.42 ^b	1.49	9.1
A younger adolescent	1.22 ^a	3.41	n.a.	3.11 ^b	8.35	n.a.	5.27 ^c	9.76	n.a.
A older adolescent	4.37 ^a	6.80	n.a.	7.15 ^b	10.62	n.a.	8.79 ^c	12.08	n.a.

Note: **M* represents the mean score calculated from the aggregated scores of all 18 items (maximum score = 18) of which the problem drinking scale consists (Cornel and Knibbe 1994). **Percentages of problem drinkers are computed with a cut-off score > 3. n.a. = not applicable. Values for adolescent alcohol use (A) represent the intensity of alcohol use, i.e., the number of glasses of alcohol consumed in the past week. Fathers had significantly more alcohol-related problems than mothers at all three time points, with $p < .01$. Older adolescents reported significantly more alcohol than younger adolescents at all three time points. Means in the same row that do not share superscripts (a, b, c) are significantly different ($p < .001$)

Table 2 Fit indices for all models

	Father				Mother			
	PM	AS	BC	SU	PM	AS	BC	SU
df	26	30	30	26	27	30	29	28
χ^2	36.13	58.73	76.05	41.78	47.92	56.80	78.49	42.95
<i>p</i>	0.09	0.00	0.00	0.03	0.01	0.00	0.00	0.04
CFI	0.98	0.96	0.93	0.98	0.96	0.96	0.92	0.98
RMSEA	0.03	0.05	0.06	0.04	0.04	0.05	0.06	0.04

Note: PM = Permissiveness, AS = Alcohol-specific behavioral control, BC = Behavioral control, SU = Support. Each column represents one model with a specific parenting variable, separately for mothers and fathers

permissiveness towards the older adolescent at T2 (for fathers: $\beta = .11$, $p < .01$, for mothers: $\beta = .12$, $p < .01$). More problem drinking of the mother at T1 and T2 was significantly associated with more alcohol use of the older adolescent at T2 and drinking of the younger adolescent at T3, respectively ($\beta = .16$, $p < .01$; $\beta = .14$, $p < .01$). Problem drinking of the father at T2 was significantly and positively associated to alcohol use of the youngest adolescent at T3 ($\beta = .19$, $p < .001$). More parental permissiveness at T1 led to more alcohol use at T2 in both younger and older adolescents ($.12 \leq \beta \leq .17$, $p < .05$). This significant relation was not found between T2 and T3. We did not find that parents adapt their levels of permissiveness in response to adolescent alcohol use.

Paths from parental problem drinking at T2 on alcohol-specific behavioral control at T3 were significant for the father regarding both the older and younger adolescents (respectively $\beta = -.11$ and $\beta = -.14$, $p < .01$), and for the mother regarding the younger adolescent ($\beta = -.15$, $p < .01$). Problem drinking of the father at T2 related substantially to alcohol use of the younger adolescent at T3 ($\beta = .20$, $p < .001$). Problem drinking of the mothers affected both the older ($\beta = .18$, $p < .001$) and the younger adolescents' alcohol consumption ($\beta = .15$, $p < .01$). For the younger, but not for the older adolescents, more alco-

hol-specific behavioral control at T1 was related to lower levels of adolescent alcohol use at T2 ($\beta = -.23$, $p < .001$ for fathers, $\beta = -.24$, $p < .001$ for mothers). Adolescent alcohol use negatively affected alcohol-specific behavioral control of both parents ($.10 \leq \beta \leq .12$, $p < .05$)

General parenting: behavioral control and support

The standardized regression weights of parental problem drinking, support, behavioral control, and adolescent alcohol consumption showed a strong stability over time, with values between .42 and .85 (see Table 4).

Regarding both the older and younger adolescents, paths of both maternal and paternal problem drinking with behavioral control were generally not significant. Only maternal problem drinking at T2 showed a significant association with behavioral control towards the youngest adolescent at T3 ($\beta = -.12$, $p < .01$). Problem drinking of the mother at T1 and T2 was significantly associated with alcohol use of the older adolescent at T2 and drinking of the younger adolescent at T3, respectively ($\beta = .18$, $p < .001$, $\beta = .15$, $p < .01$). Problem drinking of the father at T2 related substantially to alcohol use of the younger adolescent at T3 ($\beta = .20$, $p < .001$). Considering the cross-lagged paths, more parental behavioral control at T2

Table 3 Structural parameters estimates of the alcohol-specific parenting practices, parental problem drinking (PD) and adolescent alcohol use (standardized beta weight)

	Permissiveness		Alcohol-specific behavioral control	
	Fathers	Mothers	Fathers	Mothers
<i>Stability paths</i>				
1. PD T1–PD T2	.79	.76	.80	.76
2. PD T2–PD T3	.82	.88	.82	.82
3. Parenting OA T1–Parenting OA T2	.68	.67	.55	.55
4. Parenting OA T2–Parenting OA T3	.73	.73	.64	.64
5. Alcohol use OA T1–Alcohol use OA T2	.46	.47	.55	.54
6. Alcohol use OA T2–Alcohol use OA T3	.66	.66	.67	.67
7. Parenting YA T1–Parenting YA T2	.75	.76	.50	.49
8. Parenting YA T2–Parenting YA T3	.76	.76	.49	.48
9. Alcohol use YA T1–Alcohol use YA T2	.36	.37	.42	.42
10. Alcohol use YA T2–Alcohol use YA T3	.55	.54	.59	.57
<i>Paths from PD</i>				
11. PD T1–Parenting OA T2	.11**	.12**	.07	–.08
12. PD T2–Parenting OA T3	.05	.03	–.11**	–.07
13. PD T1–Alcohol use OA T2	.08	.16**	.09	.18***
14. PD T2–Alcohol use OA T3	.02	.02	.03	.03
15. PD T1–Parenting YA T2	.07	.03	.05	–.02
16. PD T2–Parenting YA T3	.05	.04	–.14**	–.15**
17. PD T1–Alcohol use YA T2	.00	–.02	.00	–.03
18. PD T2–Alcohol use YA T3	.19***	.14**	.20***	.15**
<i>Cross-lagged paths</i>				
19. Parenting OA T1–Alcohol use OA T2	.15**	.12*	.05	.04
20. Parenting OA T2–Alcohol use OA T3	.02	.03	–.02	–.07
21. Alcohol use OA T1–Parenting OA T2	–.01	.01	–.07	–.05
22. Alcohol use OA T2–Parenting OA T3	–.04	–.04	–.10*	–.09
23. Parenting YA T1–Alcohol use YA T2	.17**	.17**	–.23***	–.24***
24. Parenting YA T2–Alcohol use YA T3	.04	.05	.05	–.03
25. Alcohol use YA T1–Parenting YA T2	.01	.02	–.02	–.10*
26. Alcohol use YA T2–Parenting YA T3	.01	.01	–.12*	–.10*
27. Alcohol use OA T1–Alcohol use YA T2	.08	.09	.09	.09
28. Alcohol use OA T2–Alcohol use YA T3	.11*	.12*	.09	.11*

Note: PD = Parental Problem Drinking, OA = Older Adolescent, YA = Younger Adolescent. All stability paths are significant at $p < .001$. The numbered paths in the table correspond to the arrowed paths depicted in Fig. 1

* $p < .05$, ** $p < .01$, *** $p < .001$

was associated with less alcohol consumption of the older adolescents at T3 ($\beta = -.11, p < .05$ for fathers, $\beta = -.18, p < .001$ for mothers), but not from T1 to T2. Younger adolescents also consumed less alcohol at T2 when their parents exerted more behavioral control at T1 ($\beta = -.15, p < .01$ for fathers, $\beta = -.14, p < .01$ for mothers). In addition, older adolescents’ drinking at T2 negatively affected parental behavioral control at T3 ($\beta = -.12, p < .01$ for fathers, $\beta = -.14, p < .01$ for mothers), indicating that when older adolescents drank more, parents exerted less general behavioral control. This result was not found for the younger adolescent.

No significant associations were found between parental problem drinking and the support parents provide to both the younger and older adolescent. Paternal problem drinking at T2 directly affected alcohol use of the younger adolescent at T3 ($\beta = .20, p < .001$). Mothers’ problem drinking at T1 and T2 affected alcohol use of the older adolescent at T2, and drinking of the younger adolescent at T3, respectively ($\beta = .18, p < .001$; $\beta = .14, p < .01$). More parental support at T1 was related to less alcohol use of the younger adolescents at T2 ($\beta = -.10, p < .05$ for fathers, $\beta = -.15, p < .01$ for mothers). These associations were not found between T2 and T3, nor for the older

Table 4 Structural parameters estimates of general parenting practices, parental problem drinking (PD) and adolescent alcohol use (standardized beta weight)

	Behavioral control		Support	
	Fathers	Mothers	Fathers	Mothers
<i>Stability paths</i>				
1. PD T1–PD T2	.80	.73	.81	.77
2. PD T2–PD T3	.83	.82	.85	.80
3. Parenting OA T1–Parenting OA T2	.61	.64	.76	.73
4. Parenting OA T2–Parenting OA T3	.70	.70	.76	.72
5. Alcohol use OA T1–Alcohol use OA T2	.54	.53	.53	.53
6. Alcohol use OA T2–Alcohol use OA T3	.66	.66	.67	.67
7. Parenting YA T1–Parenting YA T2	.66	.63	.70	.67
8. Parenting YA T2–Parenting YA T3	.63	.73	.69	.70
9. Alcohol use YA T1–Alcohol use YA T2	.43	.42	.43	.42
10. Alcohol use YA T2–Alcohol use YA T3	.58	.57	.59	.57
<i>Paths from PD</i>				
11. PD T1–Parenting OA T2	.03	–.06	.00	.07
12. PD T2–Parenting OA T3	–.05	–.04	–.06	–.01
13. PD T1–Alcohol use OA T2	.09	.18***	.10	.18***
14. PD T2–Alcohol use OA T3	.03	.00	.03	.02
15. PD T1–Parenting YA T2	.06	.00	.08	.03
16. PD T2–Parenting YA T3	–.04	–.12**	–.03	–.06
17. PD T1–Alcohol use YA T2	.00	.00	.00	–.01
18. PD T2–Alcohol use YA T3	.20***	.15**	.20***	.14**
<i>Cross-lagged paths</i>				
19. Parenting OA T1–Alcohol use OA T2	.04	.03	–.04	–.07
20. Parenting OA T2–Alcohol use OA T3	–.11*	–.18***	–.02	–.02
21. Alcohol use OA T1–Parenting OA T2	–.07	–.05	–.01	–.02
22. Alcohol use OA T2–Parenting OA T3	–.12**	–.14**	–.06	.01
23. Parenting YA T1–Alcohol use YA T2	–.15**	–.14**	–.10*	–.15**
24. Parenting YA T2–Alcohol use YA T3	–.05	–.08	.07	–.01
25. Alcohol use YA T1–Parenting YA T2	–.04	–.09*	–.11**	–.08*
26. Alcohol use YA T2–Parenting YA T3	–.05	–.07	.02	–.02
27. Alcohol use OA T1–Alcohol use YA T2	.10*	.09	.09	.10
28. Alcohol use OA T2–Alcohol use YA T3	.10*	.10*	.11*	.11*

Note: PD = Parental Problem Drinking, OA = Older Adolescent, YA = Younger Adolescent. All stability paths are significant at $p < .001$. The numbered paths in the table correspond to the arrowed paths depicted in Fig. 1

* $p < .05$, ** $p < .01$, *** $p < .001$

adolescents. In addition, more alcohol use of the older adolescents at T1 was associated with less parental support at T2 ($\beta = -.11$, $p < .01$ for father, $\beta = -.08$, $p < .05$ for mothers).

Additional analyses

We also tested whether older adolescents influenced their younger siblings in drinking behavior. Results showed that alcohol consumption of the older adolescents tended to directly affect alcohol use of the younger adolescent ($.10 \leq \beta \leq .12$, $p < .05$).

Discussion

The aim of the present study was to gain insight into the associations between parental problem drinking, parenting, and adolescent alcohol use in a sample of Dutch families. The first main finding shows that, except for alcohol-specific behavioral control, parental problem drinking does not structurally affect parenting over time. More alcohol-related problems did not result in less behavioral control, less general support, or higher permissiveness. Our results differ from those of other studies in which significant relations between parental

problem drinking and parenting were found (Chassin et al. 1993; King and Chassin 2004; Rutherford et al. 1997). These differences could be due to methodological issues, as problem drinking or alcoholism in the latter studies were often diagnosed in conformity with the DSM-IV criteria, whereas we concentrated on a broader range of alcohol-related problems in a community sample. Thus, because of our assessment of problem drinking,² instead of alcohol dependence or abuse, and because of our focus on a community sample instead of a clinical sample, the present study reflects the situation in the general population, and as such enhances the generalizability of the findings. Another explanation for the non-significant relation between parental problem drinking and general parenting comes from the buffering hypothesis, which states that “support protects persons from the potentially pathogenic influence of stressful events” (Cohen and Wills 1985, p. 310). Accordingly, children of one problem-drinking parent may be protected from the parent’s inadequate parenting by the support and adequate parenting of the other (non-problem drinking) parent. A buffering mechanism has been reported in the literature. For example, Van Aken and Asendorpf (1997) found that low support from one parent could be compensated by support from the other parent in affecting adolescent self-esteem. In addition, peer friendships, positive peer relations and family cohesion have each shown to be a protective factor against children’s externalizing problems in family conflict situations (Criss et al. 2002; Farrell et al. 1995). With respect to problem drinking, the possibility of enhancing resiliency in children and adolescents, by protecting against possible harmful influences from one parent by a strong relationship with the other parent, siblings, or peers, should be a topic of examination in future research. In addition, with regard to the persons in our sample, being part of a stable, nuclear family that consists of two biological parents with two or more children living together may be protective in itself.

Our findings do not imply that problem drinking has no effect on personal cognition or functioning, but suggest that parents are able to regulate their problem behavior with regard to their children and parenting practices. However, parental problem drinking may affect

the way in which parents handle alcohol use within the family. Parents with more alcohol-related problems are not more permissive than parents who do not have these problems. Maintaining the set rules by means of alcohol-specific behavioral control, however, does appear to be a problem.

Our second main finding is that higher levels of behavioral control, support, rules, and alcohol-specific behavioral control account for less alcohol consumption in mainly the younger adolescents, which corresponds with the literature on this topic (e.g., Kerr and Stattin 2000; Van der Vorst et al. 2005, 2006). Alcohol-specific rule setting played an important role in drinking of both the younger and older adolescents. When parents were more permissive toward alcohol use, adolescents reported higher levels of drinking, which is in accordance with other studies on rule enforcement and adolescent alcohol use (Jackson et al. 1999; Van der Vorst et al. 2005; Van Zundert et al. 2006; Yu 2003). However, support and both general and alcohol-specific behavioral control were only associated with less alcohol use of the younger adolescent, up to the age of about 14 years. For older adolescents the effect of parenting disappeared, and parental problem drinking was found to directly affect adolescent alcohol use. In explaining this pattern, it might be that parenting exerts influence before and during the initiation phase of alcohol use, which in Dutch adolescents takes place around the age of 14 years (Poelen et al. 2005), but that parenting is no longer important once the habitual drinking pattern has been established (DeCourville 1995). Further, it has been suggested that genetic effects increase in importance over time during late adolescence, whereas environmental factors decrease in importance. Twin studies have indeed shown that shared environmental factors, such as parenting, play a profound role in the initiation of alcohol use, but that genetic factors are more important in frequency of alcohol use and problem drinking in young adulthood (see Hopfer et al. 2003; Pagan et al. 2006). Moreover, during adolescence, parental factors decrease in importance, whereas the influence of peers increases, making the latter a strong predictor for adolescent drinking (Fergusson et al. 1995). As such, shared environmental factors, such as parenting and parental modeling, affect alcohol consumption in young adolescence. Drinking in later adolescence may be related to other, non-shared factors, such as genes and peer drinking. Accordingly, future research should apply a longitudinal, behavioral genetic design, preferably examining the different stages of adolescent drinking (initiation, frequency of consumption, drinking to intoxication) in order to partial out the different effects of genetic and environmental factors.

² To examine whether the differing results were due to the current measurement of alcohol problems we adjusted the thresholds to create a more ‘extreme’ group of problem drinkers (score ≥ 4). However, subsequently carried out new analyses did not show significantly stronger effects when compared to the earlier analyses. As such we did not change our initial thresholds.

Our third main finding considers the reciprocal associations between adolescent alcohol use and parental behaviors. More adolescent alcohol use made parents decrease their levels of general and alcohol-specific behavioral control over time. Levels of support were also negatively adjusted in response to adolescent alcohol use, but only in the younger adolescents. Our findings concur with recent studies that also reported bidirectional findings between parenting practices and adolescent substance use (Huver et al. 2006; Stice and Barrera 1995; Van der Vorst et al. 2006). However, parents did not adjust their levels of permissiveness in response to adolescent alcohol use. Perhaps rule-setting is more stable over time, and is not affected by fluctuations in adolescent alcohol use. The application of those rules, however, by means of exerting control, was influenced by the levels of alcohol that adolescents consumed. Since our study is one of the first to examine reciprocal effects between adolescent drinking and parental factors, more research on this topic is warranted.

Regarding differences between fathers and mothers, we found that maternal, but not paternal problem drinking was directly associated with alcohol use of the oldest adolescent. This is a remarkable finding, considering the fact that in most parenting studies with a focus on alcoholism or problem drinking, women are underrepresented (e.g., Chassin et al. 1993). Future research should specifically include mothers in studies regarding alcoholic or problem-drinking parents.

Limitations

Despite the advantages of our study, such as multi-informant data, longitudinal design and the testing of reciprocal associations in path analyses, some limitations should be addressed. First, we did not further examine relationships in subgroups (for example, sex differences) because of a lack of statistical power and, subsequently, the risk of making Type II errors. Nonetheless it should be stressed that in this type of longitudinal study with a full-family design, the sample size was substantial and the low attrition rates over the three waves were remarkable. Second, parental factors explained only a small part of the variance in adolescent drinking. However, finding small effects does not imply that parental factors are unimportant. The finding that parenting influences adolescent alcohol consumption can have large practical implications (see Abelson 1985). Third, parents may have under-reported their alcohol-related problems because of social desirability and adolescents may have under-reported their alcohol use because of the presence of their parents at home while filling in the questionnaires. In an attempt to anticipate these biases, and to ensure confidentiality, the

questionnaires had to be completed individually and separately, without the possibility for family members to discuss the answers. In addition, studies have shown that self-reports concerning alcohol use are a reliable source of information (Engels et al. 2007). Fourth, although the sample was carefully selected, the results cannot be generalized to the whole Dutch population, because of the lack of for example, single-parent families and step-families. Fifth, in the Netherlands the legal age to drink beer and wine is 16, and the legal age to drink liquor is 18. This may make it difficult to compare previous research from the USA, where the legal age to drink is 21, with our results. Sixth, it might be that the initial measurements triggered follow-up discussions about alcohol use within families, which might have acted as an intervention. However, since our study is longitudinal and ongoing, we did not want to encourage any speculations or thoughts on the content of the questionnaires which might affect the following measurements, and as such we did not consult the families on these matters. Seventh, in our questionnaires, the definition of “glasses” of alcohol was left up to the respondents to interpret. This may have lead to a reporter bias in the exact amount of alcohol consumed because of different (non-standard) glass sizes. However, measurement of the precise amount of alcohol consumed is rather difficult to realize in our current study design. Experimental designs or diary studies will be able to more accurately measure and control the precise quantity of consumed alcohol. See Kerr et al. (2005) for an elaborated discussion on this topic.

Taking these limitations into account, this study is the first to disentangle the prospective relations between parental alcohol-related problems, parenting, and adolescent alcohol use in a community sample using multi-informant data. The results show that parental problem drinking does not substantially and systematically affect parenting, and that parenting influences adolescent alcohol use, but only up to the age of about 14 years. This implies that shared environment factors (e.g., parenting and modeling effects) influence the development of alcohol use in young adolescents. When adolescents grow older, and move out of the initiation phase, their drinking behavior may be more affected by other factors, such as genetic susceptibility and peer drinking.

Acknowledgement This study was financed by grants from the Dutch Organization of Scientific Research, and the Behavioural Science Institute.

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Appendix

Table A Means and standard deviations of parenting from the perspective of younger and older adolescents over fathers and mothers at Time 1 (T1), Time 2 (T2), and Time 3 (T3)

	Fathers			Mothers		
	T1	T2	T3	T1	T2	T3
Permissiveness younger adolescent	1.95 (.80)	2.45 (.86)	2.88 (.90)	1.95 (.80)	2.45 (.86)	2.88 (.90)
Permissiveness older adolescent	2.74 (.94)	3.29 (.87)	3.56 (.82)	2.74 (.94)	3.29 (.87)	3.56 (.82)
Alcohol-specific control younger adolescent	3.07 (1.03)	2.91 (1.04)	2.64 (.95)	3.28 (.93)	3.15 (.93)	2.90 (.91)
Alcohol-specific control older adolescent	2.66 (1.02)	2.37 (.90)	2.10 (.83)	2.93 (.96)	2.67 (.87)	2.35 (.80)
Behavioral control younger adolescent	3.72 (.89)	3.57 (.95)	3.45 (.90)	4.08 (.66)	4.02 (.73)	3.91 (.75)
Behavioral control older adolescent	3.47 (.99)	3.28 (.98)	2.94 (.98)	4.00 (.76)	3.75 (.83)	3.38 (.91)
Support younger adolescent	3.95 (.48)	3.85 (.52)	3.87 (.54)	4.12 (.40)	4.08 (.44)	4.06 (.47)
Support older adolescent	3.93 (.53)	3.89 (.53)	3.86 (.52)	4.12 (.41)	4.09 (.43)	4.07 (.41)

Note: Values represent means. Standard deviations are between brackets. All scales range from 1 (least 'permissive') to 5 (most 'permissive')

References

- Abelson, R. P. (1985). A variance explanation paradox: When a little is a lot. *Psychological Bulletin*, *97*, 128–132.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs: Prentice-Hall.
- Barnes, G. M., Farrell, M. P., & Banerjee, S. (1994). Family influences on alcohol abuse and other problem behaviors among Black and White adolescents in a general population sample. *Journal of Research on Adolescence*, *4*, 183–201.
- Bentler, P. M. (1990). Comparative fit indexes in structural equation models. *Psychological Bulletin*, *107*, 238–246.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In: Bollen, K. A. & Long, J. S. (Eds.). *Testing structural equation models* (pp. 136–162). Beverly Hills: Sage.
- Byrne, B. M. (1998). *Structural equation modeling with LISREL, PRELIS and SIMPLIS: Basic concepts, applications, and programming*. Mahwah: Lawrence Erlbaum Associates.
- CBS: Statistics Netherlands (2006). *Gezondheid en zorg in cijfers 2006* [Health and care statistics 2006]. Retrieved November 8, 2007 from <http://www.cbs.nl>.
- CBS: Statistics Netherlands (2007). *Jaarboek onderwijs in cijfers 2007* [Yearbook figures regarding education 2007]. Retrieved July 10, 2007 from <http://www.cbs.nl>.
- Chassin, L., & Barrera, M., Jr. (1993). Substance use escalation and substance use restraint among adolescent children of alcoholics. *Psychology of Addictive Behaviors*, *7*, 3–20.
- Chassin, L., Curran, P. J., Hussong, A. M., & Colder, C. R. (1996). The relation of parent alcoholism to adolescent substance use: A longitudinal study. *Journal of Abnormal Psychology*, *105*, 70–80.
- Chassin, L., Pillow, D. R., Curran, P. J., Brooke, S. G., & Barrera, M., Jr. (1993). Relation of parental alcoholism to early adolescent substance use: A test of three mediating mechanisms. *Journal of Abnormal Behavior*, *102*, 3–19.
- Cohen, S., & Wills, T. A. (1985). Stress, social support and the buffering hypothesis. *Psychological Bulletin*, *98*, 310–357.
- Cornel, M., Knibbe, R. A., van Zutphen, W. M., & Drop, M. J. (1994). Problem drinking in a general practice population: the construction of an interval scale for severity of problem drinking. *Journal of Studies on Alcohol*, *55*, 466–470.
- Criss, M. M., Pettit, G. S., Bates, J. E., Dodge, K. A., Lapp, A. L. (2002). Family adversity, positive peer relationships, and children's externalizing behavior: A longitudinal perspective on risk and resilience. *Child Development*, *73*, 1220–1237.
- Davis, L. J., Hurt, R. D., Jr., Morse, R. M., & O'Brien, P. C. (1987). Discriminant analysis of the Self-Administered Alcoholism Screening Test. *Alcoholism: Clinical and Experimental Research*, *11*, 265–268.
- DeCourville, N. H. (1995). Testing the applicability of problem behavior theory to substance use in a longitudinal study. *Psychology of Addictive Behaviors*, *9*, 53–66.
- Engels, R. C. M. E., Knibbe, R. A., & Drop, M. J. (1999). Why do late adolescents drink at home? A study on psychological well-being, social integration and drinking context. *Addiction Research*, *7*, 31–46.
- Engels, R. M. C. E., & Van der Vorst, H. (2003). The roles of parenting in adolescent and peer alcohol consumption. *Netherlands' Journal of Social Sciences*, *39*, 53–68.
- Engels, R. C. M. E., Van der Vorst, H., Dekovic, M., & Meeus, W. (2007). Correspondence in collateral and self reports on alcohol consumption: A within family analysis. *Addictive Behaviors*, *32*, 1016–1030.
- Farrell, M. P., Barnes, G. M., & Banerjee, S. (1995). Family cohesion as a buffer against the effects of problem-drinking fathers on psychological distress, deviant behavior, and heavy drinking in adolescents. *Journal of Health and Social Behavior*, *36*, 377–385.
- Fergusson, D. M., Horwood, L. J., & Lynskey, M. T. (1995). The prevalence and risk factors associated with abusive or hazardous alcohol consumption in 16-year-olds. *Addiction*, *90*, 935–946.
- Finkel S. E. (1995). *Causal analysis with panel data*. Thousand Oaks: Sage Publications.
- Harakeh, Z., Scholte, R. H. J., De Vries, H., & Engels, R. (2005). Parental rules and communication: their association with adolescent smoking. *Addiction*, *100*, 862–870.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol use and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, *112*, 64–105.
- Hill, S. Y., Shen, S., Lowers, L., & Locke, J. (2000). Factors predicting the onset of adolescent drinking in families at high risk for developing alcoholism. *Biological Psychiatry*, *48*, 265–275.

- Hopfer, C. J., Crowley, T. J., & Hewitt, J. K. (2003). Review of twin and adoption studies of adolescent substance use. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*, 710–719.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.
- Huver, R. M. E., Engels, R. C. M. E., Vermulst, A. A., & de Vries, H. (2006). Bi-directional relations between anti-smoking parenting practices and adolescent smoking. *Health Psychology*. Manuscript accepted for publication.
- Jackson, C., Henriksen, L., & Dickinson, D. (1999). Alcohol-specific socialization, parenting behaviors and alcohol use by children. *Journal of Studies on Alcohol*, *60*, 362–367.
- Kaplan, D. (2000). *Structural equation modeling: Foundations and extensions*. Thousand Oaks: Sage Publications.
- Kerr, M., & Stattin, H. (2003). Parenting of adolescents: Action or reaction? In A. C. Crouter & A. Booth (Eds.), *Children's influence on family dynamics: The neglected side of family relationships* (pp. 121–151). Mahwah: Lawrence Erlbaum Associates.
- Kerr, M., & Stattin, H. (2000). What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology*, *36*, 366–380.
- Kerr, W. C., Greenfield, T. K., Tujague, J., & Brown, S. E. (2005). A drink is a drink? Variation in the amount of alcohol contained in beer, wine and spirits drinks in a US methodological sample. *Alcoholism: Clinical and Experimental Research*, *29*, 2015–2021.
- King, K. M., & Chassin, L. (2004). Mediating and moderating effects of adolescent behavioral undercontrol and parenting in the prediction of drug use disorders in emerging adulthood. *Psychology of Addictive Behaviors*, *18*, 239–249.
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: The Guilford Press.
- Lieb, R., Merikangas, K. R., Höfler, M., Pfister, H., Isensee, B., & Wittchen, H. U. (2002). Parental alcohol use disorders and alcohol use and disorders in offspring: A community study. *Psychological Medicine*, *32*, 63–78.
- Marsh, H. W., Hau, K., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, *11*, 320–341.
- Mayes, L. C., & Truman, S. D. (2002). Substance abuse and parenting. In M. H. Bornstein (Eds.), *Handbook of parenting*. (pp. 329–359). Mahwah: Lawrence Erlbaum Associates.
- Mayfield, D., McLeod, G., & Hall, P. (1974). The CAGE questionnaire: Validation of a new alcoholism screening instrument. *American Journal of Psychiatry*, *131*, 1121–1123.
- Muthén, B. O. (1998–2004). *Mplus technical appendices*. Los Angeles: Muthén & Muthén.
- Muthén, L. A., & Muthén, B. O. (1998–2006). *Mplus user's guide* (4th ed.). Los Angeles: Muthén & Muthén.
- NIAAA: National Institute on Alcohol Abuse and Alcoholism. (1997). *Ninth Special Report to the U.S. Congress on Alcohol and Health*. Bethesda: The Institute.
- Newes-Adeyi, G., Chen, C. M., Williams, G. D., & Faden, V. B., Surveillance Report #74. (2005). *Trends in Underage Drinking in the United States, 1991–2003*. Bethesda: NIAAA, Division of Epidemiology and Prevention Research, Alcohol Epidemiologic Data System, e-pub at <http://www.pubs.niaaa.nih.gov/publications/surveillance74/Underage03.htm>.
- Pagan, J. L., Rose, R. J., Viken, R. J., Pulkkinen, L., Kaprio, J., & Dick, D. M. (2006). Genetic and environmental influences on stage of alcohol use across adolescence and into young adulthood. *Behavior Genetics*, *36*, 483–497.
- Poelen, E. A. P., Scholte, R. H. J., Engels, R. C. M. E., Boomsma, D. I., & Willemsen, G. (2005). Prevalence and trends of alcohol use and misuse among adolescents and young adults in the Netherlands from 1993 to 2000. *Drug and Alcohol Dependence*, *79*, 413–421.
- Russell, M., Cooper, M. L., & Frone, M. R. (1990). The influence of sociodemographic characteristics on familial alcohol problems: Data from a community sample. *Alcoholism: Clinical and Experimental Research*, *14*, 221–226.
- Rutherford, M. J., Cacciola, J. S., Alterman, A. I., McKay, J. R., & Cook, T. J. (1997). Young men's perceived quality of parenting based on familial history of alcoholism. *Journal of Child and Adolescent Substance Use*, *6*, 43–56.
- Scholte, R. H. J., Van Lieshout, C. F. M., & Van Aken, M. A. G. (2001). Perceived relational support in adolescence: Dimensions, configurations, and adolescent adjustment. *Journal of Research on Adolescence*, *1*, 71–94.
- Selzer, M. L., Vinokur, A., & Van Rooijen, L. A. (1975). A self-administered Short Michigan Screening Test (SMAST). *Journal of Studies on Alcohol*, *36*, 117–126.
- Sher, K. J. (1991). *Children of alcoholics: A critical appraisal of theory and research*. Chicago: The University of Chicago Press.
- Sher, K. J., Wallitzer, K. S., Wood, P. K., & Brent, E. E. (1991). Characteristics of children of alcoholics: Putative risk factors, substance use and abuse, and psychopathology. *Journal of Abnormal Psychology*, *100*, 427–448.
- Steiger, J. H., & Lind, J. D. (1980). Statistically based tests for the number of common factors. *Paper presented at the annual meeting of the Psychometric Society, Iowa City, IA*.
- Stice, E., & Barrera, M., Jr. (1995). A longitudinal examination of the reciprocal relations between perceived parenting and adolescents' substance use and externalizing behaviors. *Developmental Psychology*, *31*, 322–334.
- Van Aken, A. G., & Asendorpf, J. B. (1997). Support by parents, classmates, friends and siblings in preadolescence: Covariation and compensation across relationships. *Journal of Social and Personal Relationships*, *14*, 79–93.
- Van der Vorst, H., Engels, R. C. M. E., Meeus, W., Dekovic, M., & Van Leeuwe, J. (2005). The role of alcohol-specific socialization in adolescents' drinking behavior. *Addiction*, *100*, 1464–1476.
- Van der Vorst, H., Engels, R. C. M. E., Meeus, W., Dekovic, M., & Vermulst, A. (2006). Parental attachment, parental control and early development of alcohol use: a longitudinal study. *Psychology of Addictive Behaviors*, *20*, 107–116.
- Van Dijk, D., & Knibbe, R. A. (2005). *De prevalentie van probleemdrinken in Nederland: Een algemeen bevolkingsonderzoek [The prevalence of problem drinking in the Netherlands: A general population study]*. University of Maastricht, The Netherlands: Ministry of Public Health, Well-Being, and Sports.
- Van Dorsselaer, S., Zeijl, E., Van den Eeckhout, S., Ter Bogt, T., & Vollebergh, W. (2007). *HBSC 2005: Gezondheid en welzijn van jongeren in Nederland*. [Health and well-being of adolescents in the Netherlands]. Uitgave Trimbos-instituut 2007. ISBN: 978–90–5253–575–3.
- Van Zundert, R., Van der Vorst, H., Vermulst, A. A., & Engels, R. C. M. E. (2006). Parenting and parental alcohol use as related to drinking in children in regular and special education. *Journal of Family Psychology*, *20*, 456–467.
- Walitzer, K. S., & Connors, G. J. (1999). Treating problem drinking. *Alcohol Research and Health*, *23*, 138–143.
- Wood, M. D., Read, J. P., Mitchell, R. E., & Brand, N. H. (2004). Do parents still matter? Parent and peer influences on alcohol involvement among recent high school graduates. *Psychology of Addictive Behaviors*, *18*, 19–30.
- Yu, J. (2003). The association between parental alcohol-related behaviours and children's drinking. *Drug and Alcohol Dependence*, *69*, 253–262.