

The Association of Educational Achievement and School Dropout with Risk of Alcoholism: A Twenty-Five-Year Prospective Study of Inner-City Children*

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ABSTRACT. *Objective:* This prospective study is focused on the characteristics leading to alcohol use disorders in early adulthood among a cohort of black children. The principal aim of this work is to examine the impact of educational attainment, school dropout and early school adaptation on the development of alcohol abuse and dependence in adulthood. *Method:* From a population that consisted of 1,242 first graders in 1966-67, a total of 953 were interviewed at age 32-33 about their current alcohol and drug use, educational attainment, employment and family situation. *Results:* Diagnoses of alcohol abuse and dependence were defined according to

DSM-III-R criteria resulting in identification of 13.5% as having a lifetime alcohol use disorder. Early predictions of an alcohol use disorder in adulthood included early reports of underachievement in first grade by the child's teacher, dropping out of high school, whether the family set definite rules about school during adolescence, and how often the adolescent worked on homework with his/her family. *Conclusions:* The results suggest that educational achievement and some early adaptive behaviors in school are associated with risk for alcohol use disorders. The public health importance of the findings are discussed. (*J. Stud. Alcohol* 59: 318-326, 1998)

IN PRIOR STUDIES, educational level and school dropout have been found to be associated with the development of alcohol abuse and dependence in adulthood (Crum et al., 1992, 1993). These studies were based on prospective data gathered as part of the Epidemiologic Catchment Area (ECA) surveys, which included a baseline and 1-year follow-up interview. One of the limitations of these earlier investigations was the relatively short observation period. In order to more fully to address this association, the current report utilizes data from the Woodlawn study, a 25-year prospective study of individuals originally identified while in first grade, reassessed during adolescence, and then re-interviewed

as adults using the Composite International Diagnostic Interview (CIDI) (Robins et al., 1988).

The impact of the social environment during childhood and adolescence on later alcohol use has not been extensively examined. Studies of family structure indicate that changes such as gaining a stepfather or losing grandmothers might influence relations between early family environments and adult role behavior, delinquency, or alcohol and drug use (Dornbusch et al., 1985; Ensminger et al., 1983; McCord, 1990). Adolescents who drop out of school are more likely to use illegal drugs than are graduates (Mensch and Kandel, 1988). Yet, the causal links between dropping out and alcohol use remain to be disentangled. Early school failure and misconduct, as well as delayed graduation (or obtaining a GED), can be examined in relation to the links between high school dropout and alcohol use.

Although it has been shown fairly consistently that alcohol disorders and heavy drinking may lead to school dropout among adolescents and young adults (Williams and Wynder, 1993), less emphasis has been placed on the possible relationship that dropping out of school and poor educational achievement may have on the subsequent risk for alcoholism. Prior psychological literature has shown that failure to meet expected social goals may lead to behavioral problems (Jessor and Jessor, 1977; Jones, 1968, 1971; Kellam and Ensminger, 1980; Loper et al., 1973; McCord and McCord, 1962; Robins et al., 1962). If we extend this thinking to school performance, it is conceivable that failure to meet expected levels of educational achievement may lead to problem behaviors such as maladaptive drinking and alcohol

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dependence. The public health importance of this research possibility is based on the assumption that these hypothesized risk factors are potentially modifiable and may lead to prevention programs targeted at underachievers and school dropouts.

The Woodlawn study is a developmental epidemiological study of blacks. This report is focused on the characteristics described in childhood that have been found to lead to alcohol use disorders in early adulthood. We examine the impact of educational attainment, school dropout and early school adaptation on the development of alcohol abuse and dependence in adulthood. This study is unique because it has 25-year prospective data beginning before the initiation of alcohol use. Using these prospective data, we hypothesized that those who dropped out of high school and did not get their diploma and those who entered college but failed to get a college degree would be at increased risk for alcohol abuse or alcohol dependence. Furthermore, we hypothesized that those children and adolescents classified as underachievers and those with maladaptive school behavior would also be at increased risk for alcohol disorders as adults.

There are several explanations for a possible association between school dropout and underachievement and the development of alcohol use disorders. For example, the association may be due to a general tendency towards problem behavior and deviance. On the other hand, abnormal drinking behavior may be a method for coping with poor feelings and the alienation associated with failure. Furthermore, there may be common underlying etiologic traits, such as personality and environmental characteristics, that may lead to underachievement and school dropout, as well as drinking

problems. The rationale for this study was (1) to distinguish some of the possible explanations for an association of school dropout and underachievement with alcohol disorders by examining this relationship in a longitudinal sample, and (2) to identify potential etiologic pathways which could then be more fully explored in future investigations.

Method

Sample population

The original epidemiologically defined population consists of all 1,242 first graders from a relatively poor black community in Chicago's southside who have been followed longitudinally, starting in 1966-67 (Figure 1). They were assessed three times in first grade, at age 16-17 (1975-76), and by public records through age 25 (school records, police arrest records and motor vehicle records). The 1992 Woodlawn assessment builds upon data collected since 1966 on children in first grade in nine public and three parochial schools. Because the study included all children from the first-grade classrooms in the community of Woodlawn, there was no selection bias or stigma attached to inclusion. In 1992-93, when the study population were in their early thirties, a total of 83.6% (n = 1,038 of the original 1,242) were located, and 953 were interviewed about their families, education, jobs, health and well-being, neighborhoods, and alcohol and drug use (43 individuals had died, 3 could not be interviewed because they were incapacitated and 39 refused to be interviewed). Informed consent was given for participation in the research. Approximately 84% of those interviewed were

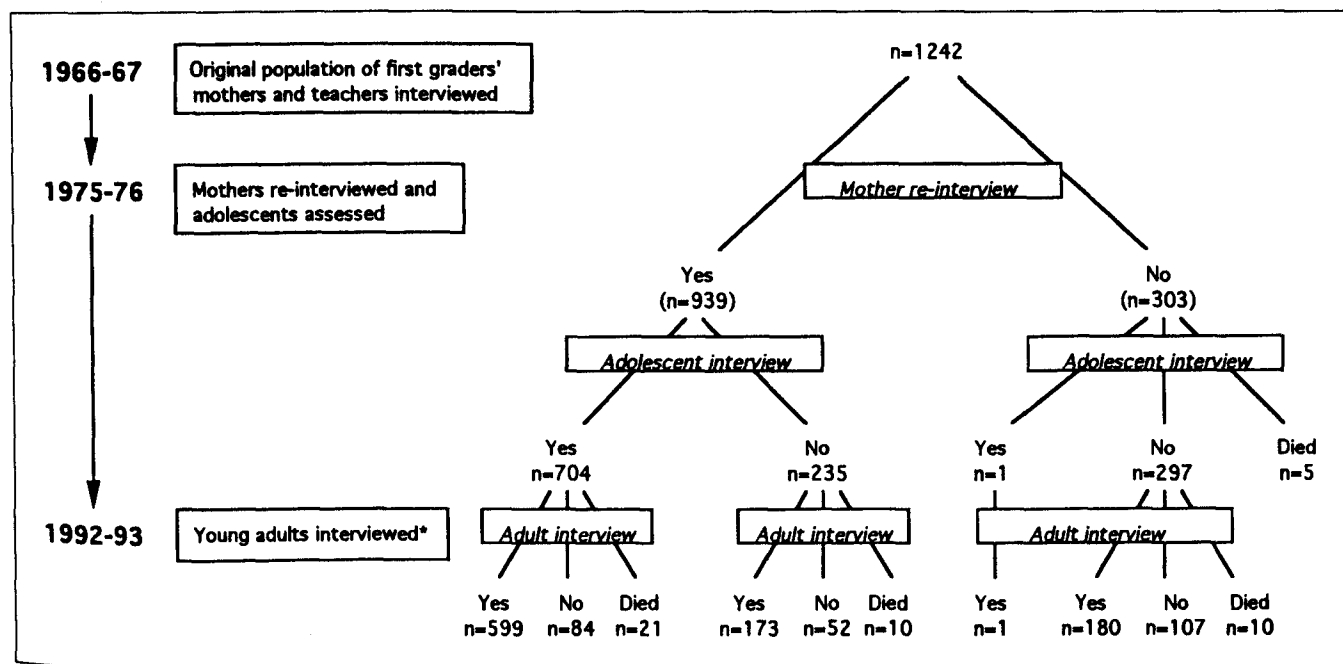


FIGURE 1. Flow chart of primary data collection for the Woodlawn study (*"Died" includes individuals who have died as well as those who were found to be incapacitated; "No" includes individuals who were not located as well as those who refused to be interviewed)

living in the greater Chicago area. The remaining 16% lived in the other north-central states and California.

The study sample includes 456 men (47.8%) and 497 women (52.2%). Although similar proportions of men and women were interviewed, refused and not located, men were more likely than women to be incapacitated or deceased (5.6% vs 1.9%). The study participants who were interviewed were compared on early data with those who were not interviewed in order to examine whether there was differential follow-up. Interviewed cases tended to be overrepresented by those from mother-father families rather than other family types. Children from families who were below the government-defined poverty level in 1966-67 were less likely to be interviewed than those who were not. Those who had dropped out of school, according to the records of the Board of Education, were less likely to be located than were high school graduates. Those whose mothers completed interviews in 1975-76 were more likely to be interviewed than those who had moved or were unlocated at that time. On the other hand, the interviewed sample did not appear to differ from those not interviewed in terms of mother's education, having a teenage mother, child maladaptive behaviors, or first-grade ratings on the mother symptom inventory.

Instrument and measures

The observations of the children's adaptive behavior in first grade (1966-67) were based on teachers' reports of tasks they considered important for children to do well in the first grade. These included five types of maladaptive behavior identified by excessive presence of the following: (1) lacking in involvement with classmates (e.g., shy, timid, alone too much, day-dreamer, friendless, aloof); (2) aggressive behavior (e.g., fights too much, steals, lies, resists authority, is destructive to others or property, obstinate, disobedient, uncooperative); (3) immature behavior (e.g., acts too young physically and/or emotionally, cries too much, has tantrums, sucks thumb, is physically poorly coordinated, masturbates, urinates in class, seeks too much attention); (4) not working up to his/her ability (e.g., does not learn as well as assessment of ability indicates); (5) restless (e.g., fidgets, is unable to sit still in classroom). For each item, teachers and mothers were asked to rank the child on each item on a four-point scale from 0 (within minimal limits of acceptable behavior, 1 (mildly excessive), 2 (moderately excessive), to 3 (severely excessive). Responses were categorized separately for mothers and teachers to assess any maladaptive behavior (mild to severe), relative to the reference category (within acceptable limits of behavior).

Questions from the adolescent interview, completed in 1975-76, that assessed school and education involvement were: (1) About how often do you work on homework together with your parents or other adults in your family? (2) How much does your family—including your mother,

father, guardian or other adult—set rules for your schooling such as doing homework, attendance at school and behavior in school? (3) About how many classes do you skip in an average week? (4) How far do you think you really will go in school? (5) Have you ever been stopped, taken to the police station or appeared in court for truancy? and (6) How many times have you been suspended from school? Categories were created for each question based on the distribution of responses to each item.

The 1992-93 adult survey instrument included questions concerning current household composition, sociodemographic information on both current and past household members, educational attainment, occupational history and economic resources. Diagnoses of alcohol abuse and dependence were obtained using the Michigan version of the Composite International Diagnostic Interview (CIDI) Kessler et al., 1994) which utilizes computer algorithms based on DSM-III-R criteria (Robins et al., 1988).

Statistical analysis

After descriptive analyses, the logistic regression model was used to estimate the degree of association between categories of schooling, educational achievement and early school adaptation and the occurrence of alcohol abuse or dependence in adulthood. This model also provided statistical control of potential confounding variables (Breslow and Day, 1980; Kleinbaum et al., 1982; Rothman, 1986). The study participants are all of similar age and racial-ethnic background, and were living in the same residential community as children. The multiple logistic regression analyses were completed while holding sex constant. This was done because sex is known to be a potential risk factor for alcoholism (Crum et al., 1992; Helzer et al., 1991). High school dropout rate is generally higher for boys (Kominski, 1990) and is specifically higher in this population (Ensminger and Slusarcick, 1992). Furthermore, the incidence and prevalence of alcohol disorders are greater among men (Eaton et al., 1989; Helzer et al., 1992), and sex was associated with case status in the initial descriptive analyses. As a consequence, to hold potential confounding constant, sex was included in the multivariate models. On the other hand, cases also differed from noncases by marital status, employment status and age of first alcohol initiation. However, these variables were not controlled for in the multiple logistic regression analyses. Although these factors may confound the association of education with alcohol disorders, they are also likely to be separate outcomes or mediators of school dropout and underachievement. Characteristics that are part of the causal pathway of the exposure of interest (in this instance school dropout) and the disease (alcohol abuse and dependence)—or are separate outcomes of the exposure—are not defined as confounding variables (Schlesselman, 1982). As a consequence, in order not to mask the education-

alcohol association by potentially overcontrolling for non-confounders, we did not hold these other characteristics constant in the multiple logistic regression analyses.

In the logistic regression analyses, when assessing data from the adolescent or adult interviews, the outcome variable was defined as those cases of alcoholism with current problems (with at least one of the criteria for alcohol abuse or dependence within the prior 12 months). A lifetime diagnosis was used as the dependent variable only in the analyses of information gathered from the first-grade interviews. The rationale for this was that current problems were more likely to have developed after the individual left school compared with lifetime problems some of which may have occurred early in life. Furthermore, because of the concern that some drinking problems may have led to school dropout rather than the reverse, a supplementary analysis was completed after removing from the sample individuals with the report of early onset problem drinking (prior to age 18).

Results

Prevalence

A total of 129 cases of alcohol use disorders (abuse or alcohol dependence) were identified by the CIDI at the early adulthood interview, ages 32-33 years. This yielded a lifetime prevalence of 13.5% (of the 953) in this inner-city population. Of these 129 individuals, 67 (7.5%) met at least one of the criteria for alcohol abuse or dependence within the prior 12 months. These individuals were considered to have a current disorder. As would be expected from prior epidemiologic studies of alcohol use disorders among community populations, men were more likely than women to have a current or lifetime diagnosis. A total of 7.2% ($n = 36$ of 497) of the women had a lifetime diagnosis of alcohol abuse or dependence, and 4.0% ($n = 19$ of 480) had a current disorder. Men had approximately two-and-one-half times the rate of both lifetime (20.4%, $n = 93$ of 456) and current (11.7%, $n = 48$ of 411) diagnoses. (A total of 62 individuals did not provide information to allow a determination of a currently active diagnosis and were not included in the calculations for the currently active categories.)

TABLE 1. Sociodemographic characteristics of currently active cases ($n = 67$) and noncases ($n = 824$) of alcohol abuse-dependence^a (data from the Woodlawn study)

	Cases		Noncases	
	<i>n</i>	%	<i>n</i>	%
Sex				
Male	48	72	363	44 [†]
Female	19	28	461	56
Marital status				
Never married	38	57	354	43*
Separated/divorced	11	16	165	20
Widowed	0	0	3	0.4
Live w/partner ^b	9	13	58	7
Married	9	13	244	30 [†]
Employment status				
Working for pay	26	39	539	65 [†]
Not working for pay	41	61	285	35
Student status				
Current student	3	4	71	9
Nonstudent	64	96	753	91
Age first tried alcohol				
Before age 10	2	3	98	12*
Age 11-13	15	22	78	10 [†]
Age 14-17	39	58	364	48
Age 18-21	9	13	220	29 [†]
Age 22+	2	3	64	8
Educational level ^c				
Dropout, grade school	2	3	9	1
Dropout, high school	18	27	139	17*
GED	8	12	50	6
High school diploma	16	24	165	20
College, no degree	9	13	213	26*
Associate degree plus	6	9	139	17

* $p \leq .05$, χ^2 , 1 df. [†] $p \leq .01$, χ^2 , 1 df. [‡] $p < .001$, χ^2 , 1 df.

^aA total of 62 individuals did not provide information to allow a determination of a currently active diagnosis and are not included in the calculations for the currently active categories.

^bThese are individuals who are not married but report living with a partner.

^cIndividuals who reported having enrolled only in technical schools were not included in analyses involving the educational variables.

Correlates of alcohol use disorders among adults

Characteristics associated with a currently active CIDI/DSM-III-R case of alcohol abuse or dependence are presented in Table 1. As has been previously mentioned, men (72%) are more likely to be cases than are women (28%). Cases are also more likely than noncases to be not-married, unemployed, school dropouts, and to report having first tried alcohol at an earlier age (Table 1).

TABLE 2. Relative risk estimates of currently active alcohol abuse/dependence based on logistic regression analyses (data from the Woodlawn study)

Educational level	Unadjusted relative risk	95% CI ^a	Adjusted relative risk ^b	95% CI ^a
Dropout, grade school	3.9	0.7 - 19.7	4.9	0.9 - 25.9
Dropout, high school	2.3*	1.1 - 4.7	2.1*	1.0 - 4.4
GED	2.8*	1.1 - 7.0	2.3	0.9 - 5.9
High school diploma	1.7	0.8 - 3.6	1.6	0.7 - 3.3
College, no degree	0.7	0.3 - 1.7	0.8	0.3 - 1.9
Associate degree plus	1.0 (reference)		1.0 (reference)	

* $p \leq .05$.

^aCI, confidence interval.

^bThe study participants are all of similar age and racial-ethnic background, and were living in the same residential community as children. Relative risk estimates based on multiple logistic regression analyses are adjusted for sex.

TABLE 2A. Relative risk estimates of currently active alcohol abuse/dependence, after removing individuals with early onset alcohol problems (age 18 or younger) based on logistic regression analyses (data from the Woodlawn study)

Educational level	Unadjusted relative risk	95% CI ^a	Adjusted relative risk ^b	95% CI ^a
Dropout, grade school	6.3	0.6 - 61.7	8.0	0.8 - 82.3
Dropout, high school	2.2	0.9 - 5.7	2.1	0.8 - 5.3
GED	1.3	0.3 - 6.3	1.2	0.2 - 5.7
High school diploma	1.6	0.6 - 4.0	1.5	0.6 - 3.8
College, no degree	0.8	0.3 - 2.3	0.8	0.3 - 2.4
Associate degree plus	1.0 (reference)		1.0 (reference)	

^aCI, confidence interval.

^bThe study participants are all of similar age and racial-ethnic background, and were living in the same residential community as children. Relative risk estimates based on multiple logistic regression analyses are adjusted for sex.

Because the principal hypotheses differentiated school dropouts as having an elevated risk for alcoholism relative to those who completed a particular level of schooling, specific levels of educational categories were examined relative to the college degree (Table 2). Although not statistically significant, dropping out of grade school is associated with over four times the risk of alcohol abuse or dependence relative to those individuals with a college degree (adjusted estimated relative risk = 4.9). Dropping out of high school is associated with a two-fold greater risk. Individuals with a high school diploma and those with some college experience have no appreciable elevated risk relative to those with a college degree and above.

In supplementary analyses (Table 2A), after removing from the sample individuals with the report of early onset problem drinking, the results are similar except that individuals with a GED are not found to be at increased risk for an alcohol disorder relative to those with an associate degree or higher. Relative risk estimates for having a GED are comparable to estimates for participants with a high school diploma.

Educational characteristics during adolescence associated with risk for alcohol disorders in adulthood

Because the descriptive analyses cannot rule out the possibility that early maladaptive drinking may lead to poor

TABLE 3. School behavior during adolescence with risk for currently active alcohol abuse/dependence in adulthood based on logistic regression analyses (data from the Woodlawn study)

School behavior reported during adolescent interview	Unadjusted relative risk	95% CI ^a	Adjusted relative risk ^b	95% CI ^a
Works on homework with family				
Several times a week	0.5	0.3 - 1.1	0.5	0.3 - 1.1
Weekly to every few months	0.4*	0.2 - 0.9	0.4*	0.2 - 0.9
Less frequently	1.0 (reference)		1.0 (reference)	
Family sets rules about school				
Entirely up to child	5.0*	1.2 - 20.2	4.2*	1.0 - 17.1
Some rules	3.0	0.9 - 9.9	2.7	0.8 - 9.0
Definite rules	1.0 (reference)		1.0 (reference)	
How often skips school				
Sometimes/often	1.7	1.0 - 2.8	1.5	0.9 - 2.6
Never/rarely	1.0 (reference)		1.0 (reference)	
Truancy				
Truant	1.6	0.7 - 3.9	1.3	0.6 - 3.2
Never	1.0 (reference)		1.0 (reference)	
How often suspended in the prior 3 years				
Often	1.9	0.7 - 5.1	1.4	0.5 - 3.9
Rarely	1.1	0.5 - 2.1	0.9	0.5 - 1.8
Never	1.0 (reference)		1.0 (reference)	
How far would like to go in school				
High school	1.7	0.8 - 3.4	1.7	0.8 - 3.4
College or higher	1.0 (reference)		1.0 (reference)	

* $p \leq .05$.

^aCI, confidence interval.

^bThe study participants are all of similar age and racial-ethnic background, and were living in the same residential community as children. Relative risk estimates based on multiple logistic regression analyses are adjusted for sex.

TABLE 4. Association of report of child's underachievement in first grade by mother and teacher with individual's risk of lifetime alcohol abuse/dependence based on logistic regression analyses (data from the Woodlawn study)

Reports by child's mother and teacher	Unadjusted relative risk	95% CI ^a	Adjusted relative risk ^b	95% CI ^a
Mother				
Underachievement	0.9	0.6 - 1.5	0.8	0.5 - 1.3
Adapting well	1.0 (reference)		1.0 (reference)	
Teacher				
Underachievement	1.6*	1.1 - 2.3	1.5*	1.0 - 2.1
Adapting well	1.0 (reference)		1.0 (reference)	

* $p \leq .05$.^aCI, confidence interval.^bThe study participants are all of similar age and racial-ethnic background, and were living in the same residential community as children. Relative risk estimates based on multiple logistic regression analyses are adjusted for sex.

educational achievement and school dropout, early characteristics reported by the adolescents regarding their behavior and achievement during grade school are studied (Table 3). In multivariate analyses, significant associations are found for the degree to which the family is involved in school behavior. For example, adolescents who work on their homework with a family member weekly to every few months are significantly less likely to develop an alcohol disorder in their early thirties relative to those who worked with a family member less frequently. Failure to set rules about school behavior is also highly associated with risk for alcoholism. Adolescents in families in which school behavior is entirely up to the adolescent are more likely to develop alcoholism relative to adolescents in families where definite rules are set by adults about schooling behavior. Other characteristics also showed elevated odds of developing an alcohol disorder but did not meet criteria for statistical significance: adolescents who often or sometimes skipped school relative to those who rarely or never skipped classes, truant students, adolescents who were often suspended relative to youths who were never suspended, and students who felt they would only go as far as high school.

Underachievement in first grade as a predictor of alcoholism in adulthood

In order to identify characteristics of educational achievement that can be identified prior to any use of alcohol, reports of first graders by their teachers and by their mothers were studied (Table 4). Children reported by their mothers as underachievers did not appear to have any appreciable risk for alcohol use disorders 25 years later. However, reports by first-grade teachers were significantly associated with risk for alcohol abuse or dependence in adulthood. Relative to children who were classified as adapting well, students reported as underachieving were 60% more likely to have an alcohol use disorder at follow-up during adulthood, ages 32 to 33 (unadjusted and adjusted estimated relative risks = 1.6).

Discussion

The current study reports on a cohort of individuals originally identified in first grade, interviewed during adolescence and reinterviewed 25 years subsequent to the initial contact. In this study sample, lifetime prevalence of alcohol abuse or dependence was found to be 13.5%. This is similar to rates previously reported for other community-based epidemiologic studies such as the ECA surveys. Consistent with prior hypotheses, educational achievement and school dropout are associated with risk of alcohol abuse and dependence. Predictors of alcoholism include (1) those identified in first grade (the teachers' rating of underachievement); (2) those identified in adolescence (few family rules about school, infrequently working on homework with family, plans to limit schooling to high school); (3) failure to complete high school. Unlike findings in prior investigations of the relationship of educational level and risk for alcohol disorders using the ECA surveys (Crum et al., 1992, 1993), no increased risk for alcoholism was found among those individuals who failed to complete college and get their college degree. On the other hand, unlike these prior reports there was an elevated risk found for individuals who did not get a regular high school diploma but then went on to get a GED. Analyses of the ECA dataset found that individuals who obtained a GED were not at any appreciable risk for an alcohol disorder relative to those with an associate degree or above.

These differences between our findings and those of prior analyses may be due to several factors. First, the ECA population is composed of participants ranging in age from 18 to 65 and older, from five different metropolitan areas, and of various racial and ethnic backgrounds, whereas the study reported here is from a one-age cohort of individuals from a single community in Chicago. Individuals of different ages and ethnic and racial backgrounds may differ in their perspective on schooling and in their social expectations for completion of specific levels of education. Second, the ECA data were collected between 1980 and 1985, while these data were gathered more recently, between 1992 and 1993. It may be that the value of a GED degree was diminished over time,

so that it is no longer viewed as a substitute for a high school diploma (e.g., the Armed Forces no longer accept a GED certificate as a substitute for a high school diploma). Third, whereas the ECA analyses included an observational period of 1 year, the current study utilizes longitudinal data comprising 25 years of follow-up, which allows us to study the relationship of education and alcoholism prior to the development of the disorder and prior to the initiation of alcohol use. Because of the concern that drinking problems may have led to school dropout rather than the reverse, after the initial logistic regression analyses were performed, a supplementary analysis was completed after individuals with the report of early onset problem drinking were removed from the study sample. In this analysis, the results for the GED group were similar to those reported from prior analyses of the ECA dataset. Although the numbers were small after these exclusions, the results suggest that obtaining a GED may be protective for the development of alcohol disorders subsequent to high school dropout. An alternative explanation for the findings may be that general academic aptitude is predictive of whether individuals later decide to complete the GED.

*School dropout, underachievement and alcoholism:
Possible etiologic pathways*

There are several possible etiologic pathways that explain the association between school dropout, underachievement and the development of alcohol use disorders. First, the association may be due to a general tendency towards problem behavior and deviance. Some youth may be more likely to have deviant behavior in a number of realms including early initiation into alcohol and other substance use, drinking-related problems, inappropriate social behavior at school, poor school performance, as well as other behavioral problems such as early sexual initiation. Recent longitudinal analyses have shown that problem behaviors are linked, such that students engaging in one problem are more likely to be involved in other problem behaviors as well (Ensminger, 1990; Huizinga et al., 1993; Jessor, 1987).

Second, abnormal drinking behavior may be a method for coping with bad feelings and the alienation associated with failure. In this case, failure would be the inability to meet expected social goals, such as doing well in school and achieving good grades. School failure may result in low self-esteem which in turn may result in drinking as a way of alleviating unpleasant feelings. Students who do poorly in school may develop feelings of low self-worth, or symptoms of depression and anxiety. For example, recent prospective analyses have examined the relationship of depressed mood with the initiation of alcohol use and the development of alcohol-related problems in an epidemiologic sample of urban youth (Crum and Anthony, 1994). In that report, students who expressed symptoms of depressed mood were at increased risk for earlier alcohol initiation and the earlier development of alcohol-related problems relative to those without depressive

symptoms. There was also a tendency for a dose response relationship with respect to this association, in that students with the greatest number of depressive symptoms had the earliest development of alcohol-related problems (Crum and Anthony, 1994). In addition, in some cross-sectional analyses, dose response evidence has been found for the relationship of alcohol consumption with the frequency of poor grades and suicidal ideation (Pierce et al., 1991). Students who are doing poorly in school may use alcohol as well as other substances to diminish depressive or anxiety symptoms and reduce feelings of inadequacy, or to increase their social acceptability with alternative peer groups.

Third, there may be common underlying etiologic traits, such as personality and environmental characteristics, that may lead to underachievement and school dropout, as well as drinking problems. Examples of these underlying characteristics are low IQ, aggressive behavior, low social bonding and parental difficulties. In prior analyses of the Woodlawn study, it was shown that low grades and aggressive behavior among first-grade boys were later associated with subsequent increased risk for dropping out of school (Ensminger and Slusarcick, 1992).

Jarjoura (1993) argues that there are complex effects resulting from school dropout and that dropouts are not necessarily a homogeneous group. He reviewed the theoretical background with respect to dropping out of school and subsequent delinquency and discussed two commonly held theories that have been used to explain findings on the relationship between school dropout and delinquent behavior: strain and social control (Jarjoura, 1993). The strain theory focuses on problems of frustration among low-achieving youths while they are in school. The frustration caused by school failure is hypothesized to lead to delinquency and other forms of deviant behavior, including substance use (Farnsworth and Leiber, 1989; Hirschi, 1969; Schulenberg et al., 1994). Social control theory argues that weaker social bonds to school increase the likelihood of delinquent behavior as well as drug use (Jarjoura, 1993). Within the Woodlawn data, adolescents with low school bonds were more likely to report heavy alcohol use and to drop out of school (Ensminger et al., 1982; Ensminger and Slusarcick, 1992). Elliott and colleagues (1989) also provide evidence for these models in their study of a longitudinal probability sample of adolescents. They found that increased strain and poor socialization were associated with weak bonds to conventional groups and conventional norms, which increased risk for delinquent behavior (Elliott et al., 1989).

There is precedence to indicate that some prevention programs are successful with regard to preventing high school dropout and drug use (Eggert et al., 1990). Eggert and colleagues found that a semester-long interpersonal relations class reduced the percentage of dropouts and improved overall grade point average and school achievement. In addition, students involved in the prevention program also showed declining rates in drug involvement (Eggert et al., 1990).

Limitations and implications of research

There are several limitations in the current report that should be discussed. First, the lack of information regarding the timing of school dropout and the onset of alcohol problems does not permit us to distinguish between those adults who may have dropped out of school due to problem drinking or other substance use and those whose alcohol-related problems began after school dropout. We attempted to address this issue by excluding remitted cases of alcohol disorders in the dependent variable and by removing early onset problem drinkers in the supplementary analyses. Second, we were not able to control for other sources of potential confounding. It is quite possible that underachievement in first grade and the development of alcoholism in adulthood are both due to other underlying factors, such as parental or familial drinking, the presence of cognitive dysfunction or learning disabilities in the child and/or the occurrence of early family conflicts. This study points to the importance of investigating such relationships. Third, attrition in the follow-up, although relatively small (less than 20% over 25 years), may be selective. If attrition was related to the outcome (alcoholism) and the exposure (educational level, underachievement, school dropout), then the results may be biased. However, it is likely that selective loss to follow-up would be greater for individuals with alcoholism and for those individuals who dropped out of school; thus, study attrition is likely to have reduced the degree of association. It is plausible, therefore, that the relative risk estimates are underestimates. Finally, in any study that is measuring school performance or achievement, with behavioral outcomes such as alcohol abuse and dependence, accuracy of reporting is critical. Evidence in this study has the advantage of depending on several sources (i.e., teachers, mothers and adult subjects), and these provide a coherent picture.

In summary, this 25-year prospective study highlights a number of findings: (1) the prevalence of alcohol disorders among this original sample of inner-city children is similar to rates reported from other surveys; (2) dropping out of high school (and possibly also grade school) is associated with an increased risk for alcohol abuse/dependence relative to obtaining a college degree; (3) measures of early schooling behavior among adolescents that are associated with development of an alcohol disorder as adults are whether the family sets definite rules about school and how often the child works on homework with his/her family; (4) early reports of underachievement in first grade by the child's teacher may signal an increased risk for alcohol abuse/dependence in adulthood.

The present report emphasizes the potential importance of early school behavior and achievement in signaling the increased risk for alcoholism. The results suggest that educational achievement and early adaptive behavior in school are associated with risk for alcohol use disorders in adulthood. One of the difficulties in interpreting these data is the pos-

sible multiple reasons for the reported associations. For example, it is quite plausible that early reports of underachievement by the child's first-grade teacher is an indicator of many factors such as familial conflicts, learning disabilities, poor parent monitoring, economic and social stressors, or genetic susceptibility to cognitive problems. Any or all of these factors may be the underlying agent in the pathway to behavioral problems, problem drinking and alcoholism. Yet, these early predictors may identify high-risk groups that could be targeted for prevention or early intervention programs. The public health importance of the findings is related to the potentially modifiable aspects of school underachievement, family involvement in schooling and failing to complete intended levels of education.

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