

Childhood Risk Factors for Early-Onset Drinking*

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ABSTRACT. Objective: There is relatively little research on the childhood antecedent predictors of early-onset alcohol use. This study examined an array of psychosocial variables assessed at age 10 and reflecting Problem Behavior Theory as potential antecedent risk factors for the initiation of alcohol use at age 14 or younger. **Method:** A sample of 452 children (238 girls) ages 8 or 10 and their families was drawn from Allegheny County, PA, using targeted-age directory sampling and random-digit dialing procedures. Children and parents were interviewed using computer-assisted interviews. Logistic regression analyses were used to examine the age-10 univariate and multivariate predictors of the initiation of alcohol use by age 14 or younger. **Results:** Twenty-five percent of the sample reported having more than a sip or a taste of alcohol in their life by age 14. Sex, race, and age cohort did not relate

to early drinking status. Children with two parents were less likely to initiate drinking early. Early initiation of drinking related significantly to an array of antecedent risk factors (personality, social environment, and behavioral) assessed at age 10 that reflect psychosocial proneness for problem behavior. In the multivariate model, the variables most predictive of early-onset drinking were having a single parent, sipping or tasting alcohol by age 10, having parents who also started drinking at an early age, and parental drinking frequency. **Conclusions:** Initiation of alcohol use by age 14 reflects childhood psychosocial proneness to engage in problem behavior as measured by Problem Behavior Theory and having a family environment conducive to alcohol use. (*J. Stud. Alcohol Drugs*, 72, 741–751, 2011)

STARTING TO DRINK ALCOHOL in early adolescence or younger is associated with a greater likelihood of developing both problem drinking in adolescence (Ellickson et al., 2001, 2003; Gruber et al., 1996; Hawkins et al., 1997; Horton, 2007; Pedersen and Skrondal, 1998; Warner et al., 2007) and alcohol abuse or dependence in adulthood (DeWit et al., 2000; Grant and Dawson, 1997; Hingson et al., 2006). Early initiation of drinking is also associated with a variety of other problematic outcomes later in adolescence and in young adulthood, including academic problems, dropping out of high school, delinquent behavior, fighting after drinking, illicit drug use, prescription drug misuse, substance use disorders, employment problems, risky sexual behavior, pregnancy, unintentional injuries, drinking and driving, and alcohol- and other drug-related motor vehicle crashes (Ellickson et al., 2003; Gruber et al., 1996; Hermos et al., 2008; Hingson et al., 2000, 2001, 2002, 2008, 2009; Hingson and Zha, 2009; McCluskey et al., 2002; Stueve and O'Donnell, 2005; Zakrajsek and Shope, 2006). Given these linkages with multiple later problems, it is crucial to develop a better understanding of the risk factors that predict the early initiation of alcohol use.

Prevalence of child and adolescent alcohol use

Large-scale epidemiologic surveys of alcohol use among children ages 12 and younger are rare. According to the 1999 Partnership Attitude Tracking Study (sponsored by the Partnership for a Drug-Free America), which surveyed a national probability sample of nearly 2,400 U.S. elementary school students, 9.8% of 4th graders, 16.1% of 5th graders, and 29.4% of 6th graders had had more than just a sip of alcohol in their lives (see Donovan, 2007). Recent data on the use of alcohol in the past year (rather than lifetime) is reported annually by Pride Surveys. According to the 2008–2009 summary of school district surveys performed across the United States, 3.7% of 4th graders, 4.6% of 5th graders, and 7.6% of 6th graders had drunk alcohol in the past year (Pride Surveys, 2009).

Among adolescents, the most recent Monitoring the Future survey of U.S. students in 2009 shows that 36.6% of 8th graders, 59.1% of 10th graders, and 72.3% of 12th graders have had some experience with alcohol (Johnston et al., 2010). Somewhat higher rates of adolescent alcohol experience were reported in the 2009 Youth Risk Behavior Survey (Eaton et al., 2010): 63.4%, 9th grade; 71.1%, 10th grade; 77.8%, 11th grade; and 79.7%, 12th grade.

Definition of early-onset drinking

The definition of early-onset drinking is still evolving. Studies have adopted cut-points for early onset of age 12 or younger (De Genna et al., 2009), age 13 or younger (Baumeister and Tossman, 2005; Bossarte and Swahn, 2008;

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King and Chassin, 2007), age 14 or younger (Hingson et al., 2000; McGue and Iacono, 2005; Sartor et al., 2009), and age 15 or younger (Humphrey and Friedman, 1986). In the present analyses, early initiation of alcohol use is defined as drinking at age 14 or younger, the most common definition in this literature.

Antecedents of early alcohol use initiation

A number of prospective studies have focused on the childhood predictors of the initiation of drinking by age 14 (see review by Zucker et al., 2008). Only a few studies have examined the psychosocial antecedents of starting to drink in childhood (Andrews et al., 2003; Baumrind, 1985; Bush and Iannotti, 1992; Long and Boik, 1993; Macleod et al., 2008). Among the variables predicting childhood onset were alcohol use intentions, beliefs about alcohol, self-esteem, less social assertiveness, negative school attitudes, depression, less parental encouragement, parental smoking, maternal cannabis use, male gender, and lower social class.

When early onset is defined as initiation before age 14 or 15, a number of additional variables figure as risk factors. Antecedent personality variables found to predict early initiation of drinking include lower levels of behavioral control and lower levels of resiliency (Wong et al., 2006), greater rebelliousness and sensation seeking (Sargent et al., 2006), less bonding to school (Hawkins et al., 1997), greater depression (Crum et al., 2008; Kaplow et al., 2001), and less separation anxiety and greater generalized anxiety (Kaplow et al., 2001).

Antecedent social environment variables predicting early-onset drinking are parental alcoholism (King and Chassin, 2007; Wong et al., 2004), greater parental drinking (Hawkins et al., 1997), maternal drinking and smoking (Hayatbakhsh et al., 2008), lower parental monitoring (Hayatbakhsh et al., 2008; Rose et al., 2001), worse home environment (Rose et al., 2001), family disruption (Hayatbakhsh et al., 2008), having more friends who drink (Hawkins et al., 1997), and greater exposure to alcohol use in the movies (Sargent et al., 2006).

Behavior variables predictive of starting to drink before age 14 are conduct disorder, oppositional defiant disorder or any externalizing disorder (McGue et al., 2001), conduct problems (Lynskey and Fergusson, 1995), smoking (Sargent et al., 2006), greater behavior problems and fewer emotional problems (Rose et al., 2001), and sleep problems (Wong et al., 2004, 2009). Last, sociodemographic predictors include male gender (Rose et al., 2001) and White ethnicity (Hawkins et al., 1997).

Problem Behavior Theory

The social-psychological framework of Problem Behavior Theory (Donovan, 2005; Jessor and Jessor, 1977;

Jessor et al., 1991) encompasses a number of the variables noted above as predictors of early-onset drinking, as well as other personality, social environment, and behavior system variables. Within each of the three systems comprising the framework, the explanatory variables reflect either instigations for problem behavior or controls against it, and together they generate a dynamic state of proneness that specifies the likelihood of occurrence of normative transgression or problem behavior. The component variables comprising the personality, social environment, and behavior systems are described in the Method section. Previous research has shown the utility of the framework for the explanation of variation in adolescent and young adult involvement in drinking, problem drinking, marijuana use, sexual behavior, and risky and drinking driving (Costa et al., 1995; Donovan, 1993, 1996; Donovan et al., 1999; Jessor and Jessor, 1977; Jessor et al., 1991). Greater psychosocial proneness for problem behavior ought to relate to early-onset drinking because initiation of alcohol use at a young age violates both legal and social norms for acceptable behavior (Prins et al., 2011).

Focus of the present article

In this article, we examine the antecedent predictors of early-onset alcohol use in a community sample of 8- and 10-year-old children who have been followed up thus far through average ages 16 and 18, respectively. It was hypothesized that children who initiate alcohol use at age 14 or younger would show greater problem behavior proneness in their personality, perceived environment, and behavior systems at age 10 than children who initiate drinking at later ages.

Method

Data were collected during the first 14 waves of an ongoing longitudinal study of the risk factors for the early onset of alcohol use and transitions into problematic drinking (the Tween to Teen Project; Donovan and Molina, 2008; Donovan et al., 2009). Human subject procedures were approved by the University of Pittsburgh Institutional Review Board. A certificate of confidentiality was received from the National Institute on Alcohol Abuse and Alcoholism to help protect the identities of participants.

Procedures

Families were selected for participation using targeted-age directory and random digit dialing sampling of Allegheny County, Pennsylvania (population 1.3 million), which includes the city of Pittsburgh (Donovan and Molina, 2008). Cohorts of 8- and 10-year-old children were recruited to capture children before they had initiated regular alcohol use and to establish an accelerated longitudinal design. Quotas

ensured that half of the families included an 8-year-old and that half of each age-cohort would be female. Single mother-headed families and African American families were oversampled.

Eligible families completed computer-assisted interviews at home or at our offices. Parents provided child consent, and both children and parents provided personal assent. Interviews were read to the children, who responded using the computer mouse. Parents completed interviews independently in a separate room. Target children were paid \$15 and parents were each paid \$50. Subject payments increased slightly over time to maintain their motivation to continue in the study.

Participants

At baseline, 209 8-year-old children and 243 10-year-old children completed interviews. Children participated every 6 months (with a 1.5-year hiatus between Waves 7 and 8). Interviews were completed at baseline by 452 mothers and 320 fathers/partners (92% of fathers in eligible households) and annually thereafter. Participants did not differ significantly from the other families contacted on the screening variables of mother's education, race, or age cohort of the target child (Donovan and Molina, 2008). Approximately one quarter of the children were African American, and one quarter of the families were headed by a single mother.

Attrition over time

By the end of Wave 14, 7.5 years after baseline, 82% ($n = 371$) of the children were still involved in the research. There were no gender or cohort differences in retention, but African American children were significantly less likely to continue in the study (26% at baseline versus 22% at Wave 14). Discontinuers differed from continuers on only one of the 13 Wave 1 measures used by Donovan and Molina (2008) to summarize psychosocial proneness to deviance, which together accounted for little of the variance in attrition (1.2% by adjusted R^2).

Establishing age at initiation of alcohol use

Age at initiation of alcohol use was established using prospective data rather than retrospective recall, which has high levels of unreliability in adolescents and which exhibits substantial "forward telescoping" (Bailey et al., 1992; Engels et al., 1997; Johnson and Mott, 2001; Labouvie et al., 1997; Parra et al., 2003; Prause et al., 2007).

Children were asked questions about sipping or tasting alcohol (Donovan and Molina, 2008) and were then asked: "Have you ever had a drink of beer, wine, or liquor (not just a sip or a taste of someone else's drink) in your life?" (Responses: *yes* = 1, *no* = 0). The consistency of their self-

reports across 14 data waves was examined to establish the earliest wave at which they reported drinking and confirmed it at the next wave, 6 months later (e.g., the pattern 01011111111111, where 0 = abstainer and 1 = drinker at each wave, was coded as onset at Wave 4): 52% were completely consistent, 25% had one inconsistent report, 13% had two inconsistencies, 7% had three inconsistencies, and 3% had four to six inconsistencies (out of 14). Unconfirmed self-reports were coded as not having initiated yet, because these may reflect an incomplete understanding of what constitutes an alcoholic beverage. Once confirmed, all later waves were coded as positive for the initiation of drinking (Spath et al., 2009). Age at interview was used as a conservative measure of the age at initiation.

Table 1 reports the distribution for the prospectively determined ages at initiation of drinking: 112 of the children (25% of sample, 54% of drinkers) reported having a drink by age 14. In subsequent analyses, we focused on the 104 children who initiated drinking after age 10, the youngest age at which there were antecedent data for both age cohorts (eight children who had a drink by age 10 were excluded from the analyses). The comparison group consisted of 289 adolescents who had not started drinking before age 15. Fifty-one abstainers who dropped out of the study before age 15 were excluded because they had not yet passed through the period of risk for early-onset drinking.

Measurement of the psychosocial predictors of early initiation

The predictor set included variables reflecting Problem Behavior Theory (Jessor and Jessor, 1977) and several variables from other sources that have been found to predict alcohol involvement among adolescents. Measures of the selected variables were modified for use with children and incorporated into the interviews. All measures were assessed before initiation of drinking at an average age of 10.4

TABLE 1. Distribution on prospectively determined age at initiation of alcohol use (among ever drinkers)

Age in years	Freq.	%	Cumul. freq.	Cumul. %
8	2	1.0	2	1.0
9	4	1.9	6	2.9
10	2	1.0	8	3.8
11	14	6.7	22	10.5
12	19	9.1	41	19.6
13	31	14.8	72	34.4
14	40	19.1	112	53.6
15	47	22.5	159	76.1
16	31	14.8	190	90.9
17	16	7.7	206	98.6
18	3	1.4	209	100.0
Total	209	100.0		

Notes: Percentages of the sample who initiated drinking at ages 17 and 18 are low because many of the adolescents had not yet reached these ages. Freq. = frequency; cumul. = cumulative.

years (Wave 5 for the younger cohort, Wave 1 for the older cohort).

Personality system measures. The following personality system measures from Problem Behavior Theory were assessed: Value on Academic Achievement, a 5-item scale reflecting the personal importance of doing well in school ($\alpha = .65$); Expectation for Academic Achievement, a 5-item scale of the child's rated likelihood of doing well in school ($\alpha = .77$); Attitude Toward School, a 5-item scale measuring positive assessments of school, teachers, and the consequences of being in school ($\alpha = .71$); Attitudinal Intolerance of Deviance, a 10-item scale reflecting the rated "wrongness" of behaviors like defacing property, lying to parents, shoplifting, and aggression ($\alpha = .82$); Attitude Toward Drinking, a 4-item scale assessing approval of sipping, drinking, and drunkenness ($\alpha = .77$); Attitude Toward Drug Use, a 4-item measure of approval for using tobacco, marijuana, pills, and LSD (d-lysergic acid diethylamide) or cocaine ($\alpha = .90$); and Religiosity, a 6-item scale measuring the personal importance of religious guidance for the direction of daily life ($\alpha = .86$).

In addition to these Problem Behavior Theory variables, the following personality variables were assessed: Positive Alcohol Expectancies, a 13-item measure of agreement that drinking has effects such as increasing relaxation, reducing shyness, decreasing worry, and feeling happier ($\alpha = .85$; Donovan et al., 2009); Negative Alcohol Expectancies, a 14-item measure of agreement that drinking has effects such as making people lose their temper, act impulsively, ignore responsibilities, lose coordination, and become sleepy ($\alpha = .84$; Donovan et al., 2009); Sensation Seeking, an 11-item version of the thrill and adventure seeking subscale of the Zuckerman et al. (1978) sensation seeking scale-V measure ($\alpha = .56$); Impulsivity, an 8-item abridged version of the Eysenck et al. (1984) measure ($\alpha = .64$); and Internalizing Behavior, a measure reflecting anxiety and depression from the Child Behavior Checklist completed by the mother (Achenbach, 1991).

Perceived environment system measures. The perceived environment system encompasses variables reflecting the child's perceptions of two major classes of social agents, parents and peers, and within each of these classes, variables with both proximal and distal relationships to child drinking. Measures of the family domain include the following: Mother-Child Relationship, a 6-item scale assessing intimacy and affection (Furman and Buhrmester, 1992; $\alpha = .76$); Father-Child Relationship, a similar measure assessing the child's closeness to his or her father ($\alpha = .79$); Conflict with Parents, a 16-item measure ($\alpha = .88$) assessing how often parents and children fight about chores, bedtimes, homework, friends, etc., a revision of the Issues Checklist used by Robin and Foster (1989); Parental Control, a 14-item scale ($\alpha = .69$) assessing child versus parental say in decision-making regarding the above issues; Perceived Parent Approval of Child Drinking, a 4-item scale asking how their parents feel about a child their age drinking ($\alpha = .81$);

Parental Alcohol Socialization, a 5-item scale assessing the frequency of parent-child discussions about child drinking ($\alpha = .90$; Donovan and Molina, 2008); Parental Approval of Child Drug Use, a 4-item scale assessing perceived parental approval for the use of cigarettes, marijuana, and other drugs ($\alpha = .92$); Exposure to Mother Drinking and Exposure to Father Drinking, asking if the child had seen his or her mother or father drink alcohol in the past year; and Density of Family Alcohol Problems, a measure of the proportion of first- and second-degree relatives with past or present alcohol problems as assessed by maternal reports on the Mann Family Tree (Mann et al., 1985; Molina et al., 2010).

Measures of the following perceived environment system variables relevant to the peer domain were also assessed: Parent versus Peer Influence, a 7-item scale asking if parents or peers are more influential when important decisions are faced ($\alpha = .60$); Susceptibility to Peer Pressure, a 4-item measure assessing peer influence regarding alcohol, cigarettes, and delinquent behaviors (Dielman et al., 1993; $\alpha = .70$); Friends' Approval of Drinking, a 4-item scale asking how their close friends feel about someone their age drinking ($\alpha = .80$); Friends' Approval for Drug Use, a 4-item scale asking how their close friends feel about someone their age using marijuana or other drugs ($\alpha = .92$); Peer Pressure for Drinking, a 2-item scale asking if friends ever try to get the child to try a drink of beer and if friends have offered the child a drink of beer, wine, or distilled spirits ($\alpha = .92$); and Peer Pressure for Smoking, a 2-item scale asking if close friends ever tried to get the child to try a cigarette or offered him or her one ($\alpha = .97$).

Behavior system measures. Measures of the following problem and conventional behavior variables were assessed: General Deviant Behavior, a 14-item measure of frequency of lying, cheating, stealing, and aggression in the past 6 months ($\alpha = .79$); Externalizing Behavior, a measure of mother reports of child delinquent and aggressive behavior (Achenbach, 1991); Sipping/Tasting Alcohol by Age 10, a measure of ever having sipped or tasted alcohol by age 10 (Donovan and Molina, 2008); Religious Behavior, a 3-item measure of frequency of church attendance, religious instruction, and religious youth group involvement in the past 6 months ($\alpha = .70$); School Performance, a single question regarding usual grades received; and Prosocial Activities, a 3-item measure of involvement in the past 6 months in activities such as helping homeless people or the elderly, cleaning up the environment, and collecting toys or clothes for the needy ($\alpha = .63$).

Greater proneness for problem behavior is indicated by lower value and expectation for academic achievement, less positive attitudes toward school, greater approval of drinking and drug use, lower intolerance of deviance, lower religiosity, greater susceptibility to peer pressure, greater peer than parental influence, greater perceived friends' approval for drinking and other drug use, greater peer pressure for

smoking and drinking, more frequent deviant behavior, less frequent religious behavior, lower grades, and less prosocial activity. It is hypothesized that these measures of psychosocial proneness for problem behavior will relate significantly to early initiation of alcohol use.

Measures of parental variables

The following variables were assessed for both parents at child age 10: Intolerance of Child Deviance, a 14-item scale reflecting how wrong it is for someone their child's age to lie, steal, hit others, etc. ($\alpha = .85$ and $.91$ for mother and father, respectively); Approval of Child Drinking, a 4-item measure of parental approval of sipping, drinking, and drunkenness by someone their child's age ($\alpha = .64$ and $.86$); Approval of Child Drug Use, a 10-item scale assessing attitude toward child smoking, marijuana use, and other drug use ($\alpha = .82$ and $.95$); Religiosity, a 6-item scale assessing the personal importance of religion for daily life ($\alpha = .90$ – $.91$); Alcohol Socialization, a 5-item measure of how often each parent has talked with the child about alcohol use ($\alpha = .88$ – $.92$); General Deviant Behavior, an 18-item measure of each parent's frequency of involvement in norm-violating behaviors (e.g., lying, stealing, aggression) in the past year ($\alpha = .67$ and $.86$); Alcohol Drinking Frequency, a measure of how often each parent drank beer, wine, and distilled spirits in the past 6 months; Early-Onset Drinking, a dichotomous indicator of whether the parent reported starting to drink by age 14; and Religious Behavior, a 4-item scale of each parent's attendance at religious services, adult forums, charitable activities, and social events ($\alpha = .81$).

Analytic procedures

Logistic regression analyses (Hosmer and Lemeshow, 2000) were performed using SPSS Statistics 17 (SPSS Inc., Chicago, IL). Logistic regression was used instead of survival analysis for several reasons. First, our interest was in predicting initiation of drinking before a specific age rather than predicting earlier versus later drinking onset. This is consistent with most of the literature on predictors of early-onset drinking. Second, the number of children in our sample who initiated drinking at each age was relatively small, particularly at the youngest ages. Third, none of the children in the younger cohort had reached ages 17 or 18 by Wave 14, which would have resulted in systematic censoring of their data in survival analyses.

The univariate relations of the predictor variables to the binary dependent variable of early-initiation drinking (coded 0, 1) were determined by logistic regressions consisting of the predictor and a constant. For each variable, the regression coefficient, its standard error, and the Wald test are reported, as well as the odds ratio (OR) and its 95% confidence interval (CI). All variables having a significant Wald test (p

$\leq .05$) were included in the multivariate analyses. Overall predictive utility (variance accounted for) was estimated by the Nagelkerke R^2 . The overall fit of the multivariate model was determined by the Hosmer–Lemeshow test.

Results

Demographic correlates of early drinking

Age cohort differences. The two age cohorts did not differ significantly in the percentage of early-onset drinkers: 24% of the 8-year-old cohort had initiated drinking by age 14 versus 28% of the 10-year-old cohort (OR = 1.11, 95% CI [0.88, 1.39]). Consequently, the two age cohorts were combined for the following analyses.

Gender differences. Overall, boys and girls did not differ significantly in the percent initiating alcohol use at a young age: 23% versus 30%, respectively (OR = 1.45, 95% CI [0.92, 2.28]).

Racial differences. White children and African American children initiated early alcohol use at approximately the same rate: 26% versus 32%, respectively (OR = 1.34, 95% CI [0.80, 2.26]).

Socioeconomic differences. Mother's self-reported education related significantly ($p < .05$) to early initiation of child drinking (OR = 0.84, 95% CI [0.71, 0.99]), indicating that children of less educated mothers were more likely to initiate drinking early. Father's education did not relate significantly (OR = 0.95, 95% CI [0.80, 1.14]).

Family composition. Children in single mother-headed households were significantly ($p < .001$) more likely than children in two-parent families to initiate drinking at an early age: 44% versus 22%, respectively (OR = 0.36, 95% CI [0.22, 0.60]).

Psychosocial predictors of early-onset drinking

Table 2 presents the univariate relations with early drinker status of the psychosocial variables collected at age 10 via children's self-reports. As can be seen, a substantial number of variables display significant ($p < .05$) Wald tests. Children who initiated drinking early had lower expectations for academic achievement, less positive attitudes toward school, less intolerance of deviance, greater approval of drinking, lower religiosity, greater peer than parental influence, greater friends' approval of drinking and of other drug use, more conflict with parents, less parental control, higher perceived parental approval of child drinking, greater exposure to parental drinking ($p < .10$), more frequent deviant behavior, and less frequent religious behavior ($p < .10$). All of these variables reflect higher levels of psychosocial proneness for problem behavior.

In addition, this table shows that sipping or tasting alcohol by age 10 relates significantly to early drinking. Cross-tabula-

TABLE 2. Univariate relations of antecedent psychosocial variables from target self-report with early alcohol initiation

Variable	<i>B</i>	<i>SE</i>	Wald	OR	[95% CI]
Personality system variables					
Value on academic achievement	-0.028	0.060	0.22	0.973	[0.865, 1.093]
Expectation for academic achievement	-0.107	0.050	4.53*	0.899	[0.814, 0.992]
Attitude toward school	-0.163	0.060	7.45**	0.850	[0.756, 0.955]
Intolerance of deviance	-0.125	0.041	9.43**	0.882	[0.814, 0.956]
Attitude toward drinking	0.191	0.067	8.19**	1.210	[1.062, 1.379]
Positive alcohol expectancies	-0.007	0.014	0.26	0.993	[0.966, 1.021]
Negative alcohol expectancies	0.005	0.016	0.10	1.005	[0.974, 1.038]
Attitude toward drug use	0.135	0.088	2.35	1.144	[0.963, 1.360]
Religiosity	-0.100	0.039	6.68**	0.905	[0.838, 0.976]
Impulsivity	-0.015	0.057	0.07	0.985	[0.882, 1.102]
Thrill-seeking behavior	0.114	0.058	3.78†	1.120	[0.999, 1.256]
Internalizing behavior	0.016	0.022	0.57	1.017	[0.974, 1.061]
Susceptibility to peer pressure	0.207	0.161	1.65	1.230	[0.897, 1.686]
Perceived peer environment					
Relative parental vs. peer influence	0.120	0.049	5.86*	1.127	[1.023, 1.242]
Friends' approval of drinking	0.160	0.057	7.99**	1.174	[1.050, 1.312]
Friends' approval for drug use	0.205	0.073	7.85**	1.228	[1.064, 1.418]
Peer pressure for drinking	-0.053	0.243	0.05	0.948	[0.589, 1.526]
Peer pressure for smoking	0.481	0.346	1.94	1.618	[0.822, 3.186]
Perceived parental environment					
Relationship with mother	-0.021	0.028	0.56	0.980	[0.928, 1.034]
Relationship with father	-0.034	0.027	1.61	0.967	[0.917, 1.019]
Conflict with parents	0.030	0.013	5.79*	1.031	[1.006, 1.057]
Parental control	-0.063	0.026	5.99*	0.939	[0.893, 0.988]
Parental approval of child drinking	0.111	0.045	6.04*	1.117	[1.023, 1.220]
Parental alcohol socialization	-0.009	0.026	0.11	0.991	[0.941, 1.044]
Parental approval of child drug use	0.081	0.056	2.07	1.084	[0.971, 1.210]
Exposure to mother's drinking	0.414	0.230	3.22†	1.512	[0.963, 2.375]
Exposure to father's drinking	0.420	0.243	2.98†	1.521	[0.945, 2.449]
Behavior variables					
General deviant behavior	0.079	0.025	9.80**	1.082	[1.030, 1.137]
Externalizing behavior	0.042	0.073	0.33	1.043	[0.904, 1.203]
Sipped alcohol by age 10	0.633	0.232	7.42**	1.883	[1.194, 2.969]
Religious behavior	-0.045	0.024	3.44†	0.956	[0.911, 1.003]
School performance	-0.241	0.159	2.32	0.785	[0.576, 1.072]
Prosocial activities	0.044	0.065	0.47	1.045	[0.921, 1.187]

Notes: Coefficients are from separate logistic regressions, including a constant, predicting early-onset status. Odds ratios (ORs) [Exp(*B*s)] and their 95% confidence intervals (CIs) are reported for all variables.

†*p* < .10; **p* < .05; ***p* < .01 (all two tailed, *df* = 1).

tions show that 33% of children who sipped or tasted alcohol by age 10 initiated drinking by age 14 versus 21% of children who had not sipped alcohol by age 10, $\chi^2(1) = 7.5, p = .006$.

Table 3 presents the univariate logistic regression results based on the mother and father/partner interviews when the children were 10 years old. Significant mother-reported predictors of child early drinking were lower levels of religiosity and religious behavior, more frequent drinking ($p < .10$), and early-onset drinking ($p < .10$). For fathers, significant predictors were greater approval of child drinking and child drug use, more frequent drinking, early-onset drinking, and less frequent religious behavior. Density of family alcohol problems did not relate significantly.

Multivariate analyses predicting early-onset drinking

A multivariate logistic regression analysis was performed using all of the variables in the preceding analyses that related significantly ($p < .05$) to early onset. For these analyses, the

mother and father/partner variables were averaged to form parental variables so as not to exclude children without participating fathers from the analyses. In Table 4, the significant predictors of early-onset drinking were having a single parent ($p < .01$), sipping or tasting alcohol by age 10 ($p < .05$), parental early onset of drinking ($p < .05$), and greater parental frequency of drinking ($p < .05$). Conflict with parents and greater peer than parental influence showed trends of association ($p < .10$). Taken together, the psychosocial variables accounted for 23.5% of the variance in early drinking initiation (from the Nagelkerke R^2). The logistic regression equation fit the data well according to the Hosmer–Lemeshow test, $\chi^2(8) = 2.30, p = .97$, and correctly classified 76.5% of the children. A supplementary logistic regression including only the six predictors listed directly above accounted for 15.3% of the variance, suggesting that a third of the variance explained was accounted for by measures of psychosocial proneness that correlated with these significant multivariate predictors. For example, having a single parent was associated with less

TABLE 3. Univariate relations of antecedent psychosocial variables from parental self-reports with child early alcohol initiation

Variable	<i>B</i>	<i>SE</i>	Wald	OR	[95% CI]
Mother report variables					
Intolerance of child deviance	0.024	0.044	0.29	1.024	[0.939, 1.117]
Approval of child drinking	-0.011	0.103	0.01	0.989	[0.807, 1.211]
Approval of child drug use	0.071	0.089	0.63	1.073	[0.902, 1.277]
Religiosity	-0.079	0.033	5.80*	0.924	[0.867, 0.985]
Alcohol socialization	-0.003	0.031	0.01	0.997	[0.938, 1.059]
General deviant behavior	-0.015	0.042	0.12	0.985	[0.907, 1.070]
Drinking frequency	0.005	0.003	2.81†	1.005	[0.999, 1.011]
Early-onset drinking	0.514	0.280	3.63†	1.672	[0.965, 2.895]
Religious behavior	-0.072	0.024	8.61**	0.931	[0.887, 0.977]
Density of family alcohol problems	0.495	0.678	0.53	1.640	[0.434, 6.196]
Father report variables					
Intolerance of child deviance	-0.023	0.033	0.49	0.977	[0.916, 1.042]
Approval of child drinking	0.158	0.075	4.44*	1.171	[1.011, 1.356]
Approval of child drug use	0.293	0.143	4.23*	1.341	[1.014, 1.774]
Religiosity	-0.055	0.036	2.35	0.946	[0.881, 1.016]
Alcohol socialization	0.057	0.034	2.81†	1.059	[0.990, 1.132]
General deviant behavior	-0.002	0.029	0.01	0.998	[0.942, 1.057]
Drinking frequency	0.006	0.002	5.59*	1.006	[1.001, 1.010]
Early-onset drinking	0.619	0.292	4.49*	1.857	[1.047, 3.293]
Religious behavior	-0.091	0.031	8.57**	0.913	[0.858, 0.970]

Notes: Coefficients are from separate logistic regressions, including a constant, predicting early-onset status. Odds ratios (ORs) [Exp(*B*)s] and their 95% confidence intervals (CIs) are reported for all variables.

†*p* < .10; **p* < .05; ***p* < .01 (all two tailed, *df* = 1).

intolerance of deviance, greater friends' approval of drinking and drug use, more frequent delinquent behavior, and less frequent church attendance.

Discussion

Twenty-five percent of the children reported having had a drink of alcohol (not just a sip or taste of someone else's

drink) by age 14 or younger. Across a wide array of personality, perceived environment, and behavior system variables drawn from Problem Behavior Theory (Jessor and Jessor, 1977), children whose scores reflected greater proneness for problem behavior were more likely to initiate drinking early. These children had less conventional scores on measures of their

TABLE 4. Multivariate relations of antecedent psychosocial variables with early alcohol initiation

Variable	<i>B</i>	<i>SE</i>	Wald	OR	[95% CI]
Expectation for academic achievement	-0.006	0.063	0.01	0.994	[0.879, 1.125]
Attitude toward school	-0.039	0.076	0.27	0.962	[0.829, 1.115]
Intolerance of deviance	-0.043	0.054	0.62	0.958	[0.861, 1.066]
Attitude toward drinking	0.129	0.092	1.96	1.137	[0.950, 1.362]
Religiosity	-0.041	0.050	0.66	0.960	[0.870, 1.059]
Parental vs. peer influence	0.113	0.061	3.48†	1.120	[0.994, 1.261]
Friends' approval of drinking	-0.048	0.090	0.29	0.953	[0.798, 1.137]
Friends' approval of drug use	0.050	0.106	0.22	1.052	[0.853, 1.296]
Conflict with parents	0.029	0.016	3.32†	1.030	[0.998, 1.062]
Parental control	-0.043	0.030	2.10	0.958	[0.904, 1.015]
Parent attitude toward drinking	-0.022	0.063	0.12	0.979	[0.865, 1.107]
General deviant behavior	0.017	0.032	0.27	1.017	[0.955, 1.083]
Sipped alcohol by age 10	0.657	0.273	5.79*	1.928	[1.130, 3.292]
Mother education	-0.063	0.106	0.35	0.939	[0.763, 1.156]
Single- vs. two-parent family	-0.960	0.302	10.12**	0.383	[0.212, 0.692]
Parental approval child drinking	-0.062	0.128	0.23	0.940	[0.731, 1.208]
Parental approval child drug use	0.161	0.118	1.86	1.175	[0.932, 1.482]
Parental religiosity	-0.004	0.056	0.01	0.996	[0.892, 1.112]
Parental drinking frequency	0.007	0.003	4.44*	1.007	[1.001, 1.014]
Parental early onset	0.788	0.367	4.62*	2.200	[1.072, 4.515]
Parental religious behavior	-0.050	0.041	1.46	0.951	[0.878, 1.032]
Constant	0.690	3.167	0.05	1.995	

Notes: Parental measures are the average of mother and father reports (to prevent loss of adolescents with no father data). OR = odds ratio; CI = confidence interval.

†*p* < .10; **p* < .05; ***p* < .01 (all two tailed).

attitudes, beliefs, and expectations related to religion and school; they had greater approval of drinking; they perceived their friends to be more supportive of alcohol and drug use and their parents as being less disapproving of children their age drinking; and they reported more frequent involvement in delinquent-type behaviors. Their parents also reported drinking more frequently and being less involved in religious activities.

The present findings extend the explanatory reach of Problem Behavior Theory beyond its previous developmental scope. Earlier studies had established the utility of this theoretical framework for the explanation of variation in a diverse array of problem and health-related behaviors in both adolescence and young adulthood (Donovan, 1993; Donovan et al., 1991, 1993, 1999; Jessor, 1987; Jessor and Jessor, 1975, 1977; Jessor et al., 1991). The linkage found here between psychosocial risk for problem behavior assessed at age 10 and early initiation of alcohol use demonstrates the utility of the framework at a younger life stage than previously examined.

Not only do the data demonstrate a consistent relationship between greater psychosocial proneness to deviance at age 10 and the likelihood of initiating drinking at a young age, but taken together, these variables explained almost a quarter of the variance. This is approximately twice as much variance as accounted for when Problem Behavior Theory was used to predict time to onset of drinking in a sample of adolescents aged 13–15 years old at baseline (Jessor and Jessor, 1975). The present relationship might have been even stronger had the psychosocial predictor measures been assessed closer to the actual ages at early initiation of drinking (which varied from age 11 to age 14). The relationship may have also been attenuated somewhat by there being relatively less variance on these measures of proneness to deviance at 10 years of age than there would be at older ages.

Of particular interest in the findings were the negative relations of child and parental religiosity and church attendance to early initiation of drinking; more religious children and those more involved in religious observances and youth groups were less likely to initiate drinking early, as were children whose parents were more religious. These findings expand previous research that has been largely cross-sectional in nature and limited to adolescent self-reports (Brown et al., 2001; Burkett, 1980; Sinha et al., 2007; Wallace et al., 2003). Although the present analyses were not designed to assess whether these variables qualified as protective factors moderating risk for early onset, it would be important in future research to determine the extent to which parental religiosity and observance reinforce the effects of the child's own religiosity in delaying onset.

Family contexts in which children were exposed to parental drinking and perceived approval for their own use of alcohol increased the likelihood that the children would start drinking at age 14 or younger, consistent with our earlier

research on child sipping or tasting of alcohol (Donovan and Molina, 2008). Not only did more frequent parental drinking relate to early initiation, but parents' own early initiation of drinking related as well—suggesting not only environmental influence but also genetic influence.

The significant role of sipping or tasting alcohol by age 10 in the prediction of early-onset drinking raises several issues. First, it should be emphasized that sipping or tasting alcohol and having a first drink are distinct alcohol use behaviors whose relation is not artifactual. In our computer-assisted interview at each wave, we asked about sipping before we asked about ever having a drink of alcohol (“not just a sip or a taste of someone else's drink”). It was thus clear to the children that we considered sipping and drinking to be distinct behaviors. The longitudinal patterning of the children's responses to these questions validates their understanding of these behaviors. Among children who had ever engaged in both behaviors, 91% started sipping in an earlier wave than they started drinking; only 5% started both in the same wave. Second, children who had already had a drink of alcohol by age 10 ($n = 8$) were excluded from the analyses so that all participants were initially either abstainers (51%) or sippers (49%). Third, although the present result appears to contradict our earlier finding that sipping or tasting alcohol in childhood was not associated with problem behavior proneness (Donovan and Molina, 2008), it can be reconciled by noting that, whereas age-10 sippers were more likely than nonsippers to initiate drinking by age 14 (33% vs. 21%, respectively), the majority of them (67%) did not in fact progress into early-onset drinking. This suggests that the relation of childhood sipping to early-onset drinking may be because of a more problem-behavior-prone subset of sippers or those who sip in nonfamily contexts (Ward et al., 2010). Further person-centered research should be pursued to test this speculation. We will continue to follow this sample to determine if there is longitudinal support for a linkage between early sipping and later problems.

A number of the predictor variables examined here failed to show significant relations to early-onset drinking, including sensation seeking, impulsivity, and alcohol expectancies. It may be that these variables are more predictive of progression into higher intensity alcohol involvement than they are of early initiation of use. Surprisingly, children's externalizing behavior problems failed to predict early-onset drinking despite the significant relation of self-reported deviant behavior that was found. It is possible that there simply was insufficient variation in these mother reports of potentially more severe behaviors at age 10. Lastly, our measure of the family density of alcohol problems may not have shown a significant relation to early-onset drinking because it assessed only maternal reports of biological relatives' problem drinking rather than familial diagnoses of alcohol dependence as examined by King and Chassin (2007) and Wong et al. (2004).

In addition to the psychosocial variables and sipping/tasting, family structure had a substantial impact on the early initiation of drinking. Being raised in a household headed by a single mother increased the risk of starting to drink by age 14, whereas having a father in the household decreased this risk (see also Dooley et al., 2005; Hayatbakhsh et al., 2008). Single parenthood may reflect greater sociodemographic disadvantage (Molina et al., 2010) and was shown to relate to a number of other psychosocial risk factors (e.g., greater tolerance of deviance and friends' drinking and drug use). Identification of the factors mediating this relationship would be important for the design of prevention programs targeted to children being raised by single mothers.

The present findings have several other implications for prevention. First, the relation between psychosocial proneness to problem behavior at age 10 and early-onset drinking suggests the need for prevention programming at younger ages than currently targeted. Second, the findings illustrate that a wide array of psychosocial variables affect risk for early-onset drinking, which is itself an important risk factor for later problematic drinking (see the Introduction). Third, the importance of family factors (both as perceived by the child and as reported by the parents) in predicting early-onset drinking supports the inclusion of family components in prevention efforts (Spath et al., 2006; Stigler et al., 2006).

Several considerations should be kept in mind when evaluating these findings. First, the sample was recruited from a single county in the northeastern United States. The sample does, however, include families from both urban and suburban areas, White and African American families, and families headed by single mothers as well as two-parent families. Second, the participation rate among eligible families was somewhat low, similar to other studies requiring a commitment for multiple waves of participation by multiple family members. Participating families, however, did not differ from refusing or ineligible families on the screening variables examined. Third, the measure of early initiation drinking was based solely on child self-reports. Care was taken, however, to examine the patterning of child reports over 14 waves of data to establish their age at initiation. In addition, self-reported alcohol use has been shown to be valid in both adolescent (Brener et al., 2003; Smith et al., 1995; Winters et al., 1990–1991) and child samples (Dielman et al., 1995; Donovan et al., 2004). Last, although the research assessed both mother's and father's educational attainment as background factors, family income and parental occupational status were lacking, resulting in less complete measurement of family socioeconomic position.

The present findings demonstrate the relation of an array of modifiable psychosocial risk factors assessed in middle childhood to early-onset drinking. This array included child attitudes, perceptions of support in their peer and family environments, and their involvement in delinquent-type behavior, as well as parental reports of alcohol intake and religious

involvement. Continued follow-up of these children as they move through adolescence should permit us to determine whether this same array of variables also figure as antecedent risk factors for transitions into heavy episodic drinking, drunkenness, and alcohol problems.

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