

Antecedent Predictors of Children's Initiation of Sipping/Tasting Alcohol

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Background: Sipping or tasting alcohol is one of the earliest alcohol-use behaviors in which young children engage, yet there is relatively little research on this behavior. Previous cross-sectional analyses determined that child sipping or tasting is associated with the child's attitude toward sipping and with a family environment supportive of alcohol use, but not with variables reflecting psychosocial proneness for problem behavior as formulated in Problem Behavior Theory (Jessor and Jessor, *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth*, 1977, Academic Press, New York). This study extended these analyses longitudinally to identify antecedent predictors of the childhood initiation of sipping or tasting alcohol in a multiwave study.

Methods: A sample of 452 children (238 girls) aged 8 or 10 and their families was drawn from Allegheny County, PA, using targeted-age directory sampling and random digit dialing procedures. Children were interviewed using computer-assisted interviews. Antecedent variables collected at baseline (Wave 1) were examined as predictors of the initiation of sipping/tasting alcohol in childhood (before age 12) among Wave 1 abstainers ($n = 286$).

Results: Ninety-four children initiated sipping/tasting alcohol in a nonreligious context between baseline and turning age 12. Initiation of sipping/tasting did not generally relate to baseline variables reflecting psychosocial proneness for problem behavior. Instead, as found in the previous cross-sectional analyses, the variables most predictive of initiating sipping/tasting were perceived parents' approval for child sipping, parents' reported approval for child sipping, parents' current drinking status, and children's attitudes toward sipping/tasting alcohol.

Conclusions: These longitudinal analyses replicate the earlier cross-sectional results. Young children's sipping/tasting of alcohol reflects parental modeling of drinking and parental approval of child sipping and does not represent a precocious manifestation of a psychosocial proneness to engage in problem behavior.

Key Words: Alcohol, Children, Epidemiology.

RESEARCH has increasingly recognized that involvement with alcohol is a developmental phenomenon (e.g., Masten et al., 2008) in which both alcohol-use initiation and escalation into alcohol problems have their highest incidence prior to adulthood. By age 18, two-thirds (68%) of U.S. teens can be classified as drinkers (Johnston et al., 2014; Substance Abuse and Mental Health Services Administration [SAMHSA], 2013). In contrast, only 7% of 12-year-olds

have ever had a full drink of alcohol (SAMHSA, 2013). Similar increases in prevalence from early to late adolescence are also shown for binge drinking and heavy drinking (Masten et al., 2008; SAMHSA, 2013).

There is also developmental progression in alcohol involvement at the individual level. Commonly cited stages include abstinence, sipping or tasting, ever drinking, current drinking, binge drinking, heavy drinking, problem drinking, and alcohol dependence (e.g., Donovan and Molina, 2013; Guo et al., 2000; Jackson, 2010; Lanza et al., 2007). This study focuses on the earliest transition in the youngest population, specifically, from abstinence into sipping or tasting alcohol among children. There have been no previous longitudinal examinations of the antecedent predictors of this transition.

Historically, sipping or tasting alcohol has received little research attention. In most studies, questions about drinking have asked about "any alcohol use" (Andrews et al., 2003; Bush and Iannotti, 1993; Dunn and Goldman, 1998), "having more than just a few sips" (Johnston et al., 2014), or having "a full drink" (Jackson et al., 1997, 1999; SAMHSA, 2013), effectively treating sipping or tasting inconsistently as either drinking or abstinence. Here, we distinguish between sipping and drinking, defining drinking as having had more than a sip or a taste of alcohol.

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There are several reasons why it is important to study sipping or tasting alcohol in childhood. First, unlike drinking, sipping is prevalent in the child population. Although there is no federal nationwide surveillance of sipping among children, community studies reported that approximately a third of 9-year-olds (Jackson et al., 2013), 30% of third to sixth graders (Johnson et al., 1997), and more than half of fourth graders or fifth graders (Bush and Iannotti, 1992) had initiated sipping. In our own longitudinal study (Donovan and Molina, 2013), the prevalence of ever sipping was 37% by age 8 and 66% by age 12. Second, sipping generally precedes drinking in the natural history of alcohol involvement: 91% of children/adolescents who started drinking had initiated sipping previously (Donovan and Molina, 2011), with 3.6 years on average between their initiation of these 2 behaviors (Donovan and Molina, 2013). Third, although sipping seems to set the stage for later drinking (because it happens first), we currently know little about the antecedents of children's sipping. Identification of the antecedents of sipping or tasting should contribute to a better understanding of this behavior's role in the development of alcohol-use involvement.

Previous research has highlighted the importance of the family alcohol environment in children's early use of alcohol. Long before they first taste alcohol, children have witnessed its use (and sometimes abuse) both societally and in their immediate family (Zucker et al., 1995). Through observation of family drinking and alcohol-use portrayals on television, children vicariously learn about alcohol use as a social behavior and develop beliefs about its positive and negative functions (Donovan et al., 2009; Dunn and Goldman, 1998; Zucker et al., 2008). Most of children's early alcohol use occurs in a family context, and parents or other relatives are the most common providers of alcohol (Casswell, 1996; Donovan and Molina, 2008; Fossey, 1994; Jahoda and Crumond, 1972; Strycker et al., 2003).

The most consistent correlates of sipping in childhood are children's perceptions of parental approval of child sipping, perceived parent drinking status, parents' reported approval of child sipping, and parents' reported drinking frequency (Donovan and Molina, 2008; Jackson et al., 2012, 2013; Johnson et al., 1997; Quine and Stephenson, 1990). Childhood sipping is also associated with having friends who sip or who approve of sipping (Donovan and Molina, 2008; Jackson et al., 2013; Johnson et al., 1997). Whether these family and peer environment correlates are also antecedents of childhood initiation of sipping or tasting alcohol has yet to be examined through prospective longitudinal research.

Given that sipping in childhood is more likely to be parentally approved and to occur in family contexts, it does not meet theoretical criteria to be considered a problem behavior. Accordingly, we (Donovan and Molina, 2008) previously hypothesized that child sipping ought *not* to be associated with psychosocial proneness for problem behavior, an underlying construct measured by personality, social, and behavior variables from Problem Behavior Theory

(PBT) reflecting instigations for and controls against drinking, drug use, and delinquency (Jessor and Jessor, 1977; see component variables in the Materials and Methods section). Our cross-sectional analyses generally confirmed this expectation: Psychosocial proneness for problem behavior was not associated with child sipping (only child attitude and perceived friends' approval related significantly).

In contrast to these results for child sipping, variables reflecting childhood psychosocial proneness for problem behavior are antecedent predictors of the initiation of early-onset drinking (having more than a sip or a taste before age 15, and typically within early adolescence; Donovan and Molina, 2011). This difference in results is attributable to the fact that early-onset drinking, unlike child sipping, is strongly disapproved by parents (Prins et al., 2011), occurs largely in peer contexts (Anderson and Brown, 2011; SAMHSA, 2008), and correlates with a variety of other problem behaviors (Chun and Mobley, 2010; Farrell et al., 2000; Guilamo-Ramos et al., 2005), warranting its consideration as a problem behavior and its relation to earlier problem-behavior proneness.

FOCI OF THIS STUDY

Given that the relations (or the lack thereof) of the above social environment and psychosocial proneness variables to child sipping were based only on cross-sectional data, it is important to determine whether these relations (or their hypothesized absence) replicate in longitudinal data. This study therefore (i) examined whether the family alcohol environment and peer modeling variables actually serve as antecedent predictors of the *initiation* of sipping or tasting alcohol before age 12 among children who are abstainers and (ii) examined whether the variables reflecting psychosocial proneness for problem behavior are generally *not* significant antecedent predictors of the initiation of sipping or tasting among abstinent children.

To enhance the interpretability of the hypothesized lack of significant relation between the antecedent measures of psychosocial proneness for problem behavior and children's initiation of sipping/tasting, we will show that, as predicted by PBT, these proneness variables do nevertheless significantly predict later child involvement in delinquent-type behavior.

MATERIALS AND METHODS

Data were drawn from the first 14 waves of an ongoing longitudinal study of the risk factors for early onset of alcohol use (the Tween to Teen Project). The human subject procedures used were approved by the University of Pittsburgh Institutional Review Board, and a Certificate of Confidentiality was granted by the National Institute on Alcohol Abuse and Alcoholism.

Procedures and Participants

Between March 2001 and June 2002, families were selected for participation using targeted-age directory and random digit dialing sampling of Allegheny County, Pennsylvania (population

1.3 million, including the city of Pittsburgh). The baseline sample consisted of 2 age cohorts. Of the 452 families who participated, 210 families had an 8-year-old child (118 girls, 92 boys) and 242 had a 10-year-old child (120 girls, 122 boys). Overall, 56% of the eligible families completed baseline interviews. Participating families did not differ from nonparticipating families on any of the screening measures of race, mother's education, or child age (Donovan and Molina, 2008). African American families were oversampled (24% vs. 13% locally and nationally); European American families constituted 73% of the sample (vs. 83% locally, 80% nationally); and 2% were Other (vs. 2.5% Asian and 1.5% Hispanic locally). Single-mother headed families were also oversampled, constituting 23% of participating households. Four percent of the mothers had completed some high school, 15% had graduated from high school, 14% had vocational training, 24% had attended some college, 32% had graduated from college, and 11% had postgraduate education.

Computer-assisted interviews were completed at home or in our offices. Child interviews were performed every 6 months (with 18 months between Waves 7 and 8). Parent interviews were completed annually. In this cohort-sequential design, younger cohort members participated at average ages 8.5 through 16.0, and older cohort members participated at average ages 10.5 through 18.0.

At Wave 14 (7.5 years after baseline), 82% ($n = 371$) participated. There were no gender or cohort differences in retention, but African American families were significantly less likely to continue (24% Wave 1 vs. 21% Wave 14). Attrition bias was examined using 13 baseline personality, social environment, and behavior measures reflecting psychosocial proneness for deviance (Jessor and Jessor, 1977). Discontinuers differed from continuers on just 1 measure (religious behavior), and together, the 13 variables accounted for only 1.2% of the variance in attrition.

Measurement of Children's Sipping or Tasting

Children's alcohol use was assessed by computer-assisted interviews at each wave. Following a statement that "drinks like beer, wine, and liquor contain alcohol," children were asked: "Have you ever had a sip or a taste of beer, wine, or liquor?" (responses: No; Yes, once; Yes, 2 or 3 times; and Yes, more than 2 or 3 times). Children who had sipped or tasted alcohol were asked to click on all contexts in which they had sipped alcohol, including as part of a religious observance, with family at dinner, as part of a family celebration or party, with friends, by themselves, and somewhere else. They were then asked whether they had ever had a drink of alcohol (*not just a sip or a taste of someone else's drink*) in their life.

For the present analyses, children who had sipped alcohol only as part of religious observances were considered abstainers (approximately 15% of all sippers; see Donovan and Molina, 2008). Jackson and colleagues (2013) similarly excluded religious-only sippers. Age of sipping initiation was established by determining at what wave of data collection the child first reported sipping alcohol in a nonreligious context and then confirmed this in the next wave (6 months later). Their age at interview from the initial report was used as a conservative measure of their initiation age. The mean age of initiating sipping in a nonreligious context was 11.46 years old ($SD = 2.54$), which is slightly older than their similarly established age of initiating sipping in any context ($M = 11.02$; see Donovan and Molina, 2013).

Table 1 reports how children were classified for the analyses. Baseline sippers or drinkers (Group 1) were excluded ($n = 148$), as were children not assessed through the entire period of risk for child sipping (Group 2, 18 abstainers who dropped out before age 12). Baseline abstainers who did not initiate sipping before age 12 ($n = 192$ in Groups 3 to 5) were coded 0 for the logistic regression analyses. Ninety-four children who were abstainers at baseline but who initiated sipping before age 12 (Group 6) were coded as 1 for

Table 1. Sipping Initiation Groups by Sex

Group	Boys	Girls	Combined	Code
1. Baseline sippers or drinkers	69	79	148	Blank
2. Abstainer dropouts before age 12	6	12	18	Blank
3. Abstainers through Wave 14	41	34	75	0
4. Abstainer dropouts at age 12+	6	4	10	0
5. Sipping initiators at age 12+	49	58	107	0
6. Sipping initiators before age 12	42	52	94	1
Total	213	239	452	

Codes are values used in the logistic regression analyses.

the logistic regressions. On average, they initiated sipping or tasting 1.2 years ($SD = 0.66$) after baseline.

Measurement of the Family Alcohol Environment

All predictor variables were assessed at baseline (child ages 8 or 10). Children were asked about their own and others' alcohol-use attitudes and behavior. Child perceptions of parental attitudes and behavior included the following: *Perceived Parent Approval of Sipping/Tasting*, a single question asked how their parents feel about someone their age having a sip of someone else's drink (high score = greater approval); *Parental Alcohol Socialization*, a 5-item scale asked how often parents talked to her/him about not drinking, how parents felt about children his/her age drinking, the dangers of drinking, the consequences if caught drinking, and how alcohol makes people act ($\alpha = 0.87$); *Mother's Perceived Drinking Status*, a question asking whether their mother drinks beer, wine, or liquor; and *Father's Perceived Drinking Status*, a similar question about their father.

Measures from the parent interviews included the following: *Mother's Approval of Child Sipping*, a 3-item scale assessing her approval of someone her child's age sipping or tasting someone else's drink or having a sip during a family dinner ($\alpha = 0.76$); *Father's Approval of Child Sipping*, the same 3-item scale for fathers ($\alpha = 0.69$); *Mother's Alcohol Socialization*, a 5-item scale identical to the child measure above, asking how often the mother talked to her child about drinking ($\alpha = 0.88$); *Father's Alcohol Socialization*, the same 5-item scale for fathers ($\alpha = 0.92$); *Mother's Drinking Frequency*, a 3-item measure assessing how often the mother drank beer, wine, and liquor in the past 6 months; and *Father's Drinking Frequency*, the same 3-item measure for fathers. Each measure was also averaged across parents to ensure that all children (even those with single mothers) could be included in the multivariate analyses.

Measurement of Child Psychosocial Proneness for Problem Behavior

PBT (Jessor and Jessor, 1977) comprised the main theoretical framework of the research. In this framework, variables from the personality system, the perceived environment system, and the behavior system contribute to an overall level of proneness for problem behavior. Previous research has established the predictive utility of this framework for the explanation of adolescent variation in an array of problem behaviors including drinking, problem drinking, marijuana use, delinquency, and risky sexual behavior (Costa et al., 1995; Donovan, 1996; Donovan et al., 1999; Jessor and Jessor, 1977). The variables included here were all collected at baseline and figured in the earlier cross-sectional analyses (Donovan and Molina, 2008).

The following personality system measures were assessed: *Value on Academic Achievement*, a 5-item scale asking how important it is to do well in school ($\alpha = 0.60$); *Expectation for Academic Achievement*, a 5-item scale assessing how sure the child was he/she would do well in school ($\alpha = 0.72$); *Attitudinal Tolerance of Deviance*, a 10-item scale asking "how wrong" behaviors like marking up

property, lying to parents, shoplifting, and fighting were (reverse-scored, $\alpha = 0.84$); *Personal Attitude Toward Sipping/Tasting*, a 3-item scale assessing child approval of sipping or tasting someone else's drink or having a sip during a family dinner ($\alpha = 0.64$); and *Religiosity*, a 6-item scale assessing the personal importance of religious practices, guidance, and participation in youth groups ($\alpha = 0.82$).

Measures of the following perceived environment system variables were assessed: *Susceptibility to Peer Pressure*, a 4-item measure asked how likely it would be for them to tear a page out of a library book, skip school, smoke a cigarette, or have a drink, if a friend dared them or offered a cigarette or a drink (Dielman et al., 1993; $\alpha = 0.63$); and *Perceived Friends' Approval of Sipping/Tasting*, a question asking how their close friends feel about someone their age having a sip of someone else's drink.

Interviews assessed the following behavior system variables: *General Deviant Behavior*, a 14-item measure of frequency of lying, cheating, stealing, and fighting in the past 6 months ($\alpha = 0.76$); *Religious Behavior*, a 3-item measure of frequency of church attendance, religious instruction, and religious youth group involvement in the past 6 months ($\alpha = 0.70$); *School Activities*, a 3-item index reflecting the number of clubs and additional activities, helping out at school, and doing jobs at school; and *Prosocial Activities*, a 3-item measure of involvement in helping homeless people or the elderly, cleaning up the environment, and collecting toys or clothes for the needy in the past 6 months ($\alpha = 0.61$).

It was hypothesized that these childhood measures of psychosocial proneness for problem behavior would not relate significantly to the initiation of child sipping/tasting, despite their history of relation to adolescent drinking. They should, however, relate significantly to involvement in *General Deviant Behavior at average age 11.5*, assessed using the same measure as above ($\alpha = 0.86$).

Analytic Procedures

Logistic regression procedures in IBM SPSS Statistics (Version 21; IBM Corporation, Armonk, NY) examined the relation of the antecedent Wave 1 predictor variables to the initiation of sipping/tasting before age 12 (coded 0 vs. 1) among abstainers. Age cohort membership was included in all analyses to control for variation in age at baseline when the predictors were assessed. For each variable, its regression coefficient, standard error, and the Wald test are reported. Odds ratios (ORs), estimated as $\text{Exp}(B)$, and their 95% confidence intervals (95% CI) are also reported. Significant confidence intervals for the ORs do not include the value of 1.00. All variables with a Wald test significant at the 0.05 level in the univariate analyses were entered into a multivariate logistic regression using forward stepwise selection (age cohort was forced to enter on the first step). At each step, the variable with the smallest significance level of its score statistic was selected for entry if its significance was below 0.05. The overall fit of the logistic model at the final step was determined by the Hosmer-Lemeshow test (Hosmer and Lemeshow, 2000).

Partial correlation and multiple regression analyses were performed to determine the relation of the baseline measures of psychosocial proneness for problem behavior to later childhood involvement in general deviant behavior.

RESULTS

Socio demographic Predictors of Initiation

The following socio demographic variables were examined as potential predictors of the initiation of sipping/tasting before age 12: age cohort membership (age 8 vs. age 10 at

Wave 1), sex, ethnic-racial background (African American vs. white/other), family structure (single-parent vs. 2-parent families), and socioeconomic differences (some college education vs. less for the mother).

Age cohort membership did not predict initiation (Wald = 0.34, OR = 0.93, 95% CI = 0.76, 1.19). Although not significantly related, age cohort membership was statistically controlled in all subsequent analyses due to its importance for the cohort-sequential design of the research. After controlling for age cohort, however, none of the other socio-demographic variables significantly predicted sipping initiation. These variables were therefore not statistically controlled in subsequent analyses.

Family Alcohol Environment Predictors of Child Sipping/Tasting Initiation

Table 2 presents the univariate relations of the family alcohol environment variables to sipping/tasting initiation. Perceptions of greater parental approval of sipping were significantly associated with a higher likelihood of initiating

Table 2. Univariate Relations of Family Alcohol Environment Variables to Childhood Initiation of Alcohol Sipping/Tasting

	B	SE	Wald	OR (95% CI)
<i>Child report variables (Wave 1)</i>				
Perceived parent approval of sipping	0.864	0.278	9.6**	2.37 (1.38–4.09)
Parent alcohol socialization	–0.030	0.028	1.1	0.97 (0.92–1.03)
Perceived mother's drinker status	0.219	0.139	2.5	1.25 (0.95–1.63)
Perceived father's drinker status	0.204	0.140	2.1	1.23 (0.93–1.62)
Perceived parent drinker status	0.268	0.157	2.9 ⁺	1.31 (0.96–1.78)
<i>Parent report variables (Wave 1)</i>				
Mother's approval of child sipping	0.136	0.057	5.6*	1.15 (1.02–1.28)
Father's approval of child sipping	0.150	0.063	5.7*	1.16 (1.03–1.31)
Parent approval of child sipping	0.186	0.064	8.5**	1.20 (1.06–1.37)
Mother's alcohol socialization	–0.053	0.035	2.2	0.95 (0.89–1.02)
Father's alcohol socialization	–0.032	0.035	0.8	0.97 (0.90–1.04)
Parent alcohol socialization	–0.052	0.039	1.8	0.95 (0.88–1.02)
Mother's current drinking status	0.929	0.334	7.7**	2.53 (1.32–4.87)
Father's current drinking status	1.130	0.475	5.6*	3.09 (1.22–7.86)
Parent current drinking status	1.215	0.397	9.4**	3.37 (1.55–7.34)
Mother's drinking frequency	0.091	0.063	2.1	1.10 (0.97–1.24)
Father's drinking frequency	0.096	0.063	2.3	1.10 (0.97–1.25)
Parent drinking frequency (Avg)	0.116	0.065	3.2 ⁺	1.12 (0.99–1.28)
Parent drinking frequency (Max)	0.115	0.054	4.5*	1.12 (1.01–1.25)

Coefficients are from separate logistic regressions including a constant, age cohort, and the baseline predictor variable predicting initiation of sipping/tasting. ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$ (all 2-tailed, $df = 1$).

sipping or tasting alcohol. Perceiving parents as drinkers, however, was minimally related to initiation.

Both mother and father reports of greater approval of child sipping and both mother and father reports that they were current drinkers related significantly to child sipping initiation. Mother- and father-reported frequency of current drinking did not separately relate to initiation, but the highest frequency of drinking by either parent did. Neither child nor parent report of alcohol socialization discussions related significantly to initiation.

Psychosocial Proneness Predictors of Child Sipping/Tasting Initiation

Table 3 presents the univariate logistic regressions predicting sipping/tasting initiation from the baseline measures of psychosocial proneness for problem behavior. Of the 11 variables examined, only the child’s personal attitude toward sipping significantly predicted later initiation of sipping or tasting alcohol. Friends’ approval of sipping/tasting at baseline, which was significant in the cross-sectional analyses, did not relate to later initiation. Variables reflecting problem-behavior proneness more generally also did not relate to initiation of child sipping/tasting.

Multivariate Logistic Regressions Predicting Child Sipping/Tasting Initiation

Table 4 presents the results of logistic multiple regressions predicting sipping/tasting initiation among abstainers. The coefficients tabled are from the final step of the stepwise analyses. Only 3 predictors were significant: in order of entry, parental current drinking status, perceived parental approval of child sipping, and parent-reported approval of child sipping. Child attitude toward sipping did not enter the equation. Together, these 3 variables accounted for 13.1% of

Table 3. Univariate Relations of Problem-Behavior Proneness Variables with Child Initiation of Alcohol Sipping/Tasting by Age 12

	B	SE	Wald	OR (95% CI)
Value on academic achievement	-0.041	0.056	0.4	0.96 (0.84-1.09)
Expectations for academic achievement	-0.027	0.053	0.3	0.97 (0.88-1.08)
Tolerance of deviance	0.045	0.045	1.0	0.96 (0.88-1.04)
Religiosity	-0.091	0.047	3.8+	0.91 (0.83-1.00)
Attitude toward sipping	0.176	0.067	6.8**	1.19 (1.05-1.36)
Susceptibility to peer pressure	0.269	0.233	1.3	1.31 (0.83-2.07)
Friends’ approval of sipping	0.332	0.184	3.2+	1.39 (0.97-2.00)
General deviant behavior	0.015	0.031	0.2	1.02 (0.96-1.08)
Religious behavior	-0.029	0.027	1.2	0.97 (0.92-1.02)
School activities	-0.092	0.091	1.0	0.91 (0.76-1.09)
Prosocial activities	0.064	0.069	0.9	1.07 (0.93-1.22)

Coefficients are from separate logistic regressions including a constant, age cohort, and the baseline predictor variable predicting initiation of sipping/tasting. ***p* < 0.01, +*p* < 0.10 (all 2-tailed, *df* = 1).

Table 4. Results of Stepwise (Forward Selection) Multivariate Logistic Regression Analyses Predicting Initiation of Sipping/Tasting Before Age 12

	B	SE	Wald	AOR (95% CI)
Variable selected at each step				
1. Age cohort	-0.225	0.153	2.1	0.79 (0.59-1.08)
2. Parent current drinking status	1.631	0.512	10.2**	5.11 (1.87-13.93)
3. Perceived parent approval of sipping	0.953	0.298	10.2**	2.59 (1.45-4.65)
4. Parent approval of child sipping	0.168	0.075	5.0*	1.18 (1.02-1.37)
Constant	-2.068	1.40	2.2	0.13

AOR, adjusted odds ratio.

All predictors with univariate *p* < 0.05 were included. Age cohort was forced to enter in the first step. Coefficients are from the final step. ***p* < 0.01, **p* < 0.05 (all 2-tailed, *df* = 1).

the variance in the initiation of sipping or tasting alcohol according to the conservative Cox-Snell *R*², 18.1% according to the Nagelkerke *R*². The logistic regression equation fit the data well according to the Hosmer-Lemeshow test ($\chi^2 = 8.02, p = 0.43$).

Analyses Predicting General Deviant Behavior

Despite their lack of relation to sipping initiation, most of the baseline measures of psychosocial proneness were significant predictors of general deviant behavior at age 11.5. Partial correlations (controlling for age cohort) were the following: value on academic achievement (-0.089, *p* = 0.070), expectations for academic achievement (-0.090, *p* = 0.068), attitudinal tolerance of deviance (0.204, *p* = 0.000), religiosity (-0.108, *p* = 0.027), attitude toward sipping (0.112, *p* = 0.023), susceptibility to peer influence (0.215, *p* = 0.000), friends’ approval of sipping (0.145, *p* = 0.003), general deviant behavior (0.446, *p* = 0.000), religious behavior (-0.164, *p* = 0.001), school activities (-0.018, *p* = 0.711), and prosocial behavior (-0.053, *p* = 0.278). Together, these variables accounted for nearly a quarter of the variance in later general deviant behavior (adjusted *R*² = 0.233) despite their hypothesized inability to predict sipping initiation over the same interval.

DISCUSSION

The present longitudinal research replicates and extends previous cross-sectional studies that suggested the importance of the family alcohol environment for children’s sipping and tasting of alcohol (Donovan and Molina, 2008; Jackson et al., 2012, 2013). Examination of the predictors of the initiation of sipping/tasting among baseline abstainers established that parental drinking status and parental attitudes toward child sipping function as antecedent predictors for children’s sipping or tasting behavior. This is the strongest evidence to date of the influence of the family alcohol environment on this initial stage of alcohol involvement in childhood.

Parental modeling of alcohol use in the home has long been acknowledged as a significant predictor of adolescent drinking (Aas et al., 1996; Brook et al., 1986; Donovan and Molina, 2011; Latendresse et al., 2008; Spijkerman et al., 2007), demonstrating the importance of social learning principles (Bandura, 1977). No previous studies, however, have examined its role in the initiation of sipping or tasting in childhood. Parental reports of their status as drinkers, assessed on average a year before children's first sip, were the strongest predictors of initiation. Children whose parents reported being current drinkers were 3 times as likely to start sipping before age 12 as other children.

Parental approval of sipping in childhood, although generally low in our sample (see Prins et al., 2011), was also a strong antecedent predictor of sipping initiation, with both child perceptions of parent approval and parents' reports of approval entering the multivariate analyses after parent drinker status. Consistent with socialization perspectives, both of these measures of parent approval correlate significantly with parent drinking (see also Dielman et al., 1993; Ennett et al., 2013; Yu, 2003) as well as with the child's own attitude toward sipping (which did not enter the logistic regressions after the family alcohol measures). Further research is needed to delineate the longitudinal socialization pathways linking parental drinking and approval to child perceptions of parental approval and the formation of their own attitudes prior to their initiation of alcohol use, as well as to examine the reciprocal relations among these variables once child drinking has become established.

Although neither mother- nor father-reported drinking frequency separately predicted sipping initiation, there was a significant effect for the highest frequency reported by either parent, suggesting that it was the child's exposure to parental drinking that was most important, not the gender of the drinking parent. This finding expands earlier research establishing the importance of parental modeling for both genders.

The finding that the initiation of child sipping was not predicted by earlier psychosocial proneness for problem behavior suggests that childhood sipping is not a precocious manifestation of a larger constellation of risk for problem behavior at this life stage. This finding is in distinct contrast to earlier analyses (Donovan and Molina, 2011) in which childhood psychosocial proneness predicted the initiation of early-onset drinking (generally at ages 12 to 14). The differing relations of these 2 alcohol-use behaviors (sipping vs. drinking) to earlier childhood problem-behavior proneness are not only consistent with their contrasting definitions as problem behaviors, but also suggest that childhood sipping and early-onset drinking may have very different implications for later involvement in problem drinking and other problem behaviors. Although there is substantial evidence linking early-onset drinking to other problematic behaviors including alcohol dependence, drug abuse, criminal behavior, risky sexual behavior, job problems, and motor vehicle crashes in both adolescence and young adulthood (see Zuc-

ker et al., 2008), there is currently little information on the potential later outcomes of childhood initiation of sipping or tasting alcohol.

In our own earlier research, we found that children who had sipped alcohol by age 10 (i.e., at an even younger age than examined here) were almost twice as likely as other children to start drinking (more than a sip) before age 15 (Donovan and Molina, 2011). Given the relation of such early-onset drinking to later problematic outcomes (see above), this result could suggest that childhood sipping may increase the risk of later problematic outcomes despite its lack of relation to childhood psychosocial proneness. Among those children who had started sipping by age 10, only a third started drinking before age 15. These children may differ from the rest in terms of their psychosocial proneness for problem behavior, family support for alcohol use, or peer models and support for drinking. Further research is warranted to determine which of these variables mediate or moderate the relation between sipping in childhood and later alcohol involvement in adolescence—including complete abstinence, continued sipping, or progression into either normative drinking or more problematic alcohol-use and related problems.

Only variables that figured in the earlier cross-sectional analyses were included in the present longitudinal investigation. The modest percentage of the variance accounted for in the multivariate logistic regression argues for expanding the set of antecedent predictors to be examined in future investigations. Prime candidates for inclusion would be variables important for understanding the socialization of children's alcohol-specific cognitions, such as parenting styles and parent-child relationship quality.

It is important to note that the general lack of relation of the psychosocial proneness measures to later sipping and tasting was not due to methodological problems such as restricted variation on the predictors at ages 8 or 10 (and consequent reduced power). This was shown by their ability here to account for substantial variability (nearly a quarter of the variance) in general deviant behavior at age 11.5 years.

Several considerations should be kept in mind when evaluating these findings. First, the sample was drawn from a single county in the northeastern United States. Although geographically constrained, the sample does include urban and suburban, white and African American, and single-mother and 2-parent families. Reflecting Allegheny County, however, the sample does not include many Hispanic- or Asian American families. Thus, the generalizability of the present results needs to be established using statewide or national studies of children. Second, the baseline participation rate was somewhat low. This limitation is partially ameliorated by the lack of either participation bias or retention bias. Third, the measure of child sipping/tasting was based only on self-reports. However, age of initiation was based on consistent reports across multiple waves of data, and both child and adolescent self-reports have been shown to be valid (Brener et al., 2003; Dielman et al., 1995; Donovan et al., 2004; Smith et al., 1995; Winters et al., 1990-91).

The present findings are important because they identify parental alcohol use and their attitudes toward child sipping as significant antecedent predictors of this earliest stage of alcohol involvement. Psychosocial proneness for problem behavior, which predicts both early-onset drinking and adolescent problem drinking, and which predicted child delinquent behavior in this study, did not predict the initiation of sipping or tasting alcohol in childhood, suggesting that childhood sipping is not itself a problem behavior. Further research is necessary, however, to determine how child sipping figures into the transition into early-onset drinking for some adolescents but not for most and to establish the conditions under which sipping in childhood contributes to either normative drinking or escalation into problematic alcohol use in adolescence or young adulthood. Until such evidence is available, it would be premature to characterize childhood sipping as either a low-risk behavior that ought not to be of concern or as an appropriate target for preventative action (such as urging parents not to let their children sip alcohol).

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REFERENCES

- Aas H, Jakobsen R, Anderssen N (1996) Predicting 13-year-olds' drinking using parents' self-reported alcohol use and restrictiveness compared with offspring's perception. *Scand J Psychol* 37:113–120.
- Anderson KG, Brown SA (2011) Middle school drinking: who, where, and when. *J Child Adolesc Subst Abuse* 20:48–62.
- Andrews JA, Tildesley E, Hops H, Duncan SC, Severson HH (2003) Elementary school age children's future intentions and use of substances. *J Clin Child Adolesc Psychol* 32:556–567.
- Bandura A (1977) *Social Learning Theory*. Prentice-Hall, Englewood Cliffs, NJ.
- Brener ND, Billy JO, Grady WR (2003) Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. *J Adolesc Health* 33:436–457.
- Brook JS, Whiteman M, Gordon AS, Nomura C, Brook DW (1986) Onset of adolescent drinking: a longitudinal study of intrapersonal and interpersonal antecedents. *Adv Alcohol Subst Abuse* 5:91–110.
- Bush PJ, Iannotti RJ (1992) Elementary schoolchildren's use of alcohol, cigarettes and marijuana and classmates' attribution of socialization. *Drug Alcohol Depend* 30:275–287.
- Bush PJ, Iannotti RJ (1993) Alcohol, cigarette, and marijuana use among fourth-grade urban schoolchildren in 1988/89 and 1990/91. *Am J Public Health* 83:111–115.
- Casswell S (1996) Alcohol use: growing up and learning about drinking—children in Dunedin in the 1980s, in *From Child to Adult: The Dunedin Multidisciplinary Health and Development Study* (Silva PA, Stanton WR eds), pp 206–224. Oxford University Press, Auckland, New Zealand.
- Chun H, Mobley M (2010) Gender and grade-level comparisons in the structure of problem behaviors among adolescents. *J Adolesc* 33:197–207.
- Costa FM, Jessor R, Donovan JE, Fortenberry JD (1995) Early initiation of sexual intercourse: the influence of psychosocial unconventionality. *J Res Adolesc* 5:93–120.
- Dielman TE, Butchart AT, Shope JT (1993) Structural equation model tests of patterns of family interaction, peer alcohol use, and intrapersonal predictors of adolescent alcohol use and misuse. *J Drug Educ* 23:273–316.
- Dielman TE, Leech SL, Loveland-Cherry C (1995) Parents' and children's reports of parenting practices and parent and child alcohol use. *Drugs Soc* 8(3/4):83–101.
- Donovan JE (1996) Problem Behavior Theory and the explanation of adolescent marijuana use. *J Drug Issues* 26:375–401.
- Donovan JE, Jessor R, Costa FM (1999) Adolescent problem drinking: stability of psychosocial and behavioral correlates across a generation. *J Stud Alcohol* 60:352–361.
- Donovan JE, Leech SL, Zucker RA, Loveland-Cherry CJ, Jester JM, Fitzgerald HE, Putter LI, Wong MM, Looman WS (2004) Really underage drinkers: alcohol use among elementary school students. *Alcohol Clin Exp Res* 28:341–349.
- Donovan JE, Molina BSG (2008) Children's introduction to alcohol use: sips and tastes. *Alcohol Clin Exp Res* 32:108–119.
- Donovan JE, Molina BSG (2011) Childhood risk factors for early-onset drinking. *J Stud Alcohol Drugs* 72:741–751.
- Donovan JE, Molina BSG (2013) Types of alcohol use experience from childhood through adolescence. *J Adolesc Health* 53:453–459.
- Donovan JE, Molina BSG, Kelly TM (2009) Alcohol outcome expectancies as socially shared and socialized beliefs. *Psychol Addict Behav* 23:248–259.
- Dunn ME, Goldman MS (1998) Age and drinking-related differences in the memory organization of alcohol expectancies in 3rd-, 6th-, 9th-, and 12th-grade children. *J Consult Clin Psychol* 66:579–585.
- Ennett ST, Jackson C, Bowling JM, Dickinson DM (2013) Parental socialization and children's susceptibility to alcohol use initiation. *J Stud Alcohol Drugs* 74:694–702.
- Farrell AD, Kung EM, White KS, Valois RF (2000) The structure of self-reported aggression, drug use, and delinquent behaviors during early adolescence. *J Clin Child Psychol* 29:282–292.
- Fossey E (1994) *Growing Up with Alcohol*. Routledge, London.
- Guilamo-Ramos V, Litardo HA, Jaccard J (2005) Prevention programs for reducing adolescent problem behaviors: implications of the co-occurrence of problem behaviors in adolescence. *J Adolesc Health* 36:82–86.
- Guo J, Collins LM, Hill KG, Hawkins JD (2000) Developmental pathways to alcohol abuse and dependence in young adulthood. *J Stud Alcohol* 61:799–808.
- Hosmer DW, Lemeshow S (2000) *Applied Logistic Regression*. 2nd ed. Wiley, New York.
- Jackson C, Ennett ST, Dickinson DM, Bowling JM (2012) Letting children sip: understanding why parents allow alcohol use by elementary school children. *Arch Pediatr Adolesc Med* 166:1053–1057.
- Jackson C, Ennett ST, Dickinson DM, Bowling JM (2013) Attributes that differentiate children who sip alcohol from abstinent peers. *J Youth Adolesc* 42:1687–1692.
- Jackson C, Henriksen L, Dickinson D (1999) Alcohol-specific socialization, parenting behaviors and alcohol use by children. *J Stud Alcohol* 60:362–367.
- Jackson C, Henriksen L, Dickinson D, Levine DW (1997) The early use of alcohol and tobacco: its relation to children's competence and parents' behavior. *Am J Public Health* 87:359–364.
- Jackson KM (2010) Progression through early drinking milestones in an adolescent treatment sample. *Addiction* 105:438–449.
- Jahoda G, Cramond J (1972) *Children and Alcohol: A Developmental Study in Glasgow*. Her Majesty's Stationery Office, London.
- Jessor R, Jessor SL (1977) *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth*. Academic Press, New York.
- Johnson CC, Greenlund KJ, Webber LS, Berenson GS (1997) Alcohol first use and attitudes among young children. *J Child Fam Stud* 6:359–372.
- Johnston LD, O'Malley PM, Miech RA, Bachman JG, Schulenberg JE (2014) *Monitoring the Future National Results on Drug Use: 2013 Overview, Key Findings on Adolescent Drug Use*. Institute for Social Research, University of Michigan, Ann Arbor, MI.

- Lanza ST, Collins LM, Lemmon DR, Schafer JL (2007) PROC LCA: a SAS procedure for latent class analysis. *Struct Equ Model* 14:671–694.
- Latendresse SJ, Rose RJ, Viken RJ, Pulkkinen L, Kaprio J, Dick DM (2008) Parenting mechanisms in links between parents' and adolescents' alcohol use behaviors. *Alcohol Clin Exp Res* 32:322–330.
- Masten AS, Faden VB, Zucker RA, Spear LP (2008) Underage drinking: a developmental framework. *Pediatrics* 121:S235–S251.
- Prins JC, Donovan JE, Molina BSG (2011) Parent-child divergence in the development of alcohol use norms from middle childhood into middle adolescence. *J Stud Alcohol Drugs* 72:438–443.
- Quine S, Stephenson JA (1990) Predicting smoking and drinking intentions and behavior of pre-adolescents: the influence of parents, siblings, and peers. *Fam Syst Med* 8:191–200.
- Smith GT, McCarthy DM, Goldman MS (1995) Self-reported drinking and alcohol-related problems among adolescents: dimensionality and validity over 24 months. *J Stud Alcohol* 56:383–394.
- Spijkerman R, van den Eijnden RJJM, Overbeek G, Engels RCME (2007) The impact of peer and parental norms and behavior on adolescent drinking: the role of drinker prototypes. *Psychol Health* 22:7–29.
- Strycker LA, Duncan SC, Pickering MA (2003) The social context of alcohol initiation among African American and white youth. *J Ethn Subst Abuse* 2:35–42.
- Substance Abuse and Mental Health Services Administration (2013) Results from the 2012 National Survey on Drug Use and Health: Detailed Tables. Substance Abuse and Mental Health Administration, Rockville, MD. Available at: <http://www.samhsa.gov/data/NSDUH/2012SummNatFind-DetTables/DetTabs/NSDUH-DetTabsSect2peTabs11to16-2012.pdf>. Accessed September 19, 2013.
- Substance Abuse and Mental Health Services Administration, Office of Applied Studies (2008) The NSDUH Report: Underage Alcohol Use: Where Do Young People Drink? Substance Abuse and Mental Health Services Administration, Rockville, MD.
- Winters KC, Stinchfield RD, Henly GA, Schwartz RH (1990–91) Validity of adolescent self-report of alcohol and other drug involvement. *Int J Addict* 25:1379–1395.
- Yu J (2003) The association between parental alcohol-related behaviors and children's drinking. *Drug Alcohol Depend* 69:253–262.
- Zucker RA, Donovan JE, Masten AS, Mattson ME, Moss HB (2008) Early developmental processes and the continuity of risk for underage drinking and problem drinking. *Pediatrics* 121:S252–S272.
- Zucker RA, Kincaid SB, Fitzgerald HE, Bingham CR (1995) Alcohol schema acquisition in preschoolers: differences between children of alcoholics and children of nonalcoholics. *Alcohol Clin Exp Res* 19:1011–1017.