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The Development of Children's Intentions to Use Alcohol: Direct and Indirect Effects of Parent Alcohol Use and Parenting Behaviors

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Abstract

The purpose of this study was to explore the effect of parent alcohol use and parenting behavior on the development of children's intentions to use alcohol in grades 1 through 8. We hypothesized that the effect of parent alcohol use on children's intention to use alcohol would be mediated through parenting behavior, specifically monitoring /supervision, positive parenting, and inconsistent discipline. Using cohort-sequential latent growth modeling (LGM), we tested three models examining the effect of the development of parent alcohol use on the development of children's intentions to use alcohol as mediated by the development of each of the three parenting behaviors. We used multiple group analyses to explore gender differences. The effect of growth in parent alcohol use on the growth in children's intentions was mediated only by parent monitoring/supervision and was significant only for girls. The effect of inconsistent discipline was directly related to growth in intentions for both boys and girls. Although parent alcohol use was related to less positive parenting, positive parenting was unrelated to children's intentions to use alcohol.

Keywords

Alcohol intentions; children; parent alcohol use; parenting behavior; LGM cohort-sequential modeling

Early initiation of alcohol use among children and adolescents has been identified as a major risk factor for later adolescent and adult alcohol abuse and dependence (Grant & Dawson, 1997; Jackson, Henriksen, & Dickinson, 1999). This suggests the importance of identifying risk factors related to the precursors of early initiation and intentions to use substances. In prior studies with this sample, we showed that younger children rarely used alcohol, but expressed their intentions to use alcohol in the future (Andrews, Tildesley, Hops, Duncan, & Severson, 2003).

Intentions have been shown to be predictors of subsequent behavior (e.g., Ajzen, 1988; 1991; Ajzen & Fishbein, 1980) and some (Pierce, Choi, Gilpin, Farkas, and Merrit, 1996) consider intentions to use substances in the future as the first stage of acquisition, occurring prior to

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initial use. This contention is supported by our own research (Andrews et al., 2003) and others (Marcoux & Shope, 1997; Webb, Baer, Getz, & McKelvey, 1996). With this sample, we demonstrated, that children's intentions predicted trying alcohol two years later. In a meta-analysis of intervention studies aimed at changing behavioral intentions, Webb and Sheeran (2006) found the relation between intentions and behavior was causal—not merely correlational. In addition, a medium to large change in children's intentions was needed to impact a small to medium effect on behavior suggesting that the effect of intentions on behaviors may be smaller than previously expected. Increasing our understanding of the factors associated with decreases and/or increases in children's intentions to use alcohol is essential for informing interventions.

Parent influences are important factors affecting their children's behavior. From a social learning (Bandura, 1986; Petraitis, Flay & Miller, 1995) and socioenvironmental perspective (Brook, Brook, Gordon, Whiteman, & Cohen, 1990; Patterson, Reid & Dishion, 1992) parent alcohol use/abuse and parenting behaviors have been shown to be risk factors for the development of problem behavior including alcohol use in adolescence (Andrews, Hops, & Duncan, 1997; Ary, Duncan, Biglan, Metzler, Noell, & Smolkowski, 1999; Jacob & Johnson, 1997; White, Johnson, & Buyske, 2000).

Parent Alcohol Use

Parent substance use and abuse is directly related to youth initiation and continued substance use through both genetic influences (Prescott, Aggen, & Kendler, 1999) and modeling of parent behavior (Andrews et al., 1997; Chassin, Curran, Hussong, & Colder, 1996; Eitle, 2005; Hussong, Curran, & Chassin, 1998). Significant effects have been shown for parents' alcohol use on the alcohol use of their child depending on the amount and frequency of each parent's use and age and gender of their child (Hops, Duncan, Duncan, & Stoolmiller, 1996; White et al., 2000). In addition, parent substance use problems (Costello, Erkanli, Federman, Angold, 1999) and abuse (Kaplow, Curran, Dodge, & the Conduct Problems Prevention Research Group, 2002) have been found to be predictors of early onset of alcohol use for both boys and girls. Thus, we hypothesized that greater parent alcohol use would increase children's intentions to use alcohol.

Parenting Behaviors

Parenting behaviors play an essential role in the development of antisocial/problem behaviors among children and adolescents, including substance use (Barnes, Reifman, Farrell, & Dintcheff, 2000; Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Jackson et al., 1999; Stice & Barrera, 1995). Increased parent monitoring and consistent discipline have been shown to reduce adolescents' alcohol use (Barnes et al., 2000; Jackson et al., 1999; Jones, Forehand, Brody & Armistead, 2003) and/or delay initiation of alcohol use (Eitle, 2005; Jackson et al., 1999). Positive parenting (e.g., communication, nurturance, and support) is frequently considered a protective factor having a buffering effect on negative outcomes (Wills & Yaeger, 2003). Although these three parenting dimensions are often correlated, they are considered distinct dimensions and may have differential effects (Weiss & Schwarz, 1996).

Several studies suggest that parent problem or abusive alcohol use affects parenting behaviors, and that these behaviors mediate the effect of parental substance use on their child's externalizing behavior in general (Blackson, Butler, Belsky, Ammerman, Shaw and Tarter, 1999), and more specifically on their child's substance use (Barnes et al., 2000; Brook, Whiteman, Balka, and Cohen, 1995). For example, poor parent monitoring and inconsistent discipline have been found to mediate parent alcohol abuse/problem use and their adolescents' higher initial levels and increases in alcohol use, as well as the occurrence of alcohol-related problems (Chassin, et al., 1996; Conger, Rueter, & Conger, 1997). Thus, we hypothesized that

parents with higher initial levels and increases in alcohol use would be more inconsistent in their parenting, monitor less frequently, and be less positive in their parenting, which in turn would increase children's initial levels and an increase over time in intentions to use alcohol.

Gender Differences in Children's Alcohol Use and Effects of Parenting on Child and Adolescent Alcohol Use

Previous analyses with this sample (Andrews et al., 2003) and others (Cohen, Brownell, & Felix, 1990; Duncan, Duncan, Biglan, & Ary, 1998) have indicated that boys initiate alcohol use earlier than girls but that girls increase their use more rapidly than boys. Moreover, significantly more boys than girls in our sample (Andrews et al., 2003) in grades 1 through 4 intended to use alcohol in the future with no gender differences in grades 5 through 7. While greater parent monitoring has been shown to be related to reduced initiation and decreased adolescent alcohol use, gender differences have not always been consistent (Andrews, 2005). For example, Barnes and colleagues (2000) demonstrated that male adolescents had higher initial levels of alcohol use which increased more rapidly as a function of comparatively lower parent monitoring as compared to females. In another adolescent sample (Griffin et al., 2000) higher parent monitoring reduced males' alcohol use, while increasing females' alcohol use. Finally, Webb, Bray, Getz and Adams (2002) found that only female adolescents reduced their alcohol use as of function of mother's increase in monitoring. Thus, we included an exploration of gender differences in growth of alcohol use in this paper. Based on previous analyses with this sample we hypothesized that initial level of intentions would be significantly higher for boys and that increases in intentions would be significantly higher for girls. We anticipated gender differences for the effects of parenting on children's intentions, but given the inconsistent findings in previous research we did not have specific hypotheses.

Previous Research on Intentions to Use Alcohol in this Sample

In addition to the previously mentioned findings regarding intentions to use alcohol, our earlier work demonstrated the validity of our measure of intentions to use alcohol with this school-aged sample (Andrews et al., 2003; Hampson, Andrews, Barckley, & Severson, 2006) and provided a basis for further research. We examined the lifetime prevalence and intentions to use substances, including alcohol, for the first three assessment years (i.e., first through seventh grades). Children's intentions to use alcohol increased across grades and a significantly higher proportion of children intended to use alcohol in the future compared with other substances. In another study (Hampson et al., 2006) we included the fourth assessment and extended our work using latent growth modeling (LGM) to examine the development of intentions to use alcohol across time and its association with personality variables. Using a linear growth model of intentions to use alcohol, we found that children's sociability predicted the growth of positive attitudes toward alcohol use which in turn was associated with higher intentions to use alcohol. Hostility predicted initial level of these intentions through initial level of subjective norms (peer attitudes toward alcohol use). This study extended our previous work by using a cohort-sequential model with five cohorts (1st through 5th grades at T1) across four assessments (T1-T4) which allowed us to examine intentions from grades 1 to 8 developmentally. In this paper, we will examine parent risk factors (i.e., frequency of parental alcohol use and parenting behaviors) known to affect children's alcohol use and hypothesized they would affect children's intentions to use alcohol in the future.

Method

Design and Recruitment

The sample for the current study consisted of children participating in the Oregon Youth Substance Use Project (OYSUP), an ongoing longitudinal study (Andrews et al., 2003; Andrews and Peterson, 2006; Hampson et al., 2006; Severson, Andrews, & Walker, 2003).

We used a cohort-sequential design (McArdle & Anderson, 1990; Schaie, 1965; 1970) in which five grade cohorts (1st through 5th grades at the T1 assessment) were assessed at annual intervals over a four-year period, until they were in the 4th through 8th grades at the T4 assessment. This design combined both cross-sectional (five grade cohorts, as defined by grade at the first assessment) and longitudinal (four assessments) designs into one sequential design, serving as a proxy for a true longitudinal design--where a single cohort is assessed eight times, from the 1st through the 8th grade (see Figure 1 for a representation). In an earlier study using this sample (Andrews et al., 2003), we found few cohort effects. Cohort 5 girls (i.e., fifth graders at T1) were more likely to report intentions to use alcohol (58.1%) in the fifth grade than Cohort 4 girls (i.e., fourth graders at T1) when they were in the fifth grade (45.3%), $X^2(1, N=188)=3.08$, $p<.10$. We also found few cohort effects for the parenting variables. We found only two cohort effects for boys, both for inconsistent discipline. Parents of Cohort 3 boys reported significantly greater inconsistent discipline when their sons were in the third grade than parents of Cohort 2 boys when their sons were in the third grade ($F=4.58$, $df=2/251$, $p<.05$). Further, these same parents of Cohort 3 boys reported significantly greater inconsistent discipline when their sons were in the fifth grade compared with parents of Cohort 2 boys when they were in the fifth grade ($F=4.52$, $df=3/359$, $p<.01$). There were no effects for girls for any of the parenting behaviors.

Participants

One thousand and seventy-five children from 15 elementary schools in one Oregon school district, serving a predominantly working class community, participated in the study at the first assessment. Parents provided a signed consent allowing their child to participate in the first four assessments prior to the child's first in-school assessment, as well as consenting for their own participation. We also requested children agree to a verbal assent for grades 1-3 or sign a written assent for grades 4-5. All procedures, consents/assents, and questionnaires/interviews were translated into Spanish and available for those who needed it. An average of 215 students in each of the 1st through 5th grades participated at T1, with an even distribution by gender (50.3% female; $n = 528$). The average age at T1 was 9 years ($SD = 1.45$). The racial/ethnic composition of this sample was 86% Caucasian, 7% Hispanic, 1% Afro-American, and 2% each of Asian/ Pacific Islander, American Indian or Alaskan native, and other or mixed race/ ethnicity. Approximately 7% of mothers and 11% of fathers had not earned a high school diploma. Forty percent of the sample was eligible for a free or reduced lunch (a measure of low family income).

The total enrollment in the school district was 5,600 elementary students. Using stratified random sampling (by school, grade, and gender) parents of 2,127 students in 15 elementary schools were recruited and 1,075 (50.7%) consented to their children's participation. Briefly, participating children were representative of children in the same school district for race/ ethnicity and eligibility for free or reduced lunch program, but had slightly higher levels on reading and math test scores. In terms of substance use, we compared our T2 sixth graders with public school sixth graders from the same region of Oregon (U.S. Department of Health and Human Services, 2001) and found them to be similar in their prevalence of use of cigarettes, alcohol and marijuana.

Fifty-four children who participated in the study at T1 did not participate in the T4 assessment (5.0% of the total sample). Attrition between assessments was highest between the first and second assessment (3.7%). In comparing children who participated at T4 with children who did not, there were no differences at T1 on intentions to use alcohol, parent alcohol use, or other parenting behaviors. Participants were also similar to non-participants in grade, gender, race/ethnicity, proportion who received a free or reduced lunch, and achievement test scores at T1. More details on the sample are provided in Andrews et al. (2003).

The sample used in these analyses consisted of 1,050 children (98% of the entire sample) who participated at any of the four annual assessments and had at least one parent who completed a questionnaire assessing their own alcohol use and parenting behavior. Of these children 522 were boys and 528 (50.3%) were girls. These children did not differ from those in the total sample on demographic variables or intentions to use alcohol. Overall, participation for these 1,050 families was quite good with 738 families (70.2%) completing all four annual assessments, 128 families (12.1%) completing three assessments, 105 families (10%) completing two assessments, and 70 families (6.7%) completing one assessment. An additional nine families (1%) (with a participating biological mother or father) added a new stepparent during the study who participated at one assessment.

Our sample included 704 families (67%) with both mother and father participating, 311 families (30%) with mother only participating, and 35 families (3%) with father only participating. In families where both parents participated, parents were married or living together in 671 (95%) of the cases and 33 (5%) were not living together. In families where only mothers participated, 169 (54.2%) were not living with the father and 142 (45.8%) were married or living with a partner who did not participate in the study. In the families where only fathers participated, 27 (78%) were not living with the mother of the child and 8 (22%) were married or living with a partner who did not participate in the study. Overall, 15.6% of the one-parent participants (50 fathers and 4 mothers) were living with the other biological parent who refused to participate in the study.

Across assessments, in 679 (64.6%) families both parents participated three or four times and in 25 (2.4%) families both parents participated one or two times. In families where only one parent participated, 309 (29.4%) mothers/fathers participated three or four times and 37 (3.5%) mothers/fathers participated only one or two times. Therefore, across assessments for the entire sample of families 94% participated three or more times and 6% participated once or twice.

Procedures

The 1st through 3rd grade assessment was an individual structured interview. Older children completed a paper and pencil questionnaire administered in a group setting. Results of a separate study showed no differences in initial level of intentions to use alcohol as a function of the method of assessment (See Andrews et al., 2003). All T1 assessments and T2 through T4 assessments for students who remained within the school district were conducted at school during school hours. Parents were mailed questionnaires to complete and return by mail following their children's assessment. Children received a small gift (e.g., a brightly colored pencil or highlighter) for each assessment completed, while each parent received \$25 for completing their questionnaire. See Andrews et al. (2003) for a more detailed description of assessment procedures.

Measures

Intentions—Children in grades 1 through 3 were shown a picture of an alcoholic beverage and were asked “Do you think you would drink this when you are a teenager?” and “Do you think you would drink this when you are grown-up?” (“No” = 0, “Don’t know” = 1, or “Yes” = 2). Responses to the two items were summed. For the older children, intentions to drink alcohol were measured by two items: “Do you think you would drink alcohol (beer, wine, or hard liquor) when you’re a teenager (4th and 5th graders) or when you’re in high school (6th through 8th graders)?” and “Do you think you would drink alcohol (beer, wine, or hard liquor) when you’re a grown-up?” (“No” = 0, “Maybe” = 1, or “Yes” = 2). Responses were summed across the two items. For 1st through 3rd grades, the correlation between the two items across each grade ranged from .35 to .58; for 4th and 5th graders, from .45 to .54; and for 6th through 8th graders from .50 to .63. The Cronbach alphas ranged from .63 at T1 to .72 at T4.

Parenting behavior—Three subscales from the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996) were used to measure monitoring/supervision (e.g. “Child home without adult supervision” and “Don’t check that child is home on time”), inconsistent discipline (e.g. “Threatens to punish, and then doesn’t” and “Lets child out of punishment early”), and positive parenting (e.g. Let’s child know when doing a good job” and “Compliments child”). Although the monitoring/supervision subscale included parent and child behaviors, the subscale was designed to measure the extent to which the child is under parental supervision. Parent(s) reported frequency on a 5-point scale (0 = “Never,” 4 = “Always”) for monitoring/supervision (10 items, $\alpha = .70$), inconsistent discipline (6 items, $\alpha = .73$), and positive parenting (6 items, $\alpha = .78$). Because higher scores on the parental monitoring and supervision subscale reflected decreased parental monitoring and supervision, we inverted the scores so that high scores would represent an increase in monitoring/supervision. We used the average of mother and father scores (average r 's = .55 for monitoring/supervision, .35 for inconsistent discipline and .39 for positive parenting, respectively across the four annual assessments) in two-parent families and a single score for single-parent families. Although the parenting behaviors were significantly correlated among the three constructs, they did not appear to represent one global parenting construct, but rather separate dimensions of parenting. The highest correlations were between inconsistent discipline and monitoring/supervision ranging from -.24 to -.37, across the four assessments years. For positive parenting and inconsistent discipline the range was from -.17 to -.28 and for positive parenting and monitoring/supervision the range was from .09 to .25.

Parent alcohol use—Mothers and fathers were asked a series of questions regarding their past and current alcohol use including rate and frequency. We created a continuous 6-point scale from 0 = “Never used” to 6 = “Drink alcohol daily.” We then used a mean of the two parents as our parent alcohol measure (average $r = .55$ with a range from .52 to .59 across assessment years).¹

Data Analyses

We used cohort sequential latent growth modeling (LGM; Muthén, 1991) to test several sequential models, leading to three mediation models relating parent alcohol use to children's intentions to drink alcohol, through each of three parenting behaviors (i.e., monitoring/supervision, inconsistent discipline, and positive parenting). All models were analyzed with Mplus Version 4.2 (Muthén & Muthén, 2007) with the maximum likelihood method, using the EM algorithm for missing data (Little & Rubin, 1987). Using a multiple cohort design, we examined the development across eight grade levels (grades 1-8) assessed at 4 annual time points. Since, as noted, there were few cohort effects, this analysis technique was suitable for this data. We used a multiple group procedure to examine gender differences in all models.

LGM takes advantage of the longitudinal dataset by allowing for the examination and prediction of individual as well as group level change across the eight grade levels. LGM provides estimates of the average (group) developmental trajectory, including both the intercept (often termed the initial level) and slope (rate of change across grades), and the variance or individual variability in these parameters. Intercepts and slopes may both be predictors and predicted.

Analyses were done sequentially. First, separate growth models were tested for intentions, parent alcohol use, and each of the parenting behaviors to determine the function that best represented change for each variable over the eight grades. Within each growth model, the intercept and slope (latent constructs) were based on eight indicators (grades 1-8), the variable

¹A table providing the zero-order correlations among all study variables is available from the authors.

at each of four assessments. Factor loadings of the intercept on all indicators (assessments) were set to 1 and factor loadings to test a linear slope on the eight indicators were set sequentially to 0, 1, 2, 3, 4, 5, 6, and 7. To test the quadratic models, the loadings were fixed at the square of each of the linear loadings (e.g., 0, 1, 4, 9, etc.). Multiple group analysis was used in testing these models to test for significant differences between boys and girls, and between parents of boys versus parents of girls. Correlations among the residuals for variables were included at the same or adjacent time points if indicated by modification indices.²

Once models were satisfactorily fit to the data, we then proceeded to test for mediation using procedures outlined by Holmbeck (1997) and Cheong and colleagues (Cheong, MacKinnon & Khoo, 2003). Three models were evaluated: Model 1: the direct effect of parent alcohol use on children's intentions, Model 2: the indirect effect of parent alcohol use on children's intentions through each of the parenting behaviors separately (parent monitoring/supervision, inconsistent discipline, positive parenting), and Model 3: the full model including both direct and indirect effects, while maintaining the individual variable model's constraints. In order to limit the number of parameter estimates in a given model, we modeled each of the parenting variables separately, especially since we were also conducting multiple group analyses by gender.

Each model was initially run with all paths fixed to be equal or invariant across genders and sequentially tested for gender differences by freeing paths in a stepwise manner according to the modification indices. If a structural path was significant ($p < .05$) for either gender, it was included in the final model. Finally, we constrained the direct path from parent alcohol use to children's intentions to use alcohol to zero in Model 3 and examined the chi-square difference test between the two. If there was mediation, constraining the direct path to zero should not result in a significant improvement in chi-square (Holmbeck, 1997). In addition, we tested for mediation using the asymmetric confidence intervals (Cheong et al., 2003; MacKinnon, Fritz, Williams, & Lockwood, 2007; MacKinnon, Lockwood, & Williams, 2004) where the lower and upper limits must not include zero to show significance.

Results

LGM Models for Intentions, Parent Alcohol Use and Parenting Behaviors

The linear growth model for children's intentions to use alcohol fit the data well, $X^2(41, N=1050) = 85.32, p < .001$; CFI=.95; RMSEA=.045; 90% CI=.039, .064. Due to the large sample size ($N=1,050$), the chi-square statistics were significant in all models tested; however, other goodness-of-fit measures (e.g., root mean square error of approximation: RMSEA) were used to assess model fit. We also tested a quadratic model of intentions, which did not result in an improvement in fit, $X^2(34, N=1050)=96.77, p < .001$; CFI=.93; RMSEA=.059; 90% CI=.059, .072). In addition, the mean of the slope and variance of the quadratic coefficient were not significant for boys or girls and the variance of the slope was not significant for boys. Thus, the linear model yielded the best fit. An exploration of gender differences showed that the overall model did not differ significantly between genders. However, the intercept (initial level) and slope (increase over grades) varied significantly by gender (girls: $M_i=.17, t=3.92$; $M_s=.11, t=8.05$; boys: $M_i=.46, t=7.84$; $M_s=.07, t=4.61$). As expected, boys' mean initial level of intentions was higher than girls', while the mean of the slope was higher for girls (see Table 1).

²There were several residuals that were correlated in each model. None were across parent and child. For the most part they were between two consecutive timepoints (e.g., child intentions to use alcohol at T2 and child intentions to use alcohol at T3) or across the same timepoint for two parent variables (e.g. parent alcohol use at T3 with parent monitoring/supervision at T3).

In addition, while for both genders there was significant individual variability in both initial levels and slopes of intentions to use alcohol across grades, the variance associated with the intercept was significantly larger for boys than girls, but there was no difference between genders in variance associated with the slope (girls: $D_i=.26$, $t=4.52$; $D_s=.03$, $t=5.34$; boys: $D_i=.61$, $t=5.58$; $D_s=.03$, $t=3.73$). It should be noted that the measure of intentions used in this study increases in reliability as the child ages. Perhaps younger children are less certain about using alcohol as an adult, and therefore this measure is more of a reflection of their intentions to use as an adolescent. There were small, albeit significant gender differences in the correlations between the intercept and slope (girls = $-.06$; boys: $-.08$) indicating that those having a higher initial intentions to use alcohol tended to increase their intentions more slowly across grades.

Means and standard deviations for parents' alcohol use and parenting behavior are provided in Table 2. A linear growth model for parent alcohol use fit the data well, $X^2(52, N=1050) = 79.19$, $p<.01$; CFI=.99; RMSEA=.032; 90% CI=.016, .045. We also tested a quadratic model and found no significant improvement in fit, $X^2(51, 1050)=92.59$, $p<.001$; CFI=.99; RMSEA=.039; 90% CI=.026, .052. As well, the means and variances of the slope and quadratic coefficients were not significant. As expected, parent alcohol use showed no significant differences for parents of boys versus girls in the overall model or any of the parameters in the linear model. Although unexpected, there was a small, but significant increase in parent alcohol use across grades. Parents' alcohol use could increase over time due to an increase in personal stressors (e.g., divorce or loss of employment), as well as stress associated with their developing child as they approach adolescence. Because the slope parameter was small, we also tested a single factor model and found no significant improvement in fit, $X^2(39, N=1050) = 113.30$, $p<.001$; CFI=.98; RMSEA=.060; 90% CI=.048, .073. All parameters were significant including means of the intercept and slope across the sample and the variances of the intercept and slope indicating significant individual variability in both initial levels and change in parent alcohol use across grades ($M_i=2.81$, $t=48.50$; $M_s=.04$, $t=3.82$; $D_i=2.83$, $t=14.89$; $D_s=.043$, $t=6.92$; $COV_{is} = -.14$, $t=5.05$).

The linear model for monitoring/supervision fit the data well, $X^2(51, N=1050) = 117.896$, $p<.001$, CFI=.964, RMSEA=.05; 90% CI=.038, .062. We tested a quadratic model that fit the data significantly better than the linear model, $X^2(47, N=1050)=74.91$, $p<.001$; CFI=.985; RMSEA=.034; 90% CI=.018, .048 ($X^2_{diff}(4, N=1050) = 42.99$, $p<.001$), however, the means of the slope and quadratic coefficients were not significant and there was a linear dependency between the slope and the quadratic coefficient with a correlation greater than one, indicating that they represent the same factor. For the linear model, monitoring/supervision was significant at initial levels and although change in this parenting behavior across grades was small, it was significant with significant individual variability for both initial level and change across grades ($M_i = .951$, $t = 20.74$; $M_s = .347$, $t = 4.45$; $D_i = .359$, $t = 10.11$; $D_s = .010$, $t = 4.66$; $COV_{is} = -.381$, $t = -2.96$). There were no significant gender differences in parameter estimates.

The growth model for parents' inconsistent discipline showed a good fit to the data with no statistically significant differences for the overall linear model for parents of boys versus girls, $X^2(49, N=1050) = 59.78$, $p=.021$, CFI=.994, RMSEA=.021; 90% CI=.000, .037. All parameters were statistically significant except the mean of the slope factor ($M_i=2.64$, $t=56.30$; $M_s = -.042$, $t = -.47$; $COV_{is} = -.393$, $t = -2.01$). Although there was a significant initial level of inconsistent discipline for parents of both boys and girls, it did not change significantly over the eight grades, suggesting that parents continued to use the same levels of inconsistent discipline as their children grew older. However, there were significant differences in variability in both initial levels and to a lesser degree in the slope of parents' inconsistent discipline over grades ($D_i=.27$, $t=9.56$; $D_s=.003$, $t=2.30$). A single factor model showed an adequate fit of the data, $X^2(32, N=1050) = 50.85$, $p<.018$, CFI=.990, RMSEA=.034; 90% CI=.014, .050, although it was not

significantly better than the linear model. All parameters were statistically significant and there were no gender differences in parameter estimates and we selected the single factor model.

A linear model for positive parenting also fit the data well, $X^2(55, N=1050) = 88.02, p = .003$; CFI=.98; RMSEA=.034; 90% CI=.020, .047. In testing a quadratic model there appeared to be a significant improvement in the goodness-of-fit measures $X^2(51, N=1050) = 76.19, p = .01$; CFI=.99; RMSEA=.031; 90% CI=.015, .045 ($X^2_{diff}(4, N=1050) = 11.83, p < .05$), however the mean and variance for the quadratic coefficient were not significant and there was a linear dependency between the slope and the quadratic coefficients. Therefore, the linear model was used in the full model. For the linear model there were no statistically significant differences in the overall model or the parameter estimates for parents of boys versus parents of girls. The initial level of positive parenting was statistically significant ($M_i = 3.86, t = 171.84$) and there was significant individual variability in the initial level of positive parenting ($D_i = .24, t = 10.39$). The decrease in positive parenting over time was small, but significant ($M_s = -.05, t = 9.80$) and there was significant variance in the slope and a significant covariance between the initial level and slope ($D_s = .005, t = 4.17, COV_{is} = -.016, t = -3.15$). This decrease in positive parenting may reflect a decreased use of certain forms of reward over grades that are less appropriate for older children.

Model 1: Effect of Parent Alcohol Use on Children's Intentions to Use Alcohol

The final version of Model 1 is shown in Figure 2. Using a parallel process growth model (i.e., a model with two or more growth models estimated simultaneously) we examined the relation between the initial level (at grade 1) and growth in parent alcohol use and the initial level (at grade 1) and growth in children's intentions across grades. We did not allow the slope of parental use to predict the initial level of intentions. Relations between the intercept of parent alcohol use and the intercept and slope of intentions were significant suggesting that parents who used at high initial levels had children whose intentions were also at high initial levels and increased faster as a function of grade. The relation between slope of parent alcohol use and slope of intentions was also significant indicating that an increase in parental alcohol use was directly related to an increase in intentions. Multiple sample analysis showed a significant gender difference in the relation between the slope of parent alcohol use and the slope of intentions with the effect being twice as large for boys (.42) than girls (.19). The fit of Model 1 was adequate, $X^2(394, N=1050) = 593.00, p < .001$; CFI=.969; RMSEA=.031; 90% CI=.025, .036.

Model 2: The Indirect Paths from Parent Alcohol Use to Intentions through Parenting Behavior

Model 2 was tested separately for each of the three parenting behaviors (i.e. monitoring/supervision (Figure 3), inconsistent discipline (Figure 4), and positive parenting (Figure 5). In all three models, we estimated paths (a) from the intercept and slope of parent alcohol use to the intercept and slope of the mediating variable (or factor of inconsistent discipline) and (b) from the intercept and slope of the mediating variable (or single factor of inconsistent discipline) to the intercept and slope of intentions (or from the mediating single factor). We did not estimate paths from the slope of the mediating variable on the intercept of intentions as these paths would represent the prediction of initial level of intentions at Grade 1 from change in the mediating variable across grades. The slope of monitoring/supervision on the slope of intentions (see Figure 3) was significant for girls but not for boys, suggesting that girls with parents who monitored/supervised them more frequently as the child aged, decreased their intentions to use alcohol as they got older. Initial levels of monitoring/supervision did not have a significant effect on either intercept or slope of intentions for boys or girls and these paths were therefore dropped from Model 3. The path from the slope of parent alcohol use to the slope of monitoring/supervision was statistically significant and not significantly different by

gender. Parents who increased their use of alcohol as their child grew older tended to monitor/supervise their children less frequently. This model fit the data well, X^2 (392, $N=1050$) = 587.71, $p<.001$; CFI=.970; RMSEA=.030; 90% CI=.025, .035.

In Model 2 for inconsistent discipline (see Figure 4), the estimated paths between the single factor of inconsistent discipline and the intercept and slope of intentions were statistically significant and did not differ significantly by gender. Children whose parents were higher in their inconsistent discipline increased their intentions to use alcohol over time. The negative path from inconsistent discipline to initial level of intentions suggested that parents with high inconsistent discipline have children with lower initial levels of intentions. This negative relation must be evaluated in the context of the effect of high inconsistent discipline on the increase (slope) of intentions. Because this effect was positive, the negative relation with the intercept reflected a lagged effect where inconsistent discipline preceded initial levels and increases in intentions over time. Paths from the intercept and slope of parent alcohol use on inconsistent discipline were not statistically significant, indicating that the effect of parental alcohol use on intentions was not mediated by inconsistent discipline. Thus, Model 3 for inconsistent discipline was not tested. The data fit the model well, X^2 (375, $N=1050$) = 543.317 $p<.001$; CFI=.974, RMSEA=.029; 90% CI=.023, .034.

For the third parenting behavior, positive parenting (Figure 5), there was no significant direct effect of positive parenting on intentions. However, there was a statistically significant negative path from the slope of parent alcohol use to the slope of positive parenting for boys (-.27, $p<.05$) and a positive path for girls (.28, $p<.05$). This suggests that parents who increased their alcohol use as the child aged, decreased their positive parenting for boys, but increased it if their child was a girl. Initial levels of parent alcohol use had no effect on either the initial levels of positive parenting or a change in positive parenting. Results indicated there was no relation between parent alcohol use and intentions through positive parenting and thus Model 3 for positive parenting was not tested. The fit of this model was adequate, X^2 (399, $N=1050$) = 540.62, $p<.001$; CFI=.978, RMSEA=.026; 90% CI=.020, .031.

Model 3: The Direct and Indirect Paths of Parent Alcohol Use to Intentions Through Parent Monitoring/Supervision

As noted above, Model 3 was only tested for monitoring/supervision. This model (see Figure 6) included all significant paths shown in Model 2 (Figure 3), plus the direct paths shown in Model 1 (Figure 2). The direct path from intercept of parent alcohol use to intercept of intentions remained significant for both boys (.38, $p<.001$) and girls (.20, $p<.01$). However, the direct path from the slope of parent alcohol use to the slope of intentions remained significant for males (.26, $p<.01$) and became nonsignificant for girls (-.07, ns). Although the direction of the path for girls becomes negative it is not significantly different from zero. These results suggest that in the full model, monitoring/supervision mediated the relation between growth in parent alcohol use and growth in intentions, for girls only. The fit of the model was adequate, X^2 (396, $N=1050$) = 593.33, $p<.001$; CFI=.970, RMSEA=.03; 90% CI=.025, .035.

Since the only significant relation suggesting mediation was between the slope of parent alcohol use and the slope of girls' intentions to use alcohol mediated by the slope of parent monitoring/supervision, we next fixed the direct path from the slope of parent alcohol use to the slope of intentions to zero for girls only, X^2 (397, $N=1050$) = 594.25, $p<.001$; CFI=.970, RMSEA=.030; 90% CI=.025, .035. We conducted a chi-square difference test to see if the mediated model was a better fit. The fit of the two models did not differ significantly, X^2_{diff} (1, $N=1050$) = .92, ns , suggesting that the mediational model was a better model for girls. We did not perform this test for boys, because there was no significant effect of parent monitoring/supervision on intentions. We also tested the mediated effect based on the asymmetric

confidence interval (CI) method. This test showed that the CI was significant, 95% CI = (.009, .125) (Cheong et al., 2003; MacKinnon et al., 2007; MacKinnon et al., 2004).

Discussion

The purpose of this study was to examine the relations between parenting practices and children's intentions to use alcohol in the future. The results demonstrated that parent alcohol use, decreased parent monitoring, and higher inconsistent discipline increased children's intentions to use alcohol, which may have implications for prevention.

In our first model, higher initial parent alcohol use significantly increased children's initial intentions to use alcohol and to a lesser extent increases in intentions, while increased parent alcohol use significantly increased intentions over time. These findings were consistent with previous studies (Chassin et al., 1996; Eitle, 2005; White et al., 2000) that found that increased parent alcohol use/abuse increased their children's alcohol use and misuse. Conversely, some studies have found that the effect of parent alcohol use is mediated through parenting behavior (Barnes et al., 2000). The effect was stronger for boys than girls, perhaps because boys typically initiate alcohol use earlier than girls and the modeling effect may be somewhat delayed for girls (Andrews, 2005). Also developmental studies have found that the effect of father's substance use on girls' use is stronger than that on boys' use (Andrews, 2005). In addition, the smaller number of fathers participating and the composite parent alcohol use variable may have reduced the effect for girls. Finally, predictors of intentions may differ compared to actual use. In our full mediational model (i.e., Model 3, Figure 6) we found parent monitoring explained the relation between parental alcohol use and children's intentions to drink, at least for girls. Consistent with previous findings, Webb and colleagues (2002) using data from older samples have shown an effect of parental monitoring on youth substance use for both boys and girls. In contrast, Barnes (Barnes et al., 2000) found that boys were at greater risk for higher initial levels and growth in alcohol use than girls, as a function of comparatively lower parent monitoring. However, this is the first study to date to examine the effect of parenting behaviors on alcohol intentions in a sample beginning when children are in the 1st grade. Gender differences in substance use tend to be greater in younger samples and tend to decrease as children age (Andrews, 2005).

Our hypotheses that inconsistent discipline and positive parenting would mediate the effect of parent alcohol use on children's intentions to use alcohol were not supported. However, parents' increased alcohol use decreased positive parenting for boys and increased positive parenting for girls. Because there were no significant gender differences in the initial models for parent alcohol use or positive parenting there may be a mediating factor not included in the model causing this opposite effect. For example, behavioral characteristics of the child such as externalizing or internalizing behaviors could impact positive parenting differentially for boys versus girls. We do know from the literature that there are different effects for alcoholic fathers versus alcoholic mothers on their parenting behavior by gender, such that girls are monitored more closely than boys (Marshall & Chassin, 2000). In contrast to previous research (e.g., Wills & Yaeger, 2003), positive parenting did not affect children's intentions to use alcohol.

Further, children whose parents were more inconsistent in their discipline showed significant increases in their intentions to use alcohol, regardless of parents' drinking behavior. These results are consistent with the findings of Eitle (2005) and Jackson et al. (1999). Jackson found that 5th grade children who perceived higher initial levels of parent discipline had lower odds of reporting alcohol use two years later. Children whose parents do not consistently communicate and enforce rules and norms about children's alcohol use may be more likely to plan on or intend to use alcohol and/or initiate early.

This study extends our work and that of others regarding the etiology of children's intentions to use alcohol. We found a number of parent factors impacted children's intentions to use alcohol. In our previous work, we demonstrated that intentions to use alcohol in the OYSUP sample predicts their actual use two years later (Andrews et al., 2003) and showed that the hostility and sociability of children indirectly affected increased alcohol intentions through subjective norms and positive attitudes about alcohol users (Hampson et al., 2006). Two studies have shown that a child's personality characteristics interact with or mediate parent monitoring and consistency of discipline to increase or decrease their children's risk of using a substance, age of regular drinking, and frequency of drinking to get high (O'Connor and Dvorak, 2001; Ohannessian & Hesselbrock, 2007). We might expect that parent monitoring and inconsistent discipline would interact with or mediate children's hostility and sociability and their intentions to use alcohol and/or their later alcohol use.

Strengths of this study include the examination of the effect of parental alcohol use and parenting skills on the development of intentions among very young children, beginning in 1st grade. Further, to our knowledge no previous study has related the development of these parenting variables to the development of intentions to use alcohol. The methodology (cohort-sequential LGM) used in this study took full advantage of the data set and allowed us to use data from four time points to measure change across eight grades, as well as to examine the effects of individual variability of parent behavior on changes in children's intentions.

This study also has some limitations. We examined children's intentions to use alcohol, and not actual alcohol use. The primary reason for the focus on intentions is to develop interventions that will decrease alcohol use intentions and prevent or postpone alcohol initiation. Such interventions could be conducted with young children who have not yet experimented with alcohol, to prevent the development of intentions that will lead to later alcohol use. However, intentions are not proxies for behavior, and other factors not studied here may influence the relation between intentions and behavior, such as associations with deviant peers.

The parent alcohol use measure ranged from "never used" to "daily use" and did not include quantity of alcohol consumed per day. Thus, there may have been a ceiling effect with the most serious drinkers capping at the top level, lessening the effects we might otherwise find. Further, in order to simplify a complex model and to reduce the number of tested parameters we used a combined score for parent use and parenting behaviors. Because we used intentions as our dependent variable from grades 1-8, some of these children may have initiated alcohol use which may have had an impact on the results. Typically, intentions to use alcohol increase following actual use.

Previous studies have shown the importance of examining mother and father influences separately (e.g., Andrews et al., 1997; Hops et al., 1996) which will be important to do in future studies. Further, the lack of full participation by all parents/non-residential parents may have potentially biased these results. Using a cohort-sequential design, the smaller samples in the first and last time points may not represent factors accurately and may have biased our parameter estimates. We used conditions recommended for such designs (Duncan, Duncan, & Hops, 1996; Duncan, Duncan, & Strycker, 2006) including a one-year cohort overlap with a large sample (> 100) in each of the 1st and 8th grades.

Implications for prevention/intervention efforts, whether school-based or family-based, include focusing on family management skills training (e.g., monitoring, communicating, and discipline practices) in order to decrease children's intentions to use and (potentially) delay early initiation of use (Griffin et al., 2000; Rodgers-Farmer, 2000). In addition, parents need to be better informed about the impact their own drinking behavior has on their children's intentions and use of alcohol use. This could decrease parent's drinking behavior and/or

encourage alcohol-specific parenting practices which have been shown to reduce adolescent alcohol use (Van Zundert, Van Der Vorst, Vermulst, & Engels, 2006). The recent work of Kerr and Stattin (Kerr & Stattin, 2000; Stattin & Kerr, 2000) demonstrated that child disclosure, in addition to parent knowledge (monitoring) was important in predicting negative outcomes; thus training focused on strengthening parent-child communication may increase child disclosure and improve parent knowledge of their children's whereabouts and activities, in addition to day-to-day activities, even for very young children.

The gender differences we found suggest that parent training should be adapted to suit the gender of their children (Webb et al., 2002). These parenting strategies could be implemented as part of a school-based intervention or separate family interventions. School-based interventions focusing on early elementary-school children are an important part of decreasing children's intentions to use alcohol as well as other substances and delaying their initiation.

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Figure 1.

Representation of a cohort-sequential latent growth model utilizing four successive measurements across five separate grade cohorts.

Figure 2.

Model 1 for direct effect of parent alcohol use on children's intentions to use alcohol.

NOTE: Parent alcohol use and children's intentions were measured at four assessments (T1 - T4) for 1st-5th grade at T1 through 4th-8th grade at T4. Therefore, using cohort-sequential analyses each factor is represented by 8 grades. Standardized estimates are shown separately for boys and girls (girls are in parentheses). Single parameter estimates indicate invariant paths across gender (* $p < .05$, ** $p < .01$, *** $p < .001$). I = intercept, S = slope, G = grade.

Figure 3.

Model 2 for indirect effects of parent alcohol use on children's intentions through monitoring/supervision.

NOTE: Intentions, parent alcohol use, and parent monitoring/supervision were measured at four assessments (T1 - T4) for 1st-5th grade at T1 through 4th-8th grade at T4. Therefore, using cohort-sequential analyses each factor is represented by 8 grades. Standardized estimates are shown separately for boys and girls (girls in parentheses). Single parameter estimates indicate invariant paths across gender. (* $p < .05$, ** $p < .01$). I = intercept, S = slope, G = grade.

NOTE: Parent alcohol use, inconsistent discipline, and intentions were measured at four assessments (T1 - T4) for 1st-5th grade at T1 through 4th-8th grade at T4. Therefore, using cohort-sequential analyses each factor is represented by 8 grades. Standardized estimates are shown separately for boys and girls (girls in parentheses). Single parameter estimates indicate invariant paths across gender. (* $p < .05$, ** $p < .01$, *** $p < .001$). I = intercept, S = slope, G = grade, f = freely estimated .

Figure 5.

Model 2 for indirect effects of parent alcohol use on children's intentions through positive parenting.

NOTE: Parent alcohol use, positive parenting, and children's intentions were measured at four assessments (T1 - T4) for 1st-5th grade at T1 through 4th-8th grade at T4. Therefore, using cohort-sequential analyses each factor is represented by 8 grades. Standardized estimates are shown separately for boys and girls (girls in parentheses). Single parameter estimates indicate invariant paths across gender. (* $p < .05$, ** $p < .01$, *** $p < .001$). I = intercept, S = slope, G = grade.

Figure 6.

Model 3 with the direct and indirect effects of parent alcohol use on children's intentions through parent monitoring.

NOTE: Parent alcohol use, parent monitoring/supervision, and children's intentions were measured at four assessments (T1 - T4) for 1st-5th grade at T1 through 4th-8th grade at T4. Therefore, using cohort-sequential analyses each factor is represented by 8 grades. Standardized estimates are shown separately for boys and girls (girls in parentheses). Single parameter estimates indicate invariant paths across gender. (* $p < .05$, ** $p < .01$, *** $p < .001$). I = intercept, S = slope, G = grade.

Table 1
Means and Standard Deviations for Children's Alcohol Use Intentions

	Grade							
	1	2	3	4	5	6	7	8
Boys								
Mean	.70	.66	.57	.65	.64	.77	.88	1.31
S.D.	1.17	1.09	.93	.91	.89	.97	1.09	1.30
N	106	198	291	405	412	308	209	99
Girls								
Mean	.36	.25	.34	.55	.51	.69	.95	1.44
S.D.	.76	.69	.68	.83	.79	.89	1.08	1.35
N	112	212	318	422	404	294	190	94

Table 2

Means and Standard Deviations for Parent Variables

	Grade							
	1	2	3	4	5	6	7	8
Alcohol Use Frequency ^a								
Mean	3.03	2.91	2.96	2.97	2.93	2.98	2.96	3.04
S.D.	1.50	1.56	1.55	1.53	1.56	1.60	1.60	1.60
N	208	414	607	792	782	572	3374	173
Monitoring/Supervision								
Mean	23.84	23.99	23.62	23.40	23.04	22.42	21.59	21.19
S.D.	3.12	3.49	3.69	3.69	3.88	4.16	4.35	4.44
N	191	368	523	729	726	534	362	173
Inconsistent Discipline								
Mean	7.00	6.57	6.76	6.85	6.77	6.86	7.06	6.84
S.D.	3.00	3.00	3.04	3.03	3.05	2.98	2.92	2.84
N	191	378	533	736	728	537	363	175
Positive Parenting								
Mean	19.20	19.01	18.69	18.55	18.19	17.92	17.74	17.41
S.D.	2.67	2.72	2.72	2.82	2.83	2.82	3.00	3.10
N	191	379	534	735	728	537	363	174

^aMeasure is a continuous 6-point scale from 0 = "Never used" to 6 = "Drink alcohol daily."