

Do Parents and Best Friends Influence the Normative Increase in Adolescents' Alcohol Use at Home and Outside the Home?*

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ABSTRACT. Objective: The present study explored the possible impact of parental supervision of adolescents' alcohol use and drinking with parents on concurrent and prospective associations between adolescents' drinking at home and drinking outside the home. The impact of drinking with their best friend, parental drinking behaviors, and sibling influence on adolescent alcohol use were also examined, as well as whether drinking at home and outside the home predicted problem drinking. **Method:** We used three waves of longitudinal full-family data (fathers, mothers, and two adolescent siblings; $N = 428$). **Results:** Bi-directional effects between drinking at home and drinking outside the home were found for both adolescents, with drinking in one setting predicting drinking in

another setting over time. Both drinking at home and drinking outside the home predicted subsequent problem drinking. These associations did not differ as a function of adolescents drinking with parents or their best friend or of parental supervision of adolescents' alcohol use. Only adolescents' gender seemed to moderate these effects but solely in mid-adolescence. For 15-year-old boys (but not for girls), at-home drinking predicted outside-the-home drinking 1 year later. **Conclusions:** Taken together, adolescents' alcohol use increases over time, regardless of setting or with whom they drink. According to these results, prevention workers should focus on making parents more aware of their role in delaying the age at drinking onset. (*J. Stud. Alcohol Drugs*, 71, 105-114, 2010)

IN MANY EUROPEAN COUNTRIES, adolescents' alcohol use is a major health problem (Hibell et al., 2004). Hazardous and harmful drinking patterns of adolescents have been linked to a broad area of problems, including aggression, delinquency, and problem drinking (e.g., Pedersen and Skondal, 1998; Verdurmen et al., 2005). The alarming trends of alcohol use among European youth have received increased attention in the media and from national governments, with the general consensus being that these patterns should be stopped and preferably reversed (Muscat et al., 2007). Prevention is an important way to try to reduce adolescents' likelihood of (heavy) alcohol use. However, many programs aimed at preventing adolescents' alcohol use have not been very effective (Cuijpers, 2002; White and Pitts, 1998), with results varying as a function of the specific approach, goals, and focus (Spath et al., 2008; Tobler et al., 2000). Most of these programs have focused on adolescents themselves, for example, teaching them how to resist peer pressure or changing their attitudes toward drinking (Cuijpers, 2002; Tobler et al., 2000; White and Pitts, 1998). However, the orientation of some alcohol prevention efforts

has shifted to the role of parents in adolescents' alcohol use (Dusenbury, 2000; Perry et al., 2000; Spoth et al., 2004). One of the current tendencies in The Netherlands is to advise parents to supervise the drinking of their adolescent children at home. Parents are also told to drink with their children at home as the children enter adolescence. The underlying reason is that parents can socialize their children's alcohol use, and therefore they will limit their children's future drinking in other situations. This advice has also been suggested by non-Dutch European scholars (e.g., Bellis et al., 2007). The question is this: Are these recommendations supported by empirical evidence? That is, does parental supervision of adolescent alcohol use or drinking with their children at home actually lower the (normative) increase of youth alcohol use? The present study addressed this question by examining the moderating effect of parental supervision of adolescents' alcohol use and adolescents drinking with parents on prospective associations between adolescents' drinking at home and drinking outside the home. Alternative models testing links to subsequent problematic drinking, as well as parental and sibling drinking behaviors, were also examined.

Adolescent drinking at home and outside the home

Previous findings suggest that the contextual setting in which alcohol use takes place is an important factor in the amount of alcohol adolescents consume (Forsyth and Barnard, 2000; Wells et al., 2005). For instance, drunkenness and heavy drinking occur more often in settings without adult supervision (Beck and Treiman, 1996; Forsyth and Barnard,

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2000). Moreover, adolescents are less likely to get drunk or to be involved in alcohol-related problems if alcohol use occurs at home rather than outside the home (Forsyth and Barnard, 2000; Mayer et al., 1998; Wells et al., 2005). This may be because of parental supervision or because adolescents do not feel comfortable being drunk in the presence of their parents (e.g., Bahr et al., 2005; Callas et al., 2004). In contrast with these apparently beneficial consequences for adolescents, other studies suggest drinking at home also has negative outcomes. Adolescents who start to drink at home, usually during a family gathering, tend to have earlier ages at first use (Warner and White, 2003), which, in turn, places them at an increased risk for problem drinking or alcohol misuse later in life (e.g., Fergusson et al., 1994; Hawkins et al., 1997). Drinking at home also is one of the most common drinking locations for early adolescents (Forsyth and Barnard, 2000; Mayer et al., 1998), and adolescents who drink at home tend to drink more frequently (Long Foley et al., 2004).

To date, most of the studies have been cross-sectional, which makes it impossible to determine whether drinking at home leads to increases in subsequent drinking at home and increased drinking outside the home (e.g., in public drinking places and at parties with friends). There are some studies suggesting that at-home drinking is a risk factor for future drinking. For instance, drinking at home seems to lead to drinking in other settings, such as bush parties (i.e., organized, large gatherings of youth in a forest or field; Stoduto et al., 1998). Adolescents who are allowed to drink at home seem to be more likely to consume alcohol, be drunk, and be involved in heavy episodic drinking 2 years later (Jackson et al., 1999; Komro et al., 2007). Moreover, previous drinking is one of the strongest predictors of future alcohol use (e.g., van der Vorst et al., 2007). In sum, drinking at home may have some beneficial effects, such as lower risk for drunkenness, although it might have negative consequences as well, namely more frequent drinking and earlier initiation. Therefore, it remains unclear whether supervising and drinking with youth at home have protective or exacerbating effects on the development of youth alcohol use.

Parental drinking with adolescents

Drinking at home does not necessarily mean that adolescents are drinking *with* their parents. They might drink alone or drink with their friends at home. Only a few studies also took into account the effects of adolescents actually drinking alcohol with their parents. These studies showed adolescents consume fewer drinks and are less involved in heavy episodic drinking when they were drinking with parents than with friends or acquaintances (Long Foley et al., 2004; Mayer et al., 1998). However, these studies are also cross-sectional and thus do not provide insight into the predictive or moderating effects of drinking with parents on adolescents' drinking. Considering that longitudinal research suggests that parental

drinking increases adolescents' drinking (e.g., Duncan et al., 2006; Zhang et al., 1999), these concurrent findings that parental drinking is linked to less drinking of adolescents seem somewhat contradictory. Therefore, it remains unclear whether parents actually decrease their adolescents' alcohol intake at home or in pubs when they drink with them.

Parental supervision

Parental supervision of adolescents' alcohol use can be considered a specific form of parental monitoring. The influence of parental monitoring of youth daily activities on the development of adolescents' alcohol use has been well investigated. Concurrent and prospective research has shown that high levels of parental monitoring lowers the likelihood of adolescents' alcohol use (e.g., Barnes et al., 2006; van der Vorst et al., 2006). Furthermore, specifically monitoring (supervising) adolescents' drinking seems to reduce adolescents' alcohol use as long as the drinking takes place in the home and not, for instance, at a party (Long Foley et al., 2004). However, this study did not examine whether parental supervision of alcohol use actually lowers the development of adolescents' drinking.

Research aims and hypotheses

The primary aim of the current study was to explore whether parents could lower the (normative) increase of adolescents' alcohol use and could prevent problem drinking by allowing and supervising adolescent alcohol use, and by drinking with their adolescent children. We examined these research questions by testing bi-directional effects of drinking at home and drinking outside the home, with longitudinal data at three annual measurement points in separate models for older and younger siblings. Specifically, we tested the effect of drinking at home on later alcohol use (at home and outside the home) and the effect of drinking outside the home on subsequent alcohol use at home and outside the home. We expected, on the basis of previous research, that drinking at home will predict drinking at home later on, and also will predict subsequent alcohol use in settings outside the home. We expected the same effects for drinking outside the home environment. We also tested prospective links between drinking at home and drinking outside the home on future problem drinking. Moderation of the links between at-home drinking and outside-the-home drinking by parental supervision, drinking with parents and best friends, and adolescent gender were investigated. We hypothesized that high levels of parental supervision of adolescents' alcohol use and drinking with parents would reduce associations between drinking at home and drinking outside the home. In addition, because the aforementioned studies showed that youths drink more with their friends than with their parents, we expected youth reports of drinking with the best friend would increase

adolescents' drinking in both contexts. Finally, we expected the associations may be stronger for males than females, because boys, on average, consume more alcohol and drink more often than girls (Hibell et al., 2004). We also explored alternative models, including the influence of parental and sibling drinking behaviors.

Method

Participants and procedure

Data for this study were collected as part of a broader longitudinal survey (Family and Health), which examined different socialization processes underlying various health behaviors during adolescence (van der Vorst et al., 2005). We asked 20 municipalities in The Netherlands for the addresses of families with at least two children between ages 13 and 16 years. We approached approximately 5,000 Dutch families by mail, of which 885 agreed to participate by returning the enclosed response form. These families were then contacted by telephone to establish whether they fulfilled all the inclusion criteria (i.e., the parents had to be married or living together, and the siblings and their parents had to be biologically related). Families with twins or with family members who had mental or physical disabilities were excluded from the study. In addition, we also selected families based on adolescents' education level (one third special or low education, one third intermediate general education, and one third preparatory college and university education). The final sample included 428 families who participated at Time 1 (T1). Each family consisted of both parents and two adolescent children. A total of 416 families participated 1 year later at Time 2 (T2), and 404 families participated 2 years later at Time 3 (T3). All four family members separately filled out an extensive questionnaire at home in the presence of a trained interviewer, which took about 2 hours. Each family received €30 after all family members completed the questionnaire. At the end of the project, five checks of €1,000 were raffled between the families who participated in all three waves of the study. Almost all participants (95%) were of Dutch origin. The mean age of the older siblings was 15.22 years ($SD = 0.60$, range: 14-17 years) at T1, and the mean age of the younger siblings was 13.36 years ($SD = 0.50$, range: 13-15 years). Fathers' mean age was 46 years ($SD = 4.00$), and mothers' mean age was 44 years ($SD = 3.57$). Of the older siblings 52.8% were male, and 47.7% of the younger siblings were male.

Measures

Drinking alcohol at home. At all three measurement points, each family member was asked two questions about their drinking behaviors at home: (a) "In the previous week, how many glasses of alcoholic beverages did you consume at home on weekdays?" and (b) "In the previous week, how

many glasses of alcoholic beverages did you consume at home on the weekend?" Responses to these two questions were summed to obtain an indication of weekly alcohol consumption at home (Engels et al., 1999).

Drinking alcohol outside the home. At all three measurement points, each family member was asked two questions about their drinking behaviors outside the home: (a) "In the previous week, how many glasses of alcoholic beverages did you consume outside the home on weekdays?" and (b) "In the previous week, how many glasses of alcoholic beverages did you consume outside the home on the weekend?" Responses to these two questions were summed to obtain an indication of weekly alcohol consumption outside the home (Engels et al., 1999).

Problem drinking. For both siblings, problem drinking was measured with the Rutgers Alcohol Problem Index at T3 (18 items; White and Labouvie, 1989). An example of an item is, "Because of alcohol use, you were not able to do your homework." Response categories ranged from 1 (*never*) to 5 (*very often*). Internal consistency was high (both siblings: $\alpha = .84$).

Adolescents' drinking with others. At T1, adolescents were asked how many times they drank alcohol with their father, as well as with their mother in the previous month. Response categories ranged from 1 (*never*) to 6 (*daily*). The frequency of drinking with father and mother was highly correlated ($r_{\text{older}} = .76$, $r_{\text{younger}} = .75$); therefore, we summed these items into one variable: *drinking with parents*. Adolescents were also asked an identical question at T1 about the frequency of drinking with their best friend (*Drinking with best friend*).

Parental supervision of youth alcohol use. Adolescents completed a 5-item measure of parental control at T1 (Kerr and Stattin, 2000). We modified the items of the original scale to specifically address monitoring efforts and supervision of adolescents' alcohol use. Items included the following: (a) "Before you leave the home on a Saturday night, does your mother/father want to know with whom and where you will be drinking?" (b) "Do you need permission from your mother/father to drink alcohol during the week?" (c) "Do you need permission from your mother/father to drink alcohol with friends on Saturday night?" (d) "If you come home at night, do you need to tell your mother/father how much alcohol you have been drinking?" and (e) "Does your mother/father try to find out whether your friends drink alcohol?" If adolescents were not drinking yet, they were asked to imagine how their parents would monitor them if they did drink. Response categories ranged from 1 (*never*) to 5 (*always*). Internal consistency was high for both siblings (both: $\alpha = .90$).

Strategy of analyses

Two sets of structural path analyses were performed. The first set examined bi-directional associations between

adolescent reports of drinking at home and drinking outside the home. The second set examined prospective links between adolescents' reports of drinking at home and drinking outside the home on subsequent problem drinking. For both sets, models were conducted separately for older and younger siblings. Multiple-group analyses were used to test differences on parental supervision, adolescents' drinking with parents and best friends, and participants' gender. Finally, we performed two additional path models to explore possible alternative explanations, namely the influence of parental and sibling alcohol use. For all analyses, we used full information maximum likelihood with the Huber-White covariance adjustment (maximum likelihood robust [MLR] in Mplus 4.0; Muthén and Muthén, 2006). We used this estimation method, which gives robust estimates in the presence of nonnormality because of the degree of skewness in both adolescents' reports of drinking in each context. This method adjusts the expected distribution of covariances to account for nonnormality in the distributions of the individual variables and gives unbiased estimates of standard errors even with substantial deviations from normality. In addition to the adjusted chi-square statistic, all structural models were evaluated using three goodness-of-fit indices: (a) comparative fit index (CFI; Bentler, 1990), (b) root mean square error of approximation (RMSEA; Browne and Cudeck, 1993), and (c) Tucker-Lewis index (TLI; Tucker and Lewis, 1973).

Results

Descriptive analyses

Paired *t* tests revealed significant differences between older and younger siblings on all study measures ($ps < .001$; Table 1), with the exception of problem drinking at T3. Older

siblings drank more alcohol at all three measurement points and drank more frequently with parents and best friends, compared with younger siblings. Younger siblings reported higher levels of parental monitoring and supervision of alcohol use compared with older siblings.

Older adolescents. The older adolescents initially reported drinking an average of approximately one glass of alcohol at home and almost three glasses of alcohol outside the home. Drinking at home and drinking outside the home increased significantly from T1 to T2 and from T2 to T3 ($p < .01$). Older adolescents consumed significantly more alcohol outside the home than at home at each time, $t_{T1} (418) = -8.22, p < .001$; $t_{T2} (416) = -12.63, p < .001$; $t_{T3} (390) = -13.05, p < .001$. On average, the older adolescents had hardly any problems with drinking at T3. Of those who drank, 53% reported that they had been drinking with their father the month before at T1, and 73% of these adolescents did so at home; 42% drank alcohol with their mother, of which 82% did so at home. Finally, 79% of the older adolescents who drank alcohol did so with their best friend, of whom 59% drank with their best friend at home. Concurrent correlations between T1 drinking at home and drinking with parents and with best friends were both positive and statistically significant ($r = .39$ and $.32$, respectively). The correlation between T1 drinking outside the home and drinking with best friend was significant ($r = .59$), but the correlation between T1 drinking and drinking with parents was nonsignificant ($r = .08, p = .11$). Correlations between parental supervision and drinking at home and drinking outside the home were negative and statistically significant ($r = -.17$ and $-.20$, respectively).

Younger adolescents. The younger adolescents initially reported drinking almost half a glass of alcohol at home and outside the home. Drinking at home and drinking outside the home increased significantly from T1 to T2 and from T2 to

TABLE 1. Means and standard deviations of all study measures

| Variable | Older adolescents | | | Younger adolescents | | |
|-------------------------------------|-------------------|-----------|----------------|---------------------|-----------|----------------|
| | <i>M</i> | <i>SD</i> | Reported range | <i>M</i> | <i>SD</i> | Reported range |
| Alcohol use at home T1 | 1.04 | 1.71 | 0-6 | 0.43 | 0.86 | 0-3 |
| Alcohol use at home T2 ^a | 1.29 | 2.01 | 0-7 | 0.68 | 1.35 | 0-5 |
| Alcohol use at home T3 ^b | 1.68 | 2.75 | 0-10 | 1.06 | 1.91 | 0-7 |
| Alcohol use outside home T1 | 2.76 | 4.32 | 0-15 | 0.36 | 0.84 | 0-3 |
| Alcohol use outside home T2 | 4.88 | 6.24 | 0-21 | 1.60 | 2.86 | 0-10 |
| Alcohol use outside home T3 | 6.00 | 7.34 | 0-25 | 3.37 | 5.22 | 0-17 |
| Problem drinking T3 | 1.28 | 0.34 | 1-4 | 1.23 | 0.34 | 1-3 |
| Drinking with parents T1 | 1.45 | 0.68 | 1-6 | 1.29 | 0.57 | 1-4 |
| Drinking with best friend T1 | 1.93 | 0.91 | 1-6 | 1.36 | 0.64 | 1-5 |
| Parental supervision T1 | 2.79 | 0.94 | 1-5 | 3.17 | 0.92 | 1-5 |

Notes: Drinking at home and drinking outside the home describe the number of glasses of alcohol consumed in the previous week. Response categories for problem drinking were 1 (never), 2 (once), 3 (a couple of times), 4 (often), and 5 (very often). Response categories for drinking with parents and best friend were 1 (never), 2 (one to three times in the last 4 weeks), 3 (one to two times per week), 4 (three to four times per week), 5 (five to six times per week), and 6 (daily). Response options of parental supervision of youth alcohol use were 1 (never), 2 (once in a while), 3 (sometimes), 4 (often), and 5 (always). T = Time. ^aT2 refers to 1 year after baseline measurement; ^bT3 refers to 2 years after baseline measurement.

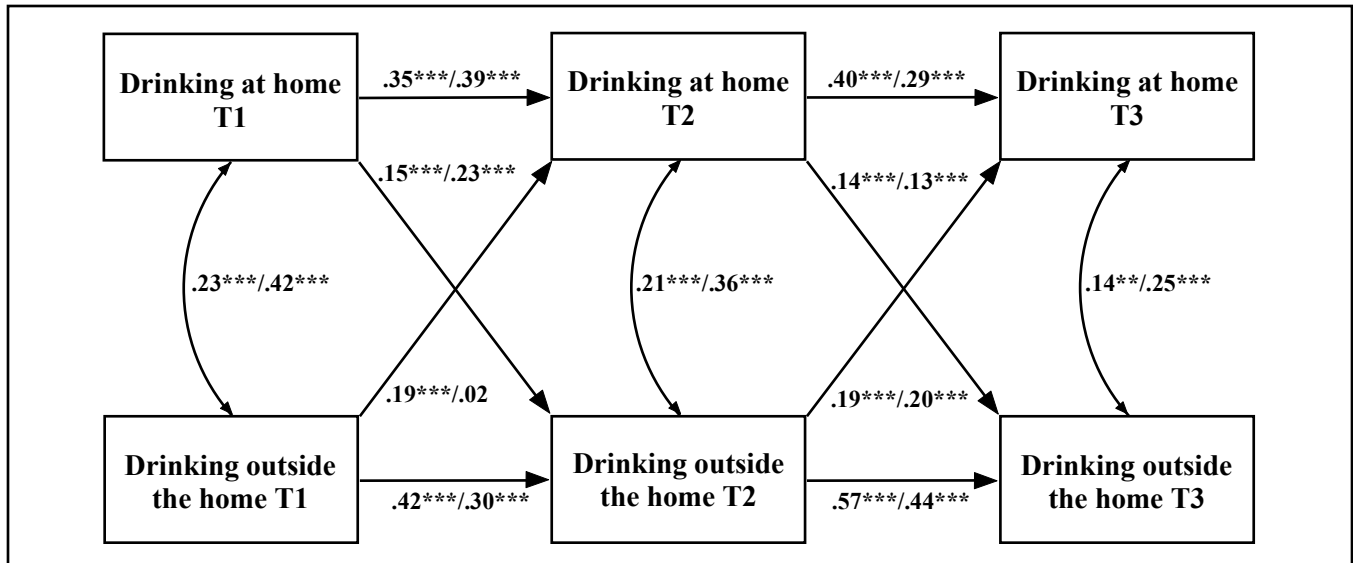


FIGURE 1. Longitudinal models examining links between adolescents' reports of alcohol use at home and outside the home for older and younger adolescents. Standardized estimates of older adolescents are presented before the slash; estimates of younger adolescents are presented after the slash. T = Time. $\chi^2_{\text{older}}(4) = 8.142, p = .086$; comparative fit index (CFI) = .987; Tucker-Lewis index (TLI) = .955; root mean square error of approximation (RMSEA) = .049. $\chi^2_{\text{younger}}(4) = 6.495, p = .165$; CFI = .991; TLI = .967; RMSEA = .038. ** $p < .01$; *** $p < .001$.

T3 ($p < .001$). Younger siblings consumed significantly more alcohol outside the home than at home the week before T2 and T3, $t_{T2}(425) = -7.72, p < .001$; $t_{T3}(418) = -10.13, p < .001$, but not at T1, $t_{T1}(426) = 1.57, p = .117$. On average, younger adolescents had hardly any problems with drinking at T3. Of the younger adolescents who consumed alcohol, 33% reported drinking alcohol with their father the month before T1, of which 68% did so at home; 31% drank alcohol with their mothers, and, of these adolescents, 61% did so at home. Finally, 33% of the younger adolescents drank alcohol with their best friend, of which 59% drank with their best friend at home. Concurrent correlations between T1 drinking at home and drinking with parents and drinking with best friends were both positive and statistically significant ($r = .52$ and $.44$, respectively); correlations between T1 drinking outside the home and drinking with parents and best friends were also statistically significant ($r = .17$ and $.57$, respectively). The correlation between drinking at home and parental supervision was negative and significant ($r = -.11, p = .03$), but the correlation between drinking outside the home and parental supervision was nonsignificant ($r = -.17, p = .07$).

Bi-directional associations between drinking at home and drinking outside the home

To assess the direction of associations between drinking at home and drinking outside the home, structural equation models were conducted separately for older and younger siblings (Figure 1). Both models adequately fit the data. All autoregressive stability paths and concurrent correlations

were positive and statistically significant ($ps < .001$) in both models. In the model examining older adolescents' drinking, all four cross-paths emerged as significant predictors. Specifically, the more the older adolescents drank at home, the more they drank outside the home; and the more alcohol they consumed outside the home, the more they drank at home. In the model examining younger adolescents' drinking, three of the four cross-paths emerged as significant predictors. As was the case with older adolescents, drinking at home consistently predicted drinking outside the home 1 year later. Unlike their older siblings, for the younger adolescents, drinking outside the home predicted an increase of drinking at home only from T2 to T3.

Drinking at home and outside the home as predictors of problem drinking

To examine whether drinking at home and drinking outside the home predicted subsequent problem drinking, we conducted two additional structural path analyses separately for older and younger siblings. These models were simple extensions of the model presented in Figure 1, with four additional paths: Two prospective paths from T2 drinking at home and T2 drinking outside the home to T3 problem drinking, and two concurrent correlational links between T3 drinking at home and outside the home and T3 problem drinking (Figure 2). Both models adequately fit the data. The same pattern of bi-directional effects presented in Figure 1 emerged for both siblings. For both siblings, at-home drinking at T2 and outside-the-home drinking at T2

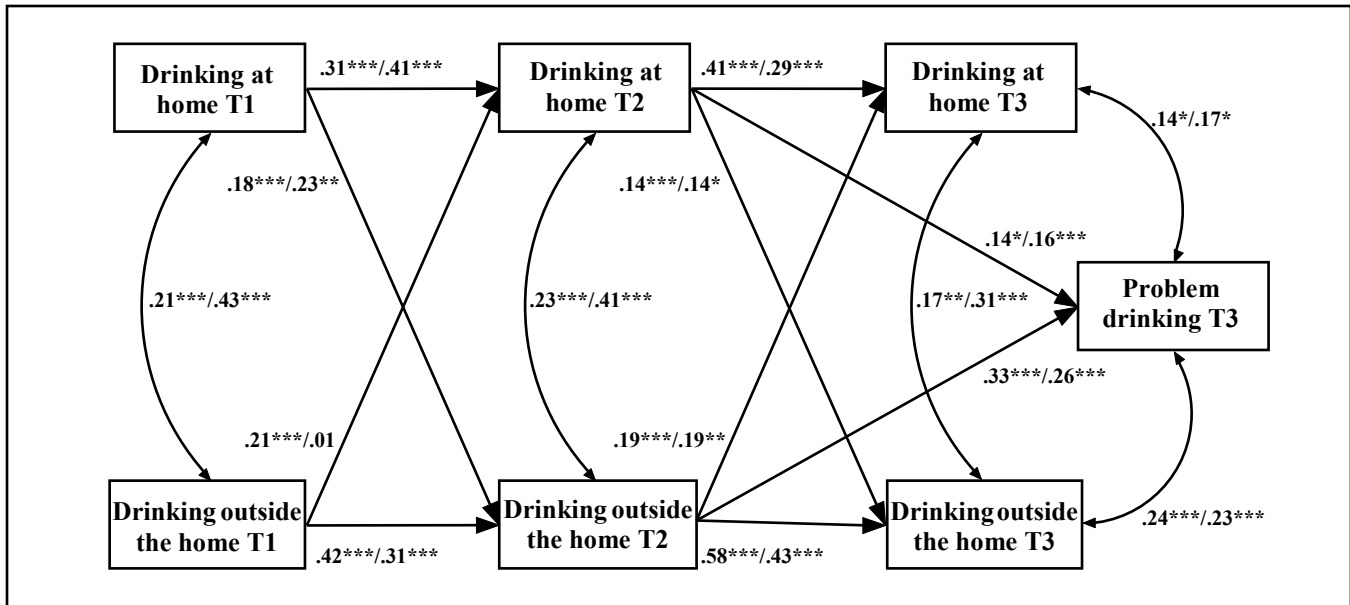


FIGURE 2. Longitudinal model of older and younger adolescents' reports of alcohol use at home and outside the home and problem drinking. Standardized estimates of older adolescents are presented before the slash; estimates of younger adolescents are presented after the slash. T = Time. $\chi^2_{\text{older}}(6) = 13.95, p = .040$; comparative fit index (CFI) = .979; Tucker-Lewis index (TLI) = .930; root mean square error of approximation (RMSEA) = .055. $\chi^2_{\text{younger}}(6) = 8.857, p = .182$; CFI = .990; TLI = .966; RMSEA = .035. * $p < .05$; ** $p < .01$; *** $p < .001$.

predicted T3 problem drinking. The T3 concurrent associations between at-home drinking and problem drinking, and between outside-the-home drinking and problem drinking, were also significant. The strength of the paths between T2 at-home drinking and T3 problem drinking, and between T2 outside-the-home drinking and T3 problem drinking, did not significantly differ for either sibling, $\chi^2_{\text{older}}(1) = 0.34, p > .05$; $\chi^2_{\text{younger}}(1) = 0.20, p > .05$.

What reduces adolescent alcohol use? Moderator effects

We conducted four sets of multiple group analyses to test moderating effects of parental supervision, adolescents' drinking with parents, adolescents' drinking with their best friend, and youth gender. The first set of analyses tested differences between adolescents reporting high levels of parental supervision at T1 (> +1 SD) and those reporting average to low levels of parental supervision (< +1 SD). The second and third set of analyses tested differences between adolescents who reported drinking with parents at T1/drinking with their best friend at T1, and those who reported not drinking with parents at T1/not drinking with their best friend at T1. The final set of analyses examined gender differences. Tests of moderation were performed by individually constraining autoregressive stability paths and cross-paths in each model to be invariant between groups. A significant chi-square difference between constrained and unconstrained models indicates a significant difference between groups (Satorra and Bentler, 2001).

Parental supervision of adolescents' alcohol use. We examined whether parents' efforts to supervise and monitor adolescents' drinking moderated the associations between drinking at home and outside the home. For both older and younger adolescents, equality constraints did not reveal any significant differences between those reporting average and low levels of parental monitoring and supervision of alcohol use ($n_{\text{older}} = 270, n_{\text{younger}} = 287$) and those reporting high levels of monitoring and supervision ($n_{\text{older}} = 158, n_{\text{younger}} = 141$).

Adolescents' drinking with parents. For both siblings, equality constraints did not reveal any significant differences in associations between adolescents' drinking at home and outside the home between those who did not drink with their parents ($n_{\text{older}} = 256, n_{\text{younger}} = 312$) and those who did drink with their parents ($n_{\text{older}} = 172, n_{\text{younger}} = 116$).

Adolescents' drinking with their best friend. For both older and younger adolescents, equality constraints did not reveal any significant differences in associations between adolescents' drinking at home and outside the home between those who reported drinking with their best friend ($n_{\text{older}} = 254, n_{\text{younger}} = 119$), compared with those who did not drink alcohol with their best friend ($n_{\text{older}} = 174, n_{\text{younger}} = 309$).

Adolescent gender. Finally, we tested whether the associations between adolescents' drinking at home and outside the home were moderated by adolescent gender. For older adolescents, equality constraints revealed the path between T1 drinking at home and drinking outside the home at T2 significantly differed between males ($n = 214$) and females

($n = 187$), $\Delta\chi^2(1) = 4.918$, $p = .027$. This path was statistically significant for males ($\beta = .212$, $z = 3.16$) but not for females ($\beta = .055$, $z = 0.77$). For younger adolescents, equality constraints revealed the path between T2 drinking outside the home and T3 drinking at home significantly differed between younger males ($n = 189$) and females ($n = 211$), $\Delta\chi^2(1) = 5.490$, $p = .019$. This path was statistically significant for males ($\beta = .343$, $z = 3.67$) but not for females ($\beta = .033$, $z = 0.47$). All other paths of the models did not significantly differ.

Alternative explanations: Parental drinking and sibling influence

Models controlling for parental drinking. Parental drinking influences adolescents' alcohol use (e.g., Chassin et al., 1996). Therefore, we expanded both models described previously (Figure 1) to include the drinking behaviors of parents at T1. We added four paths in each model: adolescents' drinking at home predicted by (a) parental drinking at home and (b) parental drinking outside the home, and adolescents' drinking outside the home predicted by (c) parental drinking at home and (d) parental drinking outside the home. Both models fit the data adequately, $\chi^2_{\text{older}}(12) = 23.755$, $p = .022$, CFI = .972, TLI = .936, RMSEA = .048; $\chi^2_{\text{younger}}(12) = 22.645$, $p = .031$, CFI = .972, TLI = .937, RMSEA = .046. The pattern of significant findings of these models was identical to those presented in Figure 1. That is, parental drinking did not alter the pattern of effects between drinking at home or outside drinking on future alcohol use of both siblings. Parental drinking at home predicted drinking at home of both adolescents ($\beta_{\text{older}} = .168$, $z = 3.43$, and $\beta_{\text{younger}} = .155$, $z = 3.23$) and outside-the-home drinking of the older siblings ($\beta = .099$, $z = 1.99$). Parental drinking outside the home predicted drinking outside the home of both siblings ($\beta_{\text{older}} = .118$, $z = 2.15$, and $\beta_{\text{younger}} = .156$, $z = 2.96$) and predicted at-home drinking of the younger siblings ($\beta = .149$, $z = 2.83$). Taken together, these results suggest parental drinking is concurrently related to adolescents' alcohol use in and outside the home. However, because youth drinking at home predicts increases in drinking outside the home, these findings may be interpreted that parental drinking indirectly predicts adolescents' subsequent drinking at home and in other contexts.

Model of sibling influence. Previous research suggests older siblings influence the alcohol use of younger siblings by being a role model, offering drinks, or introducing the sibling into a drinking culture (Epstein et al., 1999; Windle, 2000). Therefore, we examined the possibility of whether siblings influence each other's drinking at home and outside the home with a single model that included drinking in each context of both siblings. This model fit the data adequately, $\chi^2(16) = 24.455$, $p = .080$; CFI = .989; TLI = .957; RMSEA = .039. We limit our discussion of the findings to significant

cross-paths between older and younger siblings. Four cross-paths emerged as significant predictors. As expected, older sibling's drinking outside the home consistently predicted increases in younger sibling's drinking outside the home ($\beta_{\text{T1-T2}} = .09$, $p < .05$; $\beta_{\text{T2-T3}} = .16$, $p < .01$). Older sibling's drinking at home predicted increases in drinking at home of younger siblings ($\beta_{\text{T2-T3}} = .16$, $p < .01$). Furthermore, younger sibling's at-home drinking predicted increases in older sibling's at-home drinking ($\beta_{\text{T1-T2}} = .16$, $p < .01$). The findings suggest older and younger siblings influence one another in alcohol use.

Discussion

Based on the advice of (Dutch) alcohol preventionists that parents should supervise and drink with their adolescent children at home to reduce the risk of youth heavy drinking, the present study examined possible moderating effects of parental supervision, drinking with parents, drinking with their best friend, and adolescent gender on bi-directional associations between drinking at home and drinking outside the home for older and younger siblings. Similar to previous research, we found that both older and younger adolescents consumed more alcohol outside the home than at home (Forsyth and Barnard, 2000; Mayer et al., 1998). The conclusion is then easily drawn that, if youths primarily drink at home, this might have less negative consequences in terms of high consumption levels, as previous studies suggested (Forsyth and Barnard, 2000; Mayer et al., 1998). However, in our study, drinking at home predicted increased levels of drinking at home, of drinking outside the home, and problem drinking, while also controlling for previous use in both contexts. Thus, adolescents who drink at home may not initially drink heavily, but their alcohol consumption will increase in the same context, as well as in others (Jackson et al., 1999). However, adolescents who do not drink at all at home are less likely to drink heavily at home or in public drinking places and at parties later on. Moreover, adolescents who drink alcohol at home are at risk to develop alcohol problems. Taken together with findings of previous research suggesting that youth typically start to drink at home and that youth who start to drink at home have earlier ages at first use (Warner and White, 2003), advising adolescents to drink at home seems to be more harmful than initially was expected.

Our findings suggest that parents who do not want their children to develop heavy drinking patterns later on should prohibit the alcohol use of their adolescent children at home and outside the home at an early age, which has also been suggested by other researchers (Hearst et al., 2007; Jackson et al., 1999; Komro et al., 2007). That is, drinking at home not only predicts drinking outside the home, but also the inverse is the case. The more alcohol older and younger adolescents consume in a bar or at their friends' house, the more

they will drink in these places, as well as at home in the future. Drinking outside the home also predicted subsequent problem drinking. These results provide initial evidence that drinking in both settings represents a unique risk factor for future problem drinking. Furthermore, allowing older siblings (15-year-olds) to drink alcohol will indirectly affect the drinking behaviors of their younger siblings. The more alcohol the older adolescents drank, the more the younger ones drank at home, as well as in contexts outside the home. This finding corresponds with previous research of Epstein et al. (1999) and Windle (2000). Further, prohibiting adolescents' alcohol use, which can be seen as enforcing strict rules about drinking, has been shown to be one of the few parenting practices that, indeed, prevents adolescents' alcohol use (Jackson et al., 1999), especially when adolescents have not yet established a regular drinking pattern (van der Vorst et al., 2007). Combining these results of previous studies with the results of the current study, the advice of preventionists to parents could be to prohibit their children from drinking, regardless of the context.

Admittedly, drinking alcohol at home does not necessarily mean that adolescents drink together with their parents (Long Foley et al., 2004); they can also consume alcohol with their best friend or other peers. Our findings underline this assumption. For instance, more than half of the older adolescents who drank with their best friend did this at their home, and one fourth of the older adolescents who drank with their father did this in a context outside the home. Thus, solely assessing the influence of the drinking context is not enough. This was the reason why we also included drinking with parents and parental drinking in our analyses. In contrast with our expectations, we did not find consistent evidence that drinking with parents moderated these associations, which implies that drinking with or without parents has little impact on the effect of drinking in a certain context on alcohol use over time. However, drinking with parents was concurrently correlated with drinking at home and drinking outside the home for adolescents; but it was also correlated with drinking with their best friend. Parental drinking was positively associated with drinking at home and drinking outside the home for both adolescents. These outcomes are in accordance with the findings of others (e.g., Duncan et al., 2006).

The effects of drinking with the best friend provided similar results as with drinking with parents. Drinking with or without the best friend did not systematically moderate the associations between drinking at home and drinking outside the home for both adolescents but was concurrently linked to drinking at home and drinking outside the home. These relations, however, were stronger for drinking outside the home than for drinking in the home environment. In addition, gender did seem to moderate the associations between drinking at home and drinking outside the home. For the older adolescents, gender moderated the association between

at-home T1 drinking and outside-the-home T2 drinking, thus indicating that at-home drinking predicted outside-the-home drinking 1 year later for boys but not for girls. At T2 to T3, the same result was found for the younger adolescents. During this year, the younger adolescents were as old as the older ones were 1 year before. This finding suggests that, for mid-adolescent boys, an increase in at-home drinking is related to higher levels of outside-the-home drinking but that this is not the case for mid-adolescent girls. Thus, this group of boys is especially at risk for developing heavy alcohol use when they are drinking at home. However, we did not find this moderating effect of gender on both time points for both adolescent groups. Therefore, this conclusion should be treated carefully, and future research is needed to confirm our conclusion.

Finally, even parents who provided high levels of supervision did not seem to deter the normative *development* of adolescents' drinking in the different drinking settings, nor were they able to control the impact of drinking in one setting on alcohol use in another. These outcomes are in contrast with the findings of Long Foley et al. (2004). An explanation for the lack of support for parental supervision might be that it is not the monitoring that is really of importance, because youth can still hide a lot from their parents, but that consuming alcohol in the presence of parents or adults (who are not drinking at that moment) has a tempering effect on adolescents' alcohol consumption. Adolescents might not feel comfortable enough to drink then because they fear that their parents might immediately show their disapproval (Bahr et al., 2005).

Based on all of the aforementioned results, we could conclude that, if adolescents start to drink, no matter in what setting, with whom they drink, or their age, adolescents will drink more alcohol over time and (consequently) are at risk for problem drinking, a trend also found in previous research (Duncan et al., 2006; van der Vorst et al., 2007). There are only very few adolescents who lower their drinking in their teenage years (van der Vorst et al., 2009). This might imply that parents hardly play a role in adolescents' alcohol use as soon as children start to drink. It is indeed difficult for parents to affect the drinking of adolescents who already drink on a regular basis. But, parents do seem to have an important preventive impact in the initiation phase of drinking (Hearst et al., 2007; van der Vorst et al., 2007).

Although the current study has several strengths, such as its longitudinal design and the use of full-family data, several limitations should be acknowledged. First, our results might not reflect the situation in other countries with other drinking cultures or laws. Second, we have no reason to think our sample is *not* representative of (Dutch) households comprising two biological parents and siblings of different educational levels, but still one should be cautious with generalizing the findings to single-parent families, families with no biological relations between parent and adolescents,

or families with different ethnic backgrounds. Third, our null findings involving moderating effects of parental supervision and adolescents' drinking with parents and best friends, must, like all null findings, be interpreted with caution. We have attempted to take the first steps in uncovering how parents can reduce the risks of their children developing problematic patterns of alcohol use. Future research is needed to replicate and extend these findings in diverse national and international samples. Fourth, we tested the moderators (drinking with or without parents and drinking with or without their best friend) separately. However, it might be that parental and best friend factors influence the development of adolescents' alcohol use in a complementary manner (van der Vorst et al., 2009). Finally, it should be noted that this study does not focus on the underlying mechanism of parents actually teaching their adolescents to control their drinking, because we do not have information about whether parents communicate to their offspring that they should drink with them to lower their alcohol use. We have used different measures of parental and adolescent behaviors to better understand the underlying mechanism, but some questions remained unanswered.

In summary, our findings yield substantial evidence that adolescents' alcohol use leads to more drinking over time and problem drinking, regardless of the context, with whom adolescents are drinking, or their age. Based on this, we think that alcohol prevention programs should recommend that parents prohibit their children from drinking at home and outside the home and make parents more aware of their possible preventive role in the initiation phase of drinking.

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