

# Really Underage Drinkers: Alcohol Use Among Elementary Students

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Despite the current societal concern with underage drinking, little attention has been paid to alcohol use within the preadolescent population. This article presents the proceedings of a symposium held at the 2003 Research Society on Alcoholism meeting in Fort Lauderdale, Florida, that was organized and chaired by John E. Donovan. The intent of the symposium was to kick start research on alcohol use among elementary school children by reviewing what is known regarding drinking in childhood. Presentations included (1) The Epidemiology of Children's Alcohol Use, by John E. Donovan; (2) The Validity of Children's Self-Reports of Alcohol Use, by Sharon L. Leech; (3) Predicting Onset of Drinking From Behavior at Three Years of Age: Influence of Early Child Expectancies and Parental Alcohol Involvement Upon Early First Use, by Robert A. Zucker; and (4) Parent, Peer, and Child Risk Factors for Alcohol Use in Two Cohorts of Elementary School Children, by Carol J. Loveland-Cherry. Presentations indicated the need for better nationwide surveillance of children's experience with alcohol; suggested that children's reports of their use of alcohol tend to be reliable and valid; supported children's alcohol use schemas and parental drinking and alcoholism at child age three as independent predictors of early onset drinking; and showed that onset of drinking before fourth or fifth grade, peer pressure, and parental norms and monitoring predict elementary student alcohol use and misuse.

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**W**ITH THE RECENT release of the National Institute on Alcohol Abuse and Alcoholism Task Force Report on College Drinking (Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism, 2002), there has been renewed interest in the topic of alcohol use and misuse among those who are too young to drink legally. With the minimum purchase age for alcohol set at 21 in all states in the United States, college-aged drinkers are simply the oldest stratum of underage drinkers. National surveillance data from the 2002 Monitoring the Future survey revealed that the great majority of adolescents (78.4%) have had experience with alcohol by their senior year in

high school and that almost half (47.0%) have had some experience by eighth grade, before their entry into high school (University of Michigan, 2002).

It is difficult to know how many children have experience with alcohol because so few surveys include children in the elementary school population. Of the three major federally sponsored national surveys, only one includes children aged 12. The Monitoring the Future Study includes adolescents in grades 8, 10, and 12 as well as college-aged young adults who participated in the survey at younger ages. The Youth Risk Behavior Survey carried out biennially by the Centers for Disease Control and Prevention includes only high school students (grades 9–12). The National Household Survey on Drug Abuse carried out annually for the National Institute on Drug Abuse includes respondents aged 12 to 17, but the 12-year-old children included comprise too small a cohort to inform us regarding sex, ethnic/racial, and regional differences in prevalence rates of alcohol use.

Not only do we not have good surveillance of the prevalence of alcohol use among children, but also we lack scientific studies of the risk factors for the onset of drinking in childhood. Most of the important longitudinal studies of the onset of alcohol use are based on cohorts of students who were in grade 7 or older at the start of the research (Brook et al., 1985; Ellickson and Hays, 1991; Jessor and Jessor, 1977; Margulies et al., 1977; Webb et al., 1991) and so were already adolescents. The risk factor variables collected at the grade-7 baseline assessments were therefore useful only in predicting drinking that starts in adolescence.

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There are several reasons that it is critical to determine both the prevalence of alcohol use and its risk factors in children. First, it is necessary to determine the prevalence of alcohol use in this population to monitor both the need for and the success of prevention efforts in the elementary schools. Second, alcohol use onset is one of the initial stages in the progression into illicit drug use (Kandel, 2002). Knowing how many children have experience with alcohol thus serves as an indicator of the number potentially at risk for illicit drug use. Third, childhood onset of alcohol use predicts alcohol problems in adolescence as well as alcohol abuse and dependence in adulthood (DeWit et al., 2000; Grant and Dawson, 1997; Hawkins et al., 1997; Pedersen and Skrondal, 1998). Fourth, determination of the risk factors for early onset of alcohol use would permit the design of more effective prevention programs for use in the elementary schools.

#### THE EPIDEMIOLOGY OF CHILDREN'S ALCOHOL USE

*John E. Donovan*

To my knowledge, there has never been a review of studies reporting on the prevalence and distribution of alcohol use among children. Although they are not well known, there have been several important community-level studies of alcohol use among elementary students (e.g., Bush and Iannotti, 1993; Casswell et al., 1991; Dielman et al., 1984; Jackson, 1997; Johnson et al., 1997; Van Kammen et al., 1991). For epidemiological purposes, however, these studies are limited by the fact that their samples are generally drawn from just a single school district or community.

Rather than focus on published articles on local samples, the current review performed a comprehensive search for nationwide and statewide data sets that include recent information on the prevalence and distribution of alcohol use among children. For this search, children were defined arbitrarily as students in grades 6 and below, generally age 12 or younger. Sixth graders could be in either elementary or middle school, depending on the school district.

Two recent series of U.S. national surveys are available. The first consists of six multistage stratified random surveys of students in grades 4 through 6 carried out in 1993, 1995, 1996, 1997, 1998, and 1999 for the Partnership for a Drug-Free America and are known as the Partnership Attitude Tracking Study (PATS). Each survey included approximately 2300 students in 150 schools, and oversampled counties having higher proportions of black and Hispanic residents. Three classes in each randomly selected school were systematically selected, and all students in the selected classes completed anonymous questionnaires at school with parental consent. Alcohol use was assessed by a single question asking whether they had ever had more than a few sips of alcohol.

In these PATS surveys, experience with alcohol tripled between fourth and sixth grades. For example, in 1999, the most recent data, the percentage of the sample who had

tried more than a sip of alcohol was 9.8% among fourth graders, 16.1% among fifth graders, and 29.4% among sixth graders.

In each year for which sex breakdowns were available (1996–1999), fourth- through sixth-grade boys were more likely than girls to have had experience with alcohol. In 1999, for example, 20.4% of boys had tried more than a sip of alcohol as compared with just 10.1% of girls.

Racial/ethnic differences in alcohol experience were less clear-cut among these elementary students than they are in the adolescent population. In 1999, 14.8% of white fourth through sixth graders, 15.4% of black fourth through sixth graders, and 18.4% of Hispanic fourth through sixth graders had tried more than a sip of alcohol in their lives. In three of the four surveys for which ethnic/racial breakdowns were provided (1996–1999), alcohol experience among black elementary students was not substantially lower than among white students (as it usually is in adolescents) and was higher for Hispanic than for white children (unlike older students for whom the rates are generally equivalent; see University of Michigan, 2002).

During the 6-year period encompassed by the PATS national surveys (1993–1999), there was no evidence of change in the prevalence of lifetime use of alcohol among elementary school students: prevalence rates were 10%, 13%, 10%, 9%, 11%, and 9% for the 9- to 10-year-olds and were 23%, 18%, 22%, 27%, 21%, and 21% for the 11- to 12-year-olds in each year (no 1994 data).

The second series of national surveys covers the academic years from 1997 to 1998 through 2001 to 2002 and was carried out by PRIDE Surveys (Dr. Thomas Gleaton, Director; [www.pridesurveys.com](http://www.pridesurveys.com)). These surveys include fourth through sixth graders in all school districts across the United States that contracted with Pride Surveys in any given year to provide questionnaires, optically scan them, and summarize the rates of alcohol and drug use by grade in their school districts. The number of participating students was generally approximately 25,000 in each year. Questionnaires asked separately about the use of beer, wine coolers, and liquor in the past year. Lifetime alcohol experience was not a focus in these surveys.

According to the 2001–2002 PRIDE Survey, 6.3% of fourth- through sixth-grade students had beer, 7.4% had wine coolers, and significantly fewer (3.1%) had liquor in the past year. Earlier surveys show much the same pattern of beverage preference among elementary students. Among those who had consumed each beverage in the past year, most did not drink it very often. Approximately 70% of those who drank each beverage drank it just one to six times in the past year, 19% drank it one to two times a month, and 11% drank it one to seven times a week.

For all three beverages, the percentage who drank in the past year was similar or only slightly higher for fifth graders than for fourth graders. Between fifth and sixth grades, however, there was a doubling in the percentage reporting annual use. In the 2001–2002 PRIDE Survey, use of beer in

the past year was reported by 5.0% of fourth graders, 4.9% of fifth graders, and 11.0% of sixth graders. Use of wine coolers was reported by 4.3% of fourth graders, 5.8% of fifth graders, and 14.9% of sixth graders. For liquor, 1.5% of fourth graders, 2.5% of fifth graders, and 6.4% of sixth graders reported use.

In the PRIDE Surveys, there is evidence of a statistically significant but not substantial decrease in the use of all three beverages between 1997–1998 and 2001–2002 (in part because of the large sample sizes). The prevalence of use of beer in the past year decreased from 9.4% in 1997–1998 to 6.3% in 2001–2002. Similarly, the prevalence of wine cooler use decreased from 10.3% to 7.4%, and the prevalence of liquor use decreased from 4.3% to 3.1% in these elementary students.

In addition to searching for national survey data, a search was made on the Internet to locate statewide surveys of alcohol use that included children in grade 6 and lower. This involved labor-intensive searches of each of the 50 U.S. state government web pages. For example, Pennsylvania's state web site can be accessed by using the following URL: [www.state.pa.us](http://www.state.pa.us). Substituting each state's two-letter postal abbreviation in this address is sufficient to gain access to any state government web site. Listings of state agencies, offices, departments, boards, and commissions were scanned for likely sponsors of such surveys. These usually included the state Department of Education, the state Department of Health or Mental Health, and the state Commission on Criminal Justice. When a report on a likely survey was not available for downloading from a publications archive web page, the employee directory (if available) for the most likely office was examined to obtain an e-mail address to contact a staff member who might know whether the state had carried out such a survey or who could direct me to someone who might know. A copy of each relevant report was then requested.

This search determined that 39 of the 50 states have (or once had) an alcohol and drug survey that was administered to sixth-grade and sometimes younger children. The 11 states without such surveys are the following: Alaska, California, Illinois, Montana, New Hampshire, New Jersey, North Dakota, Oklahoma, South Dakota, Vermont, and Wisconsin. All 39 statewide surveys also included adolescents, for example, 6th through 12th graders; or 6th, 8th, 10th, and 12th graders; or 5th, 8th, and 11th graders. Five of these surveys (MS, NV, NC, WV, and WY) are middle-school extensions (grades 6–8) of the statewide Youth Risk Behavior Surveys of high school students (grades 9–12). Twelve of these statewide surveys (AL, AR, CO, FL, KS, LA, ME, MI, MO, NE, UT, and WA) used the Communities That Care (CTC) questionnaire (Arthur et al., 2002). These statewide surveys were most useful in the present context to confirm the national survey results with respect to sex and grade differences in children's alcohol experience and with respect to across-time trends in alcohol use.

There are, however, a number of limitations to these

statewide data. First, there is considerable variation across surveys in the way that alcohol use is defined, ranging from ever having any or ever having more than a few sips to having had a drink in the past 30 days. This makes comparisons across surveys difficult. Second, many of the reports do not disaggregate the data by sex or ethnic/racial group at each grade level, a practice that undermines their utility where the focus (as here) is on the 6th graders in 6th- to 12-grade surveys. Third, trend analyses are often based solely on the prevalence of alcohol use in the past 30 days, which for children in younger grades (fourth and fifth grades) is sometimes close to zero.

This presentation demonstrated that there are national and state-level data sets that speak to the prevalence of alcohol use among children and that the level of alcohol experience among these children is not trivial. There are problems with these data sets, however, that argue for the need to institute a series of national sample surveys of alcohol use among children. First, the PATS study no longer samples fourth through sixth graders. Second, the PRIDE surveys are convenience samples rather than representative national probability samples. Third, neither of these surveys had alcohol use as its major focus; alcohol was just one drug among many, all measured in the same way. Thus, no questions were included to rule out alcohol use that is part of religious services or to discriminate between alcohol use as part of family rituals and alcohol use in the peer context. It is critical to develop a better system to monitor the prevalence and distribution of alcohol use among children in order to assess the success of current elementary school prevention efforts as well as to predict future treatment needs.

#### THE VALIDITY OF CHILDREN'S SELF-REPORTS OF ALCOHOL USE

*Sharon L. Leech*

Although a number of studies have investigated the correlates and risk factors of alcohol use in elementary school children, most of these studies have not examined the reliability and validity of the main dependent variable, children's alcohol use. Reliability and validity studies of elementary school students' answers to alcohol use questions are critical because it is clear from the existing literature that young children are in fact using alcohol. In general, reliability tests determine whether the measure being examined is consistent or reproducible, whereas validity analyses determine whether we are measuring what we intended to measure (Hennekens and Buring, 1987). It is important to remember that just because an instrument is reliable, it is not necessarily valid.

#### *Reliability*

The reliability of children's answers to alcohol use questions has been addressed in three types of studies: investi-



gations of children's recognition of alcoholic beverages, studies of test-retest reliability, and examinations of inter-item consistency.

*Beverage Recognition.* For children to answer questions about alcohol use reliably, they must first recognize the beverages about which they are being asked. This has been addressed by the Texas School Survey of Substance Abuse Among Students, which collected data on approximately 90,000 fourth through sixth graders in 2003 (Liu, 2003). This survey found a positive relationship between grade in school and alcohol beverage recognition rates. The rates presented here are the complements of the percentage who reported that they had "never heard of" each beverage. Children at all three grade levels (fourth through sixth, respectively) recognized beer (97.5%, 98.4%, and 98.7%) and wine (95.6%, 97.2%, and 98.0%). Younger elementary school children were somewhat less likely to recognize wine coolers (84.2%, 90.5%, and 93.0% in fourth through sixth grades, respectively) or liquor (85.4%, 93.0%, and 96.3%). On the whole, elementary school children do recognize beer, wine, and liquor in survey questions.

*Test-Retest Reliability.* The test-retest reliability of a question or a scale can be determined by assessing the same children twice with the second testing occurring after a period of time short enough that their levels of alcohol use have not changed but not so short that they remember the answers that they gave at the first testing. Data from the PRIDE (Parents Resource Institute for Drug Education) Questionnaire for Grades 4–6 were used to conduct a test-retest reliability study (Metze, 2001). The survey was administered twice, 1 week apart. Three measures of reliability were calculated: (1) test-retest correlations between the first and second survey administration, (2) the percentage of exact agreement between the first and second survey administration (percentage of students who gave exactly the same responses on both occasions), and (3) the percentage of major disagreement between the first and second survey administration (the percentage of responses that differed more than one category between the test administrations). The test-retest correlations were high for all three beverages examined: beer use (0.88), wine cooler use (0.84), and liquor use (0.70), all in the past year. The percentage of exact agreement was 98.4% for both beer and wine coolers and was 99.0% for liquor, and the percentage of major disagreement was 0.0% for all three beverages. These alcohol use questions thus demonstrate high levels of test-retest reliability among elementary school students.

*Interitem Consistency.* Interitem consistency measures homogeneity and suggests that a set of items assesses a common construct. When survey results are to be interpreted at a group level, Cronbach  $\alpha$  reliabilities of 0.70 and above are generally considered acceptable (Friis and Sellers, 1996; Pollard et al., 1991). The interitem consistency of a number of alcohol questions was assessed in a study of fourth through sixth graders who completed the Children's

Drug Use Survey (Oetting et al., 1985). The alcohol use items included in this examination included the following: How often do you drink beer or wine? When do you drink beer or wine? Where do you drink beer or wine? Almost 1400 Native American children and >200 nonminority children completed the survey. The  $\alpha$  reliability coefficients for these alcohol use questions were 0.89 for Native American fourth graders, 0.90 for Native American fifth and sixth graders, and 0.87 for nonminority fourth through sixth graders. These results demonstrate high internal consistency within this set of alcohol use questions for both Native American and nonminority elementary students.

### Validity

A number of different tests of the validity of children's responses to alcohol use questions have been reported in the literature. These include the following: inclusion of fictitious drugs in the survey, collateral reports, bogus pipeline assessments, and tests of convergent validity and construct validity.

*Fictitious Drug Reports.* In the Texas School Survey described above (Liu, 2003), questions regarding a fictitious drug called "Cosma" were embedded in the questionnaire to determine whether fourth- through sixth-grade children were likely to report having used a drug that did not exist. Fewer than 2% of the children reported ever having used Cosma.

*Collateral Reports.* Although more commonly used in the treatment literature, collateral reports of children's alcohol use have been examined to test the validity of their self-reports. The Child and Parent Relations Study collected parallel child alcohol use reports from both fourth grade children and their parents (Dielman et al., 1995). Correlations between data for 199 child–mother pairs and 172 child–father pairs were computed for child's ever drinking; frequency of beer, wine, and liquor use; and usual quantity of beer, wine, and liquor use per occasion. The correlations for the mother–child pairs ranged from 0.16 for frequency of liquor to 0.34 for frequency of beer and for the father–child pairs ranged from 0.13 for frequency of liquor to 0.21 for the child ever drink item. Although modest, these correlations all were statistically significant. One reason that they are not higher may be that children define drinking differently from their parents. The children may count all drinking occasions, including those in church (e.g., communion wine) or with family, whereas parents may count only those drinking occasions at which they are present. These results point to the importance of "defining a drink," including the context in which the drink was consumed.

*Bogus Pipeline Procedure.* Wagenaar et al. (1993) used a bogus pipeline procedure on >800 sixth graders to determine whether this would influence children's reports of their alcohol use. In this procedure, the experimental group of children provided saliva samples before completing a

self-report questionnaire and were told that some of the saliva samples would be analyzed to tell whether they have used alcohol. The control group simply completed the same self-report questionnaire. The two groups did not differ on their rates of lifetime alcohol use, 12-month use, 30-day use, 7-day use, or ever having had five or more drinks. These results suggest that the control group of elementary school children, for whom there was no threat of contradiction by a biological measure, did not underreport their experience with alcohol.

*Convergent and Construct Validity.* Both the convergent validity between different measures of alcohol use and abuse and the construct validity of items assessing domains related to child alcohol use were tested using data from >1300 fourth graders who participated in the Child and Parent Relations Study (Loveland-Cherry et al., 1996). Convergent validity was demonstrated by a correlation of 0.61 between an alcohol use index that measured the average ounces of ethanol consumed per week and an alcohol misuse index ( $\alpha = 0.77$ ) that measured overindulgence, getting in trouble with peers, and getting in trouble with adults. The construct validity of the measure of children's alcohol use was demonstrated by its statistically significant correlations with a number of variables theorized to influence such use, including peer alcohol use ( $r = 0.26$ ), approval of alcohol use ( $r = -0.18$ ), parental nurturance/monitoring ( $r = -0.22$ ), family adjustment ( $r = -0.22$ ), parental permissiveness ( $r = 0.41$ ), child's tolerance of deviance ( $r = 0.37$ ), and child's deviant self-image ( $r = 0.43$ ). Similar correlations were found between the measure of alcohol misuse and these psychosocial predictors, establishing its construct validity as well.

In conclusion, although this literature is not large, the studies presented here do suggest that children younger than 12 years can reliably report alcohol use and give valid self-reports with respect to their alcohol use and related constructs. It has also been shown that reliable and valid alcohol use data can be obtained from young children without having to resort to bogus pipeline procedures.

There are some recommendations for future research, however. Frequency and quantity of alcohol use, reported by both parents and children, should be more precisely defined so as to maintain the distinction between sips and full drinks of alcohol. Situational cues and visual aids should be used when collecting child alcohol use data to elicit more accurate frequency and quantity data. Samples should be carefully selected and described, acknowledging that if school samples are used, then some of the most problematic children will probably be missed. Contexts of drinking should be assessed as well as questions regarding consequences of alcohol use. More inclusive survey instruments can be used to collect data that would help to identify those elementary school children who show evidence of problematic use even at such an early age.

#### PREDICTING ONSET OF DRINKING FROM BEHAVIOR AT THREE YEARS OF AGE: INFLUENCE OF EARLY CHILD EXPECTANCIES AND PARENTAL ALCOHOL INVOLVEMENT UPON EARLY FIRST USE

*Robert A. Zucker, Jennifer M. Jester, Hiram E. Fitzgerald, Leon I. Puttler, and Maria M. Wong*

Despite increasing information to the contrary, some of which is documented by other members of this symposium, the dominant theory of the determinants of adolescent drinking behavior is one that invokes explanatory factors originating in early adolescence or late-middle childhood. This social influence/modeling theory focuses on the influences of peer alcohol use and peer pressure to drink that occur in conjunction with the increasing desire of adolescents to be treated as adults and to be permitted to engage in those normatively age-graded behaviors that are markers of adult status (e.g., driving, having sex, drinking) (Maddox and McCall, 1964). Another facilitator is adolescents' increased access to alcohol and other drugs that results from their increased independence and physical mobility.

In contrast, the work presented here tests the hypothesis that family exposure influences at earlier ages contribute to drinking behavior outcomes. These analyses are based on data from an ongoing prospective study of the development of risk for alcohol use disorders (Zucker et al., 2000). This high-risk study (the UM-MSU Longitudinal Study) involved 400 intact families with a 3- to 5-year-old son at baseline and all siblings within 6 years of age of the target son. The particular dependent variable that we examined was age of onset of first (regular) drinking experience. This measure was selected because earlier work has documented its importance as a predictor of later problem behavior in adolescence. Early first drinking, defined as first use before the median national age of onset of 14, predicts more injuries, violence, and drunk driving during later adolescence (Gruber et al., 1996). It is also a marker for a greater likelihood of alcohol use disorders in adolescence and early adulthood.

Early child expectancies about adult alcohol use were measured at child ages 3 to 5 by a task in which children were presented with drawings of child and adult figures in common social situations (e.g., two adults on a sofa in front of a fireplace, a family eating dinner, a man watching TV) and were asked what kind of beverage the figures were drinking (alcohol versus nonalcohol). Alcohol expectancies (use schemas) were indicated by the proportion of the beverages assigned to the male adult figure that were alcoholic rather than nonalcoholic drinks (cf. Zucker et al., 1995).

Strength of these child alcohol use schemas correlated significantly with parental alcohol consumption (averaged across father and mother) and with parental alcoholism, both assessed by parental report when the children were in early childhood. As hypothesized, these alcohol use schemas assessed at ages 3 to 5 significantly predicted early

onset of drinking some 9 years later (as did parental alcohol use and parental alcoholism). Importantly, child alcohol schemas predicted early drinking onset even when the effects of parental alcoholism were statistically removed.

These findings indicate that early child alcohol expectancies are precursors of later alcohol use and counter the view that early drinking experiences are shaped solely by peer influences and modeling occurring in middle childhood and adolescence. Importantly, in addition to the effects of a family history of alcoholism, which themselves may reflect both genetic and early environmental influences, the findings indicate that very early cognitions/expectancies about alcohol, acquired at least in part through early learning in the home, are part of a causal pathway that may lead through early-onset drinking to problem alcohol use at a later life stage.

#### PARENT, PEER, AND CHILD RISK FACTORS FOR ALCOHOL USE IN TWO COHORTS OF ELEMENTARY SCHOOL CHILDREN

*Carol J. Loveland-Cherry and Wendy S. Looman*

A focus on primary prevention of adolescent alcohol use requires an “upstream” approach to strengthen protective factors and decrease risk factors, beginning when the incidence of alcohol use is minimal. The average age of initiation of alcohol use is 11 years for boys and 13 years for girls. To develop effective prevention programs, there is a need to begin earlier to identify protective and risk factors as the basis for interventions.

Although data on antecedents of alcohol use and misuse for young children are limited, there is a large body of literature on risk and protective factors for adolescent alcohol use and misuse (see, e.g., Baumrind, 1991; Dielman et al., 1990–1991; Dishion et al., 1991; Hawkins et al., 1992; Kumpfer, 1998; Loveland-Cherry et al., 1996; Steinberg et al., 1994). Individual protective factors include positive temperament or disposition, a broad repertoire of social coping skills, belief in one’s self-efficacy and ability to adapt to changing circumstances, and a positive social orientation. Individual risk factors include antisocial and other problem behaviors, alienation and rebelliousness, high tolerance of deviance, strong need for independence, psychopathology, favorable attitudes to drug use, and high-risk personality factors. Family protective factors include cohesive and supportive family environment, clear rules for expected behaviors, parental monitoring of behavior, and parental knowledge of the predictors and consequences of adolescent alcohol use. Family risk factors include permissive or inconsistent parenting; parental alcohol use; parental approval of adolescent alcohol use; cold, unresponsive, and underprotective attitudes; and lack of involvement in the children’s activities.

The data reported here are from a larger study (Loveland-Cherry et al., 1999) that evaluated the efficacy of a family intervention with parents that was designed to

decrease adolescent alcohol use and misuse. The intervention was designed to strengthen protective factors and to reduce risk factors associated with adolescent alcohol use by fostering parenting skills and family environments that would support the development of competencies in children. Relatively high levels of warmth, nurturance, monitoring and parental knowledge, and efficacy for preventing alcohol use and misuse and relatively lower levels of permissiveness and parental drinking were proposed to characterize the optimal family environment. In this paper, we examine the correlates of alcohol use and misuse in two cohorts of elementary school children and then examine outcomes in light of prior drinking status and race.

The family intervention was designed as a universal intervention for children and their families from the general school population. The initial cohort (cohort A) included 1300 children in grade 4 and their families recruited from three school districts. The cohort A sample was largely white (80% white, 15% black, and 5% other). The second cohort (cohort B) was recruited from grade 5 in two of the original school districts 3 years after cohort A. Cohort B differed from cohort A in that we purposely recruited to create a sample balanced on diversity (45% white, 48% black, and 7% other). Also, fewer of the children in cohort B reported living in two-parent families (44% vs. 60% in cohort A). The sex distribution (50% of each sex) and the proportion of children who reported previous drinking at baseline were similar for the two cohorts (28.5% of cohort A, 27% of cohort B).

The study variables were derived from the literature and included children’s perceptions of susceptibility to peer pressure, deviant self-image, tolerance of deviance, self-efficacy not to drink, and approval of alcohol use. Family/parent variables included family composition; family nurturance; and parental drinking, monitoring, permissiveness, norms, and approval of alcohol use. Peer variables included peer drinking, pressure to use alcohol, approval of alcohol use, and talk about alcohol use. Each of the variables was measured by items that had been used in previous studies (Dielman et al., 1993). Two outcome variables, alcohol use and misuse, are the focus of this paper. Alcohol use was defined as a total quantity/frequency score summarizing the number of drinks consumed per week over the past 12 months. Alcohol misuse was an index computed as the mean of eight items asking students about overindulgence, trouble with family, trouble with peers, trouble at school, or trouble with police experienced as a result of alcohol use during the previous 12 months. Previous drinking was assessed at baseline by a dichotomous (yes/no) question asking whether the student had ever drunk more than a few sips of alcohol. Data reported here are from surveys completed by children in the classroom in grades 4 through 12 for cohort A and in grades 5 through 10 for cohort B.

Hierarchical multiple regression analyses were used to identify correlates of alcohol use and misuse separately for the two cohorts. Analyses in cohort A were repeated using



grade 5 data for greater comparability with the cohort B grade 5 results. Reported drinking before baseline was a consistent significant correlate of current alcohol use (cohort A: grade 4  $\beta = 0.16$ , grade 5  $\beta = 0.28$ ; cohort B: grade 5  $\beta = 0.63$ ) and misuse (cohort A: grade 4  $\beta = 0.40$ , grade 5  $\beta = 0.21$ ; cohort B: grade 5  $\beta = 0.30$ ). Children's perceptions of peer pressure was also a significant correlate of alcohol use (cohort A: grade 4  $\beta = 0.13$ , grade 5  $\beta = 0.13$ ; cohort B: grade 5  $\beta = 0.13$ ) and of alcohol misuse (cohort A: grade 4  $\beta = 0.23$ , grade 5  $\beta = 0.35$ ; cohort B: grade 5  $\beta = 0.24$ ) in both cohorts.

Parent factors were also consistent correlates of children's alcohol use. These included parental monitoring (cohort A: grade 4  $\beta = -0.11$ , grade 5  $\beta = -0.08$ ), parental norms (cohort B: grade 5  $\beta = -0.22$ ), and parental permissiveness (cohort B: grade 5  $\beta = 0.12$ ). For alcohol misuse, parental correlates were parental monitoring (cohort A: grade 4  $\beta = -0.13$ , grade 5  $\beta = -0.13$ ; cohort B:  $\beta = -0.08$ ) and parental norms (cohort B: grade 5  $\beta = -0.34$ ). Finally, deviant self-image was weakly correlated with both alcohol use ( $\beta = -0.05$ ) and misuse ( $\beta = -0.07$ ), but only in cohort B. This cluster of variables explained 32.4% (cohort A grade 4), 12% (cohort A grade 5), and 56% (cohort 5 grade 5) of the variance in children's alcohol use and explained 31.4% (cohort A grade 4), 23.5% (cohort A grade 5), and 39.4% (cohort B grade 5) of the variance in children's alcohol misuse.

As part of the evaluation of the efficacy of the family intervention, we examined alcohol use and misuse outcomes over time, considering previous drinking status and race. We used hierarchical linear modeling to model individual use and misuse from grade 4 to grade 12 for cohort A and from grade 5 to grade 10 for cohort B. Results for cohort A indicated that white students who reported drinking before the grade 4 baseline exhibited significantly higher levels of alcohol use and misuse overall in grade 12, as well as a significantly greater rate of increase in alcohol use and misuse over time. Furthermore, the family intervention slowed the rate of increase in both alcohol use and alcohol misuse among cohort A students (regardless of race or previous drinking status).

For cohort B, white students who reported drinking before the grade 5 baseline indicated significantly higher levels of alcohol use overall in grade 10 and a greater rate of increase in alcohol use over time. Cohort B students who reported previous drinking at baseline also reported significantly higher levels of alcohol misuse overall, with an initial decrease in misuse followed by a significant acceleration in misuse. The family intervention slowed the rate of increase in alcohol use among cohort B participants (regardless of race or previous drinking status) but did not affect their alcohol misuse.

The results support the relationship between early drinking in elementary school and higher rates of alcohol use and misuse through middle adolescence. Students who start drinking before fourth or fifth grade are more involved in

drinking and alcohol problems in elementary school as well as in adolescence. In addition, the family intervention resulted in less drinking at the adolescent follow-up in both cohorts and in less alcohol misuse in cohort A, whether they drank before baseline or not. Whereas the rates of increase in alcohol use and misuse over time were greater for white students than for nonwhite students, students in the intervention condition had slower rates of increase in alcohol use (in both cohorts) and misuse (in cohort A only) than students in the control conditions. These results support the importance of increasing our understanding of factors related to alcohol use and misuse among young school-age children in order to develop more effective primary prevention interventions.

## CONCLUSIONS

*John E. Donovan*

The papers that constitute this symposium represent a variety of different fields of psychosocial research—from epidemiology to etiology and prevention—all focused on alcohol use among elementary students. The national epidemiological surveys of drinking by elementary students that I report here show that among children as young as fourth grade, approximately 10% have had more than a few sips of alcohol in their lives and half of these consumed beer in the past year, and that twice as many children report lifetime and past-year drinking by sixth grade. Unfortunately, however, the present state of this area is that we have either representative national data that are outdated or current national data that are not representative. Clearly, we need better surveillance of alcohol use among elementary students in the United States.

Despite the paucity of methodological research focused on children's self-reports of alcohol use, the evidence reviewed here by Sharon Leech supports their basic reliability and validity. This is not to say, however, that more research is not needed. Given the "hand-me-down" nature of both child and adolescent alcohol use assessments, research could profitably be invested in both cognitive interviewing and the use of computer-presented props, such as various full-sized cups, glasses, and bottles, to improve children's reports of the frequency and quantity of alcohol consumed.

Etiological research to establish the risk factors for initiation of alcohol use in middle childhood/preadolescence is rare. Most longitudinal studies of children in this field are so focused on adolescent drinking as an outcome that they fail even to assess child alcohol use prospectively, or they focus instead on substance use onset (alcohol, cigarettes, or marijuana) because of the low anticipated base rates for each separate substance. The presentation by Zucker and colleagues is an important addition to this area because it suggests the independent predictive utility for early-onset drinking of both parental alcohol use/alcoholism and socially learned alcohol expectancy schemas assessed at an early age (3–5 years).

Early-onset drinking has been shown in previous research to be a risk factor for both adolescent problem drinking (Gruber et al., 1996; Hawkins et al., 1997; Pedersen and Skronnal, 1998) and adult alcohol use disorders (DeWit et al., 2000; Grant and Dawson, 1997). The present research by Loveland-Cherry and colleagues shows that beginning to drink by fourth or fifth grade (even earlier than most definitions of early-onset drinking) has implications not only for adolescent alcohol use and misuse but also for use and misuse *within* elementary school. This finding and the steeper trajectory of growth in alcohol use and misuse seen here for very early-onset drinkers speaks to the importance of delaying onset into middle school and later. The research additionally demonstrates that an appropriately timed and targeted intervention can derail a potentially pathological life course.

As an area of research, the field of childhood drinking has yet to establish itself. The inchoate nature of this area is best indicated by the lack of any previous childhood drinking symposia at these meetings. We can speculate on some of the reasons for this. First, there may be a reluctance to acknowledge that children are becoming involved in alcohol use. Child drinking is not, however, a new thing. Nearly a century ago, alcohol use by children was recognized as an impediment to academic performance (MacNichol, 1905), and issues such as the appropriate age to permit drinking have been argued since the 1700s (see Warner, 1998). Second, the absence of good epidemiological evidence has made it difficult to establish the magnitude of the problem. Given the current surveys, it is still not possible to determine how many children are engaging in patterns of alcohol use that place them at risk of either present or future risks. Third, there is a tendency to discount children's reports of alcohol use as exaggeration or status seeking, but there is equally little research to establish the validity of alcohol use self-reports among adolescents. Fourth, there simply has not been a quorum of alcohol researchers with an interest in preadolescent drinking. It is hoped that there will be many future symposia in this area.

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#### REFERENCES

- Arthur MW, Hawkins JD, Pollard JA, Catalano RF, Baglioni AJ (2002) Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors. *Eval Rev* 26:575–601.
- Baumrind D (1991) The influence of parenting style on adolescent competence and substance use. *J Early Adolesc* 11:56–95.
- Brook JS, Whiteman M, Gordon AS, Nomura C, Brook DW (1985) Onset of adolescent drinking: a longitudinal study of intrapersonal and interpersonal antecedents. *Adv Alcohol Subst Abuse* 5:91–110.
- 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, Stewart J, Connolly G, Silva P (1991) A longitudinal study of New Zealand children's experience with alcohol. *Br J Addict* 86:277–285.
- DeWit DJ, Adlaf EM, Offord DR, Ogborne AC (2000) Age of first alcohol use: a risk factor for the development of alcohol disorders. *Am J Psychiatry* 157:745–750.
- 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, Butchart AT, Shope JT, Miller M (1990–1991) Environmental correlates of adolescent substance use and misuse: Implications for prevention programs. *Int J Addict* 25:855–880.
- Dielman TE, Leech SL, Lorenger AT, Horvath WJ (1984) Health locus of control and self-esteem as related to adolescent health behavior and intentions. *Adolescence* 19:935–950.
- Dielman TE, Leech SL, Loveland-Cherry C (1995) Parents' and children's reports of parenting practices and parent and child alcohol use. *Drugs Soc* 8:83–101.
- Dishion TJ, Patterson GR, Stoolmiller M, Skinner ML (1991) Family, school, and behavioral antecedents to early adolescents' involvement with antisocial peers. *Dev Psychol* 27:172–180.
- Ellickson PL, Hays RD (1991) Antecedents of drinking among young adolescents with different alcohol use histories. *J Stud Alcohol* 52:398–408.
- Friis RH, Sellers TA (1996) *Epidemiology for Public Health Practice*. Aspen Publishers, Gaithersburg, MD.
- Grant BF, Dawson DA (1997) Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: results from the National Longitudinal Alcohol Epidemiologic Survey. *J Subst Abuse* 9:103–110.
- Gruber E, DiClemente RJ, Anderson MM, Lodicio M (1996) Early drinking onset and its association with alcohol use and problem behavior in late adolescence. *Prev Med* 25:293–300.
- Hawkins JD, Catalano RF, Miller JY (1992) Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychol Bull* 112:64–105.
- Hawkins JD, Graham JW, Maguin E, Abbott R, Hill KG, Catalano RF (1997) Exploring the effects of age of alcohol use initiation and psychosocial risk factors on subsequent alcohol misuse. *J Stud Alcohol* 58:280–290.
- Hennekens CH, Buring JE (1987) *Epidemiology in Medicine*. Little, Brown, Boston, MA.
- Jackson C (1997) Initial and experimental stages of tobacco and alcohol use during late childhood: relation to peer, parent, and personal risk factors. *Addict Behav* 22:685–698.
- 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.
- Kandel DB (2002) *Stages and Pathways of Drug Involvement: Examining the Gateway Hypothesis*. Cambridge University Press, New York.
- Kumpfer KL (1998) Selective prevention interventions: the Strengthening Families program, in *Drug Abuse Prevention Through Family Interventions* (Ashery RS, Robertson EB, Kumpfer KL eds), NIDA Research Monograph 177, NIH Publication No. 99-4135, pp 160–207. National Institute on Drug Abuse, Bethesda, MD.
- Liu LY (2003) *Texas School Survey of Substance Use Among Students: Grades 4–6, 2002*. Texas Commission on Alcohol and Drug Abuse (TCADA), Austin, TX. Available at: www.tcada.state.tx.us.



- Loveland-Cherry CJ, Leech S, Laetz VB, Dielman TE (1996) Correlates of alcohol use and misuse in fourth-grade children: psychosocial, peer, parental, and family factors. *Health Educ Q* 23:497–511.
- Loveland-Cherry CJ, Ross LT, Kaufman SR (1999) Effects of a home-based family intervention on adolescent alcohol use and misuse. *J Stud Alcohol Suppl* 13:94–102.
- MacNichol TA (1905) A medical study of the effects of alcohol on school children. *N Engl Med Month* 24:305–307.
- Maddox GL, McCall BC (1964) *Drinking Among Teenagers: A Sociological Interpretation of Alcohol Use by High School Students*. Rutgers Center of Alcohol Studies, New Brunswick, NJ.
- Margulies RZ, Kessler RC, Kandel DB (1977) A longitudinal study of onset of drinking among high-school students. *J Stud Alcohol* 38:897–912.
- Metze L (2001) Pride Technical Report: The PRIDE Questionnaire for Grades 4–6, Reliability Study. Available at: [www.pridesurveys.com/main/supportfiles/tr9946.pdf](http://www.pridesurveys.com/main/supportfiles/tr9946.pdf).
- Oetting ER, Edwards R, Beauvais F (1985) Reliability and discriminant validity of the children's drug-use survey. *Psychol Rep* 56:751–756.
- Pedersen W, Skrondal A (1998) Alcohol consumption debut: predictors and consequences. *J Stud Alcohol* 59:32–42.
- Pollard JA, Gabriel RM, Arter JA (1991) Surveys of Student Alcohol and Other Drug Use: A Consumer's Guide 2nd ed. Western Center for Drug-Free Schools and Communities, Northwest Regional Educational Laboratory, Portland, OR. Available at: [www.nwrac.org/pub/library/s/s\\_surveys.pdf](http://www.nwrac.org/pub/library/s/s_surveys.pdf).
- Steinberg L, Fletcher A, Darling N (1994) Parental monitoring and peer influences on adolescent substance use. *Pediatrics* 93:1060–1064.
- Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism (2002) *A Call to Action: Changing the Culture of Drinking at U.S. Colleges*, NIH Publication No. 02-5010. National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD.
- University of Michigan News and Information Services (2002) Ecstasy use among American teens drops for the first time in recent years, and overall drug and alcohol use also decline in the year after 9/11 (Press Release). Ann Arbor, MI, December 16.
- Van Kammen WB, Loeber R, Stouthamer-Loeber M (1991) Substance use and its relationship to conduct problems and delinquency in young boys. *J Youth Adolesc* 20:399–413.
- Wagenaar AC, Komro KA, McGovern P, Williams CL, Perry CL (1993) Effects of a saliva test pipeline procedure on adolescent self-reported alcohol use. *Addiction* 88:199–208.
- Warner J (1998) Historical perspectives on the shifting boundaries around youth and alcohol: the example of pre-industrial England, 1350–1750. *Addiction* 93:641–657.
- Webb JA, Baer PE, McLaughlin RJ, McKelvey RS, Caid CD (1991) Risk factors and their relation to initiation of alcohol use among early adolescents. *J Am Acad Child Adolesc Psychiatry* 30:563–568.
- Zucker RA, Fitzgerald HE, Refior SK, Puttler LI, Pallas DM, Ellis DA (2000) The clinical and social ecology of childhood for children of alcoholics: description of a study and implications for a differentiated social policy, in *Children of Addiction: Research, Health and Policy Issues* (Fitzgerald HE, Lester BM, Zuckerman BS eds), pp 109–141. Routledge Falmer, New York.
- 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.