Psychopathology and Achievement in Children at High Risk for Developing Alcoholism

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ABSTRACT

Objective: To compare rates of psychopathology and academic achievement in children who were either at high or low risk for developing alcoholism and to determine whether academic deficits would predict prospectively the presence of psychopathology occurring within the next year. **Method:** Children and adolescents, aged 8 to 18 years, were evaluated as part of a longitudinal follow-up. Diagnoses obtained by using the Schedule for Affective Disorders and Schizophrenia for School-Age Children and grade-equivalent scores from the reading, spelling, and arithmetic sections of the Wide Range Achievement Test were determined at yearly intervals. **Results:** High-risk offspring were more likely to have a diagnosable disorder. In addition, analyses using the mother's and father's diagnosis of alcoholism as a covariate showed higher hazard ratios for selected disorders (depression, affective disorder, attention-deficit/hyperactivity disorder, and conduct disorder), some of which were gender-dependent. Logistic regression analysis of achievement test scores demonstrated that reading and math scores predicted the presence of childhood psychopathology at the following annual evaluation. **Conclusions:** Children from pedigrees with a high density of alcoholism are at greater risk for developing psychopathology. Furthermore, observed deficits in academic performance may be considered an indicator of a developing diagnosable illness. *J. Am. Acad. Child Adolesc. Psychiatry,* 1999, 38(7):883–891. **Key Words:** high-risk, childhood psychopathology, academic achievement, alcoholism.

It is well known that offspring of alcoholic parents are at increased risk for developing alcoholism. Adoption data suggest the risk is 4 to 6 times higher compared with offspring of nonaffected parents (Bohman, 1978; Bohman et al., 1981; Cloninger et al., 1981; Goodwin et al., 1973). While offspring of alcoholics are at increased risk for problems as adults, they also have more problems during childhood/adolescence, particularly with respect to the externalizing disorders (attention-deficit/hyperactivity disorder [ADHD], conduct disorder, and oppositional defiant disorder) (Earls et al., 1988; Hill and Muka, 1996; Reich et al., 1993). However, there have been both positive (Earls et al., 1988) and negative reports (Reich et al., 1993) concerning elevated rates of ADHD for samples that were largely based on offspring of male alcoholics. One study addressing the offspring of alcoholic women found no evidence of elevated rates of ADHD overall (Hill and Muka, 1996), though ADHD and conduct disorder were found to be significantly associated with prenatal drinking in these mothers.

Whereas there is extensive literature concerning the behavioral undercontrol that characterizes children of alcoholics (Sher and Trull, 1994), there are relatively fewer reports comparing children of alcoholics with those of nonalcoholics with respect to internalizing disorders. Previously we reported that children of alcoholic mothers had significantly more internalizing disorders than did controls (Hill and Muka, 1996), unlike young children of male alcoholics (Hill and Hruska, 1992). However, Earls et al. (1988), using a small sample of 37 children of male and female alcoholics and 17 controls, found no differences in internalizing disorders, though by child report alone, an elevation in anxiety disorders was found. Reich et al. (1993) later evaluated an enlarged sample of 126 children of male and female alco-

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holics (aged 6–18 years), finding these children at increased risk for overanxious disorder, though no significant difference was observed for depression. Using 490 college freshman with and without a family history of alcoholism, Sher et al. (1991) found the rates of a number of internalizing diagnoses to be elevated (major depressive disorder, agoraphobia, social phobia, simple phobia, and generalized anxiety disorder).

A number of studies have addressed academic achievement in children. Children of alcoholics have more often been reported to have poorer academic achievement than offspring of nonalcoholics (Hegedus et al., 1984; Knop et al., 1985; Marcus, 1986; Sher et al., 1991), though some studies have found no differences (Reich et al., 1993; Vitaro et al., 1996). Significantly lower reading comprehension and general information scores from the Peabody Individual Achievement Test (PIAT) have been reported in a sample ($n = 41$) of delinquent adolescent sons of male alcoholics (Hegedus et al., 1984). Marcus (1986) similarly reported that young children (aged 7 to 12 years) of alcoholic mothers scored significantly lower on PIAT Math and Reading subtests and were more frequently placed in special education classes. In a comparison of male children of alcoholics and nonalcoholics from lower socioeconomic strata who were followed prospectively at ages 6, 10, 12, and 14 years (Vitaro et al., 1996), school achievement, as measured by report cards, did not differ. Moreover, Reich et al. (1993) reported that Wide Range Achievement Test (WRAT) reading scores of children having an affected parent were better than those of children having neither parent alcoholic.

There are many factors influencing academic achievement. For example, cognitive abilities show substantial heritability and can be expected to influence school achievement. There is evidence that children of alcoholics have diminished verbal (Knop et al., 1985; Sher et al., 1991) and nonverbal problem-solving skills (Tarter et al., 1990), which include Block Design (Sher et al., 1991) and Halstead Category errors (Drejer et al., 1985). Therefore, school achievement could be limited by inherited capabilities associated with a biological susceptibility to alcohol dependence.

In addition to the inherited cognitive abilities a child must utilize to accomplish school-related tasks, the presence of childhood psychiatric disorders affects academic performance. For example, externalizing disorders are known to impair academic performance on reading and spelling tested 1 year later (Richards et al., 1995). While the relationship between psychological impairment and subsequent achievement appears obvious, the relationship between achievement as a predictor of psychological impairment and the presence of childhood psychiatric disorders is less obvious and less well studied. However, Hinshaw (1992), in an extensive review of the extant literature, noted that early academic problems are associated with subsequent antisocial behaviors in adolescence. This observation could have implications for the development of other psychopathology as well. Accordingly, it was hypothesized that school performance deficits might antedate the development of a diagnosable illness. If this were the case, teachers and parents who readily observe these changes could encourage intervention, possibly "nipping in the bud" psychological problems before they become exacerbated. Because of the bidirectional effects of these influences (psychopathology may antedate school performance deficits), it was necessary to test these relationships in the context of a longitudinal study. The goal of the study was to test the ability of academic deficits to predict subsequent psychopathology in which children/adolescents were evaluated yearly for both academic performance and presence of a diagnosable illness.

METHOD

Subjects

All available children between the ages of 8 and 18 years who were offspring of parents enrolled in a large family study (AA 05909-15) were included. A total of 123 children/adolescents who were either at high or low risk for developing alcohol dependence participated in the study.

The high-risk families, enrolled in the larger family study, were ascertained through a proband pair of male alcoholic siblings. Inclusion criteria required one member of the pair to be in treatment at the time the family was identified and multiple first-degree relatives to be available for testing. By study design, comorbidity (*DSM-III*, Axis I) in adult family members was minimal (no recurrent depression, schizophrenia, bipolar illness, or primary drug dependence). Clinical assessments had previously been conducted on adult family members (see Hill, 1992, for procedural detail) through face-to-face interviews using the Diagnostic Interview Schedule. All adult members of the pedigree were diagnosed for presence or absence of alcohol dependence using both *DSM-III* (the criteria in use when the study originated) and Feighner criteria (Feighner et al., 1972). A second unstructured interview was conducted by another clinician (Ph.D. or M.D. level), allowing for a consensus diagnosis to be determined. These diagnostic assessments revealed that 36 children came from families with an alcoholic father only, 5 children had only an alcoholic mother, both parents were alcoholic in 10 cases, and 19 children had neither parent alcoholic (2 parents' diagnoses unknown).

For those cases not available for an in-person interview, a minimum of 2 family history reports was used to determine a diagnosis of alcoholism. Each child had one parent who was a member of the targeted double alcoholic proband families. However, some of the high-risk

TABLE 1
Demographic Characteristics of Children

Group	Age at Entry Mean	(SD)	*n*
High-risk			
Male	9.89	(2.2)	37
Female	9.66	(1.9)	35
Low-risk			
Male	10.00	(2.1)	28
Female	9.78	(1.9)	23

TABLE 2
Ages of Children by Number of Evaluations

No. of Evaluations	Age at Evaluation Mean	(SD)	*n*
Two	12.01	(2.3)	123
Three	12.99	(2.3)	114
Four	13.88	(2.2)	102
Five	14.68	(1.8)	73
Six	15.60	(1.5)	50
Seven	16.26	(1.3)	23

children were the offspring of nonalcoholic siblings of the proband alcoholic pair (n = 19). The "marrying-in" parents were usually interviewed in person, though 33 were diagnosed on the basis of family history report.

The low-risk families were also drawn from the larger family study and were chosen for minimal Axis I *DSM-III* psychopathology, including alcoholism. These families were selected through a volunteer who responded to an advertisement in the local newspaper for a research study on personality factors and lifestyles. No inclusion criteria were given to the potential subjects.

Baseline evaluations were completed for 123 children/adolescents (representing 43 high-risk and 30 low-risk families). Demographic characteristics can be seen in Table 1. These children were invited to be part of a longitudinal follow-up and were assessed at approximately yearly intervals. Children entered the study at various times and therefore have completed a varying number of evaluations (Table 2). Analyses were based on the maximum number of repeated data assessments for each child.

Clinical Assessment

The Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS) (Chambers et al., 1985) was administered to all children by trained clinical interviewers (M.A. in psychology) at each annual evaluation. The parent who accompanied the child to the testing session participated in the K-SADS, answering the same questions asked of the child in a separate interview. K-SADS interviewers had diagnostic reliability of 90% or greater with interviewers trained by the authors of the instrument. A third- or fourth-year resident in an integrated general and child psychiatry program conducted an unstructured interview independently with both the child and the parent. Both the interviewer and the psychiatrist were blind to the risk status of the subject's family. The presence of selected disorders was determined through a "best-estimate" consensus diagnosis: depression, affective disorder, phobia, anxiety, ADHD, conduct disorder, substance abuse, oppositional defiant disorder, and adjustment disorder (Table 3). Any discrepancies were resolved in the presence of a third clinician.

An age-appropriate form of the WRAT (WRAT-R or WRAT-III) was administered to all children by a trained, master's-level clinician at each annual evaluation. The children were also asked to provide their current academic grade standing. If the parent had reported on the Child Behavior Checklist that the child had repeated a grade, the current academic grade was incremented by 1 year to reflect this. Grade-equivalent scores from the Spelling, Reading, and Math sections of the WRAT were calculated and an academic deficit score

TABLE 3
Prevalence of Psychopathology in Children

K-SADS Disorders	Percentage of Children[a] High-Risk Whole Sample (n = 72)	Low-Risk Whole Sample (n = 51)	High-Risk Without Alcoholic Parent (n = 19)
Depression	15.3	5.9	10.5
Phobia[b]	25.0	25.4	26.3
Anxiety	19.4	17.6	10.5
ADHD	18.1	2.0	5.3
Conduct	19.4	3.9	21.1
Substance abuse	13.9	5.9	10.5
Oppositional	22.2	3.9	10.5
Adjustment	9.7	5.9	15.8
Any diagnosis	68.1	45.1	47.4
Learning disability[c]	12.5	9.8	15.7

Note: K-SADS = Schedule for Affective Disorders and Schizophrenia for School-Age Children; ADHD = attention-deficit/hyperactivity disorder.

[a] Ten low-risk and 31 high-risk children had more than one diagnosis.

[b] Phobia includes simple, social, and agoraphobia.

[c] Learning disability was arbitrarily determined by the following conditions being met: (1) parent reports child as learning-disabled on Health and Medication Checklist; (2) Child Behavior Checklist report of special class for math, reading, or speech.

was determined on the basis of the difference between the current academic grade and the WRAT scores. The Peabody Picture Vocabulary Test-Revised (PPVT-R) was used as an index of the child's IQ.

Three separate analyses were performed to determine the factors predicting the presence of psychopathology in the children. Risk factors used in the models included family risk status, parental alcoholism, and academic achievement. Using presence of psychopathology as the outcome variable, survival analyses (Cox proportional hazards model) were conducted separately by gender to determine whether risk status was a significant predictor of outcome. Survival analyses were repeated using the mother's and father's diagnosis of alcoholism to determine the impact of parental alcohol use on the likelihood that a child would have a diagnosable illness. Finally, a logistic regression analysis (Categorical Data Modeling Procedure from SAS) was conducted to predict the presence of psychopathology from achievement test scores (WRAT Math, Reading, and Spelling) measured 1 year earlier. The sum of these predictions was accumulated over each repeated assessment for each child to provide an overall test of the strength of these predictions in determining the probability that a child had a diagnosable psychiatric illness.

RESULTS

Demographic Characteristics

Children in each risk group were comparable with respect to age at entry into the study, gender (Table 1), and socioeconomic status (SES). The SES of each family (average of both parents' scores) was calculated from Hollingshead's Four Factor Index of Social Status (Hollingshead, 1975). The proportion of high- and low-risk families in the lower 3 SES categories (unskilled, semiskilled, and skilled) were compared with the higher 2 categories (semiprofessional and professional) and found not to differ ($\chi^2 = 1.43$; $df = 1$, not significant). Also, 61% of low-risk and 50% of high-risk families were semiprofessional or professional.

PPVT-R standard scores were calculated for the 2 groups of children. All scores were above 75, with a mean of 115 for the low-risk group, and 108 for the high-risk group (within the standard error of measurement for the test).

Statistical Analyses

Survival Analysis of Psychopathology. Survival curves for high- and low-risk children illustrating the probability of developing psychopathology can be seen in Figure 1. The Kaplan-Meier estimate from BMDP 1L was the statistical technique used to analyze the length of time to develop an illness. While the rate of psychopathology (presence of any diagnosis) was quite similar in younger children, by adolescence, low-risk offspring exhibited greater survival (lower rates of psychopathology) than the high-risk offspring. Survival curves are presented by presence or absence of any psychopathology because too few children received any one diagnosis to accurately calculate survival for specific diagnoses.

Hazard ratios (ratio of the observed/expected cases with diagnosed psychopathology in one risk group relative to the observed/expected cases in the other group) were calculated by gender and for the entire sample (Table 4). Hazard ratios equal to 1 denote no difference between the survival curves of the 2 groups. Because of the nesting of lifetime parental diagnosis of alcoholism and risk group status (by study design, low-risk children did not have an alcoholic parent), 2 separate analyses were conducted. First, risk group (high or low) was used as a covariate. Second, hazard ratios were calculated using both the mother's and father's diagnosis of alcoholism as a covariate. As can be seen in Table 4, high-risk males are about 2 times more likely to manifest any diagnosis than low-risk males. In addition, a much higher incidence of ADHD is seen among high-risk males. However, for females, risk status does not appear to be a significant factor for any of the diagnosed disorders. Removal of the 19 high-risk children without an alcoholic parent resulted in a similar hazard ratio (2.29), justifying the inclusion of all high-risk children (with and without an alcoholic parent) in the analyses. In addition,

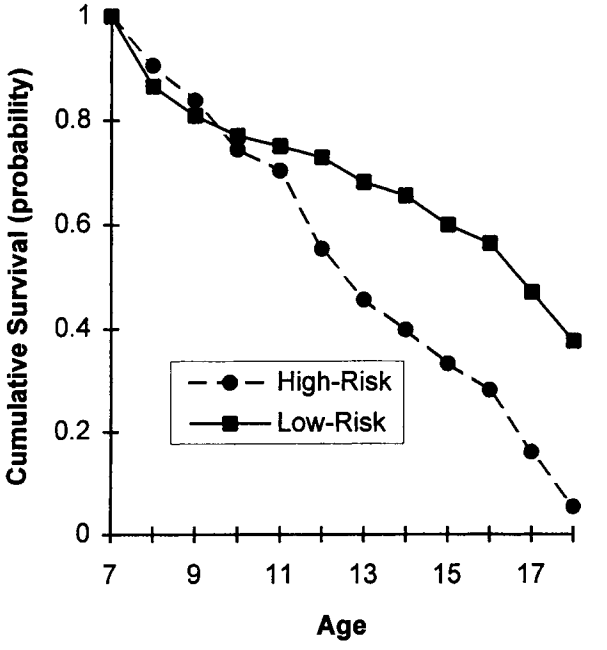

Fig. 1 Cumulative survival curves for the presence of any childhood psychopathology are presented for high- and low-risk children.

TABLE 4
Summary of Significant Hazard Ratios for Children/Adolescents by Gender

No. Not Surviving[a]	Psychopathology in Children	Hazard Ratio[b]	Coefficient/ SE	*p* Value	95% CI
		Using Familial Risk Status for Alcoholism as a Covariate			
Male (*n* = 65)					
39	Any diagnosis	Risk group = 2.12	2.01	.040	(1.07, 4.20)
11	ADHD	Risk group = 9.27	2.13	.030	(1.15, 74.90)
Whole sample (*n* = 121)[c]					
71	Any diagnosis	Risk group = 1.89	2.51	.012	(1.14, 3.16)
17	Affective	Risk group = 3.62	2.02	.040	(1.01, 12.97)
14	ADHD	Risk group = 10.55	2.28	.020	(1.33, 83.59)
14	Conduct	Risk group = 5.59	2.27	.023	(1.23, 25.38)
		Using the Presence of an Alcoholism Diagnosis in Either Parent as a Covariate			
Male (*n* = 65)					
39	Any diagnosis	Father's Dx = 1.85	1.91	.050	(0.97, 3.52)
9	Affective	Mother's Dx = 8.25	2.87	.004	(1.90, 35.91)
15	Anxiety	Mother's Dx = 6.93	3.13	.002	(2.01, 23.86)
11	ADHD	Father's Dx = 9.03	2.84	.005	(1.92, 42.53)
Female (*n* = 56)					
32	Any diagnosis	Father's Dx = 2.43	2.36	.018	(1.15, 5.17)
8	Affective	Father's Dx = 6.80	2.23	.026	(1.21, 38.11)
Whole sample (*n* = 121)					
71	Any diagnosis	Father's Dx = 2.07	3.00	.003	(1.27, 3.36)
14	Depression	Mother's Dx = 4.11	2.52	.012	(1.34, 12.63)
17	Affective	Mother's Dx = 4.87	3.05	.002	(1.73, 13.76)
14	ADHD	Father's Dx = 10.61	3.11	.002	(2.32, 48.48)
14	Conduct	Father's Dx = 3.50	2.28	.023	(1.17, 10.52)

Note: Affective disorders include depression, mania, dysthymia, and cyclothymia. CI = confidence interval; ADHD = attention-deficit/hyperactivity disorder; Dx = diagnosis.

[a] Failing to survive indicates presence of psychopathology.

[b] Hazard ratios are exponents of the coefficients of the covariate.

[c] Diagnosis unavailable for 2 fathers.

the rates of illness in those 19 high-risk children were higher than those of controls for depression, conduct, substance abuse, and oppositional disorders, suggesting that the familial/genetic diathesis is elevating rates without the necessity of living with an alcoholic parent (Table 3).

Hazard ratios calculated using mother's and father's diagnosis of alcoholism as covariates revealed interesting cross-gender effects. Alcoholism in the father was significantly associated with the risk of any psychopathology in both male and female children. Alcoholism in the mother significantly influenced the rate of affective disorder in males, whereas alcoholism in the father was associated with increased rates of affective disorder in females. When the difference between the hazard ratios is tested, significant cross-gender effects are seen for affective disorder (mother's diagnosis for females versus males, $p = .02$; father's diagnosis for females versus males, $p = .04$).

Regression Analysis of Achievement Test Scores. A comparison of the academic deficit scores for the high- and low-risk groups was performed. Analyses using *t* tests showed no significant differences for scores from the Reading, Math, and Spelling subtests from the WRAT (Table 5).

A logistic regression analysis was conducted using data from a total of 605 evaluations for 121 children to determine the relationship of risk group, academic performance deficits, and any childhood psychopathology (coded as a dichotomous variable, i.e., presence of having at least one disorder). Specifically, the academic functioning score at time t was used to predict the probability of psychopathology at time t + 1, where the interval was approximately 1 year (annual evaluations). Reading and math deficit scores were found to be significant predictors of psychopathology ($p = .01$, $p = .02$, respectively) 1 year later. However, spelling scores, as well

as group status, were not found to be significant in the cumulative regression. The final regression equation to calculate the probability of psychopathology was determined to be the following:

Ln (odds of any disorder) = −1.414 − 0.5073 (group) + 0.1599 (math) + 0.0278 (spelling) + 0.1557 (reading)

Note that group is coded as 0 and 1 for low-risk and high-risk, respectively. Thus, it appears that specific deficits in academic competence (math and reading) predict the presence of psychopathology 1 year later, irrespective of risk status.

With these positive findings for school achievement predicting later development of diagnosable psychopathology, it was hypothesized that children with ADHD might be contributing significantly to the emergence of the observed relationship. Further analyses to test this hypothesis used means of the spelling, reading, and math scores across each follow-up evaluation, excluding the 14 children with diagnosed ADHD (13 high-risk and 1 low-risk). Comparison of these scores showed that the diagnosis of ADHD in these 14 children had a minimal effect on the achievement scores of the entire group (Table 5), confirming our decision to include them in the overall analysis.

Prenatal Alcohol Exposure. While the devastating effects of high levels of alcohol use are well documented in children with fetal alcohol syndrome (Streissguth et al., 1991a), the long-term effects of fetal alcohol exposure on cognitive development are quite inconsistent. However, multiple studies suggest that 2 or fewer drinks per occasion appear to be safe with respect to cognitive effects (Coles et al., 1985; Streissguth et al., 1991b). Most of the mothers in the present sample appear to have been drinking at safe levels.

Although the focus of this investigation has not been on fetal alcohol exposure but rather on familial/genetic variables, this information is routinely obtained for all mothers of children participating in the study. The average amount of alcohol consumed by the 36 mothers who drank is quite low (0.06 drinks per day). Also, the quantity per occasion is relatively low, with 62% of the women drinking 2 or fewer drinks per occasion. Only 3 women drank more than 5 drinks per occasion, an amount found by Streissguth et al. (1991b) to predict deficits in first-grade math and reading.

Alcohol Exposure and Indications of Learning Disability. It is often assumed that prenatal alcohol exposure contributes to learning disabilities in children (Weinberg, 1997). However, studies finding differences in cognition in alcohol-exposed children must take into account the numerous environmental factors that influence cognition (e.g., SES, number of children in the household). In the present study, only 3 of the 14 mothers who drank 3 or more drinks per occasion had children in special or "learning disabled" classes. Therefore, in this sample of children, prenatal alcohol effects did not appear to be related to reported learning problems.

DISCUSSION

The objective of this investigation was (1) to compare the prevalence and type of psychopathology seen in high-risk children with that in age-matched controls, (2) to determine the degree to which high- and low-risk children differ on tested academic achievement measures, and (3) to determine whether academic achievement deficits antedate the presence of psychopathology.

Our findings indicate that high-risk offspring are at an increased risk for developing one or more childhood diagnoses (Table 4). Risk for specific disorders was increased, with hazard ratios for affective disorders, anxiety disorders, ADHD, and conduct disorder all being elevated. Cross-gender effects were seen for affective disorder in

TABLE 5
Comparison of Scores From the WRAT by Risk Group

	Spelling Scores		Reading Scores		Math Scores	
	High-Risk	Low-Risk	High-Risk	Low-Risk	High-Risk	Low-Risk
All children	0.33 (2.3)	1.02 (2.2)	1.16 (2.2)	1.90 (2.2)	−0.29 (2.0)	0.46 (2.2)[a]
14 ADHD children removed	0.52 (2.2)	1.00 (2.2)	1.34 (2.1)	1.86 (2.2)	−0.22 (1.9)	0.43 (2.2)

Note: Values represent means (SD) of difference in WRAT achievement scores and academic grade. Negative scores reflect deficits (functioning below grade level); positive scores reflect overachievement (functioning above grade level). WRAT = Wide Range Achievement Test; ADHD = attention-deficit/hyperactivity disorder.

[a] $t = 1.96$; $df = 120$; $p = .053$. All other t tests were nonsignificant.

analyses of males and females. The risk for both ADHD and conduct disorder was found to be elevated in children from high-risk families, irrespective of whether or not the analyses were conducted with risk status or parental alcoholism (the high-risk children had approximately 4 first- and second-degree relatives who were alcoholic, though in some cases [n = 19] the parent was not alcoholic). While achievement differences were not found between the risk groups as a whole, the coefficients of the regression equation provide evidence that group differences in psychopathology are due to achievement problems.

The finding of elevated rates of internalizing disorders in this study, including depression and anxiety, is consistent with several past reports (Moos and Billings, 1982; Rolf et al., 1988; Rubio-Stipec et al., 1991). More recently, Reich et al. (1993) also reported an increased risk of overanxious disorder in children of alcoholics; however, rates for other anxiety disorders and depression were not significantly elevated. The present study also demonstrated greatly elevated rates of ADHD in high-risk children (9-fold increase in the high-risk male children), in agreement with the previous report of Earls et al. (1988). However, some studies have found only a weak connection between high-risk children and attention deficit disorder (Reich et al., 1993; Rubio-Stipec et al., 1991).

The use of diverse data collection methods and instruments may, in part, account for the diversity of findings regarding children of alcoholics. The gender of the alcoholic parent would appear to be important. Women alcoholics are more likely to have partners who are also alcoholic, increasing both genetic loading for the child and increasing environmental exposure. Also, the degree of familial loading is emerging as an important variable with respect to both clinical and biological markers. For example, Benegal et al. (1995) found that the amplitude of the P300 component of the event-related potential (a late positive component associated with cognitive processes), commonly found to be lower in high-risk children (Begleiter et al., 1984; Hill and Steinhauer, 1993), was even smaller with multiple alcoholic relatives in comparison with children with only a single alcoholic relative. The present results show that group differences can be obtained in high-risk children with multiple alcoholic relatives even when a substantial number do not have an alcoholic parent (26% of the children).

Another methodological concern is the varying use of number and type of informants with respect to assessing childhood psychopathology in offspring from alcoholic families. Because agreement between different types of informants can vary considerably, with parent–child agreement usually low to moderate (Verhulst and van der Ende, 1992), it is important to use multiple informants. This is illustrated by results of the Reich et al. (1993) study, which used a structured interview (Diagnostic Interview for Children and Adolescents) that relies on both parent and child report. No significant increase in the rate of ADHD among high-risk offspring was found when data were analyzed using the child-only or the parent-only report. However, when a psychiatrist rendered the clinical diagnosis of ADHD using all available data (parent, child, and teacher reports), a significantly higher rate of ADHD was observed in the high-risk group of children with 2 alcoholic parents compared with the groups of only one or no alcoholic parents. Thus, single reports of the child or parent may be inadequate to detect differences between risk groups. This conclusion is supported by reliability studies which indicate that use of multiple informants may be superior because the reliability of both the parent and child report varies with the age of the child (Edelbrock et al., 1985). Similarly, Verhulst and van der Ende (1992) found that adolescents reported many more problems than did their parents, with externalizing disorders particularly being underreported by parents, especially for girls. However, there have also been reports suggesting that covert problems, such as anxiety and depression, may be less reliably detected than externalizing behaviors (Herjanic and Reich, 1982; Hodges et al., 1982).

The possibility exists that the significantly higher rates of depression and anxiety might be due to the parental comorbidity for both alcoholism and these disorders. For example, Helzer and Pryzbeck (1988) noted that children of alcoholics are more likely to be the product of parents with comorbid disorders. In the current sample, the issue of comorbidity was controlled by study design. Structured interviews were conducted on first- and second-degree relatives of the children to ensure that only a "pure" form of alcoholism was segregating in the high-risk families studied. The high loading of alcoholism in the children's families and/or the impact of current alcoholism in the home appear to be more likely explanations for the high rate of psychopathology seen.

One limitation of family studies is that genetic and environmental influences on the outcome variable cannot be separated definitively. Moreover, in the present analysis, too few cases were available in which offspring

came from high-risk families but did not have an alcoholic parent (19 of 72 children). Therefore, only a limited analysis of the unique contribution of risk status in the absence of parental alcoholism could be evaluated. However, it should be noted that for some disorders (e.g., major depressive disorder), differences were found in analyses using risk group and parental diagnosis of alcoholism.

Another limitation of the present study is the inability to model the effect of psychopathology on achievement. This was because there are restrictions inherent in regression analysis that prevent one from using a dichotomous variable (presence or absence of a diagnosis) to predict a continuous one (achievement deficit). However, the relationship between psychopathology and subsequent achievement appears obvious and less needful of statistical documentation. Another limitation is that psychopathology contemporaneous with measured achievement may predict psychopathology at a later time. This within-subject correlation in psychopathology cannot be directly assessed in this analysis because a dichotomous variable cannot be used to predict another dichotomous variable.

Clinical Implications

While high-risk children have greatly elevated rates of psychopathology, minimal achievement differences were noted between high- and low-risk groups, possibly because the groups were well matched for SES and IQ. The important finding from this study was that school achievement, as measured by the WRAT, is a useful predictor of later development of child/adolescent psychopathology. This observation has implications for parents and teachers who observe changes in tested achievement scores which may be prodromal of an ongoing psychological condition that may develop into a diagnosable illness. Thus we can conclude that the achievement deficits noted by Hinshaw (1992) to predict antisocial behaviors can be generalized to the hypothesis that achievement deficits antedate the presence of any psychopathology during childhood and adolescence. Therefore, diminished achievement is not only a problem with respect to opportunities for further education (preventing school dropout) and career attainment, but it also may signal an important change in the psychiatric health of the individual. The possibility exists that screening children for academic achievement may provide an inexpensive confirmation of subclinical problems and provide the appropriate impetus for referral.

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Youth Risk Behavior Surveillance—United States, 1997. Laura Kann, Steven A. Kinchen, Barbara I. Williams, James G. Ross, Richard Lowry, Carl V. Hill, Jo Anne Grunbaum, Pamela S. Blumson, Janet L. Collins, Lloyd J. Kolbe, State and Local YRBSS Coordinators

Priority health-risk behaviors, which contribute to the leading causes of mortality and morbidity among youth and adults, often are established during youth, extend into adulthood, and are interrelated. The Youth Risk Behavior Surveillance System (YRBSS) monitors six categories of priority health-risk behaviors among youth and young adults—behaviors that contribute to unintentional and intentional injuries; tobacco use; alcohol and other drug use; sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases (STDs) (including human immunodeficiency virus [HIV] infection); unhealthy dietary behaviors; and physical inactivity. The YRBSS includes a national school-based survey conducted by the Centers for Disease Control and Prevention as well as state, territorial, and local school-based surveys conducted by education and health agencies. This report summarizes results from the national survey, 33 state surveys, 3 territorial surveys, and 17 local surveys conducted among high school students from February through May 1997. In the United States, 73% of all deaths among youth and young adults 10–24 years of age result from only four causes: motor vehicle crashes, other unintentional injuries, homicide, and suicide. Results from the national 1997 YRBSS demonstrate that many high school students engage in behaviors that increase their likelihood of death from these four causes—19.3% had rarely or never worn a seat belt; during the 30 days preceding the survey, 36.6% had ridden with a driver who had been drinking alcohol; 18.3% had carried a weapon during the 30 days preceding the survey; 50.8% had drunk alcohol during the 30 days preceding the survey; 26.2% had used marijuana during the 30 days preceding the survey; and 7.7% had attempted suicide during the 12 months preceding the survey. Substantial morbidity among school-age youth, young adults, and their children also result from unintended pregnancies and STDs, including HIV infection. YRBSS results indicate that in 1997, 48.4% of high school students had ever had sexual intercourse; 43.2% of sexually active students had not used a condom at last sexual intercourse; and 2.1% had ever injected an illegal drug. Of all deaths and substantial morbidity among adults greater than or equal to 25 years of age, 67% result from two causes—cardiovascular disease and cancer. Most of the risk behaviors associated with these causes of death are initiated during adolescence. In 1997, 36.4% of high school students had smoked cigarettes during the 30 days preceding the survey; 70.7% had not eaten five or more servings of fruits and vegetables during the day preceding the survey; and 72.6% had not attended physical education class daily. These YRBSS data are already being used by health and education officials to improve national, state, and local policies and programs to reduce risks associated with the leading causes of morbidity and mortality. YRBSS data also are being used to measure progress toward achieving 21 national health objectives and one of the eight National Education Goals. **J Sch Health** 1998;68:355–369.

This encyclopedic review of adolescent risk behavior documents some worrisome trends. Nearly 20% of teenagers do not wear seat beats, 43% of sexually active students do not use condoms, and 36% of high school students smoke cigarettes. The role of chronic depression and other mental health disorders is not pursued in this article.

— M.J.M.