

Poverty, Race/Ethnicity, and Psychiatric Disorder: A Study of Rural Children

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Poverty can endanger children's mental health¹⁻³ through exposure to a range of adversities. These may include poor housing; homelessness; multiple moves from one dwelling (and often school) to another; lack of health insurance^{4,5}; and the stress that parents experience while raising a family in poverty, which can lead to harsh or noncontingent punishment, deficient parental supervision, or lack of warmth and love.^{2,6} Several researchers, who noted the high levels of psychiatric symptoms in minority children living in inner-city areas, have argued that the urban environment,⁷⁻⁹ minority status,¹⁰ or both together are harmful to emotional and behavioral development (but see Farrow and Schwartz¹¹). An associated argument is that poor families are more likely to live in impoverished neighborhoods, with poor schools, antisocial peer groups, and little "social capital."¹²⁻¹⁴ The literature on *social selection*¹⁵ argues that families may become or remain poor because they lack the personal resources—mental health, education, social connections—to climb out of poverty. In an extension to this position, Dohrenwend et al.¹⁶ has shown that poverty also may be damaging when it puts families in a position of relative deprivation compared with others whom they regard as their natural comparison group.¹⁷ Clearly, many of these mechanisms could co-occur.

The goals of this study were (1) to compare the prevalence of psychiatric disorders in nonurban poor and nonpoor Black and White children, (2) to compare the types and numbers of family risk factors for child psychopathology in poor and nonpoor Black and White families, and (3) to examine the effects of the interaction of poverty and minority status on child psychopathology.

METHODS

A full description of the setting, sample, and data collection methods can be found elsewhere¹⁸ and is summarized here.

Objectives. This study examined the effect of poverty on the prevalence of psychiatric disorder in rural Black and White children.

Methods. A representative sample of 541 Black children and 379 White children aged 9 to 17 was drawn from 4 predominantly rural counties. Structured interviews with parents and children collected information on psychiatric disorders, absolute and relative poverty, and risk factors for psychiatric disorder.

Results. Three-month prevalence of psychiatric disorder was similar to that found in other community samples (20%). Federal criteria for poverty were met by 18% of the White and 52% of the Black families. Black and White children were exposed to equal numbers of risk factors overall, but the association between poverty and psychopathology was stronger for White children (odds ratio [OR] = 2.1; 95% confidence interval [CI] = 1.1, 4.2) than for Black children (OR = 1.5; 95% CI = 0.9, 2.6). Family history of mental illness, poor parenting, and residential instability mediated this association in both groups.

Conclusions. In this rural sample, poverty was only weakly associated with child psychiatric disorders. Risk factors for both racial/ethnic groups were family mental illness, multiple moves, lack of parental warmth, lax supervision, and harsh punishment. (*Am J Public Health.* 2001;91:1494-1498)

Setting

The 4 contiguous counties in North Carolina chosen for this study are poor but have no large cities, so poverty and inner-city residence are not confounded. The 1990 census data, which are the latest available by race/ethnicity within county, indicate that 76% of the population live in rural areas, and 50% of the area's children (aged 0 to 17 years) are Black. The remainder are White, except for a very few Native American and Latino inhabitants. Median household incomes for the 4 counties ranged from \$20 554 to \$31 708, compared with \$31 548 for North Carolina and \$37 303 for the United States. In the United States as a whole, median household incomes for Black households are approximately 60% of White household incomes; in the 4 counties studied, the range was 56% to 63%. Between 18% and 36% of the children were living in poverty in 1989, compared with 17% in North Carolina and 20% in the United States. On the basis of recent census projections, we expect that household incomes and poverty rates have changed very little between 1989 and 1997 to 1998, when the study was conducted.

Sample

The sampling frame was the 17 117 names and addresses of children aged 9 through 17 years provided by the public schools information management system. A random sample of 4500 was selected, and 3942 (88%) of the children were traceable, still in the area, and at the correct age.

Parents of 3615 (92%) completed a brief telephone questionnaire, on the basis of which a subsample of children was selected for intensive assessment. The screening questionnaire consisted of the "externalizing" broadband scale items from the Child Behavior Checklist (CBCL).¹⁹ The externalizing subscale was used as a brief screen because it correlates highly with the internalizing subscale in high-risk children.²⁰

Scores were ranked and divided into 10 equal-sized groups of lowest to highest scores. We used a decision rule based on earlier work on the sensitivity and specificity of the screen relative to a full psychiatric assessment²¹ and randomly selected subjects from the 10 groups with probabilities ranging from 11% (lowest scoring group) to 51% (highest scoring group). The goal was to optimize the 2-stage design to

provide the narrowest variance estimates and maximum statistical power from a sample of fixed size (determined by the budget).^{21–23}

Of the 1333 parent–child pairs selected for interview, 29 could not be reached for further recruitment. Of the remaining 1304, complete interviews were obtained in 71% (n=920). No significant differences in response rate were found at any stage by screen score, race/ethnicity, age, or sex. Following informed consent from parents and assent from the children, interviews were conducted at home, concurrently in separate rooms to ensure privacy.

Measures

Psychiatric disorders. The Child and Adolescent Psychiatric Assessment,^{24,25} a psychiatric interview for children aged 9 and older, elicits information about symptoms contributing to a wide range of computer-generated *Diag-*

*nostic and Statistical Manual of Mental Disorders, Fourth Edition,*²⁶ symptom scales and diagnoses, based on combining symptoms from parents and children.

Risk factors for psychiatric disorder. The Child and Adolescent Psychiatric Assessment interview also collects information on a wide range of factors associated in several studies with increased risk for developing child psychiatric disorders; these are listed in Table 1, together with their prevalence in this sample.

Income and poverty. The parent reported total income from all sources on a scale ranging from \$0 to \$60 000 or higher in \$5000 increments. The mean of the range reported was taken as the best estimate of the family's annual income. We defined *federal poverty* on the basis of federal guidelines, which adjust income by family size, applying the Census Bureau's criteria for 1997 to 1998.

Relative deprivation is defined in terms of an implicit comparison group.¹⁷ We defined the comparison group as families of one's own self-defined race/ethnicity. Each family was ranked by income within its racial/ethnic group, and the range was divided into thirds. *Relative affluence* was defined as being in the top third of the White or Black group, respectively, and *relative poverty* was defined as being in the bottom two thirds.

Data Analysis

Unbiased general population prevalence estimates and group comparisons were calculated with the empirical option of the SAS program GENMOD to provide appropriately weighted parameter estimates and standard errors corrected for the study's sampling design.^{27,28}

RESULTS

Poverty and Race/Ethnicity

Table 2 shows the differences between the 2 racial/ethnic groups on a range of measures of poverty. The Black families bore a much greater burden of poverty than did the White families. The mean income of the Black families was less than two thirds that of the White families (62%). Adjusted for family size, the mean annual income of the poorest third of the Black families was 44% that of the poorest White families. In the middle third of each racial/ethnic group, the Black family incomes were on average 51% of the White family incomes, and in the top third, they were 68% of the White family incomes. Thus, the racial/ethnic disparity in income increased as income decreased.

Poverty and Child Psychiatric Disorders

Table 3 shows the 3-month prevalence of the major psychiatric disorders, by race/ethnicity and poverty level. Comparisons between the racial/ethnic groups overall (see Table 3 superscript b, columns 1 vs 6) showed only 1 significant difference: the prevalence of depression was higher in the White children. The next set of comparisons (superscripts a and e, columns 2 vs 7 and 4 vs 9) tested for racial/ethnic differences at different levels of poverty. All the significant differences were confined to comparisons between poor children; there were no racial/ethnic differences by diagnosis in nonpoor children. Poor White children had

TABLE 1—Definitions of Risk Factors for Child Psychiatric Disorder^a and Frequency in Black and White Rural Children^b: North Carolina, 1997–1998

	Black	White
<i>Foster home:</i> Child has spent time in a foster home	2.8**	0.4
<i>Stepparent:</i> One or other parent is a stepparent	12.5	17.1
<i>Teen parents:</i> One or both parents younger than 18 at subject's birth	14.8*	9.9
<i>Single parent:</i> Only 1 parental figure resident in home	33.4***	20.4
<i>Large family:</i> Four or more children in the household	8.4	7.8
<i>Lack of warmth:</i> Child or parent report lack of warmth between one or other parent and child	8.1	12.5*
<i>Lack of supervision:</i> One or other parent does not exert age-appropriate control on child's activities or friends	6.8*	3.3
<i>Harsh discipline:</i> Disciplinary style of one or other parent is harsh, restrictive, or physical	4.0	3.1
<i>Parental violence:</i> Physical or extreme verbal violence between parents	13.4	13.7
<i>Parental drug problems:</i> One or other parent has had treatment for drug problems or has a current drug problem	9.7	9.5
<i>Parental arrest:</i> One or other parent has been charged with or convicted of a criminal offense	18.7	18.1
<i>Parental mental illness:</i> Biological or other resident parent has had treatment for a mental illness	18.8	36.9
<i>Maternal depression:</i> Mother currently has 5 or more DSM-IV symptoms of depression	8.6	5.6
<i>Dangerous environment:</i> Parent or child reports that the school or neighborhood is dangerous	5.2	6.3
<i>Welfare:</i> Welfare (e.g., AFDC, unemployment benefit) first or second source of family income	6.6***	0.9
<i>Unemployment:</i> One or other parent registered as unemployed at time of interview	16.8***	9.8
<i>Lack of education:</i> One or other parent left school before 11th grade	66.4***	34.6
<i>Multiple moves:</i> Family has moved 4 or more times in the past 5 years	12.8	9.7
<i>Life event:</i> One or more recent negative events	40.0	34.9
<i>Sexual abuse:</i> Child ever exposed to sexual abuse	5.5	7.3

Note. DSM-IV = *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; AFDC = Aid to Families with Dependent Children.

^aItems were selected on the basis of a review of the literature on risk for child psychiatric disorder prior to the writing of the Child and Adolescent Psychiatric Assessment interview. Definitions are those used in the Child and Adolescent Psychiatric Assessment.²⁴

^bRisk factor significantly more common in this group: * $P < .05$; ** $P < .01$; *** $P < .001$.

TABLE 2—Family Income and Poverty in Black and White Rural Children: North Carolina, 1997–1998

	Black (n = 541)	White (n = 379)
Mean annual family income, \$ (SD)	24 126 (15 010)	38 987 (19 330)*
% Below federal poverty (<i>absolute poverty</i>)	52.0*	18.2
Mean annual income, \$ (SD) (<i>absolute poverty</i>)		
Poor	11 880 (5800)	12 871 (5335)
Nonpoor	35 473 (12 748)	43 962 (16 621)*
Mean income, \$ (SD) (<i>relative poverty</i>)		
Lowest third	8705 (3527)	19 629 (7426)*
Middle third	20 210 (2447)	39 295 (5725)*
Upper third	40 235 (11 020)	59 172 (5058)*
Lowest two thirds	13 666 (6195)	27 819 (12 198)*

* $P < .001$.

more emotional disorders, particularly depression, and more oppositional defiant and conduct disorders when poverty was defined with federal criteria. When the relative poverty criterion was used, poorer White children had more emotional disorders, especially depression, and more oppositional disorders.

The next set of comparisons tested for differences between levels of poverty within each racial/ethnic group (superscripts c and d, columns 4 vs 5 and 7 vs 8). Among the Black

children, the effects of poverty were small; the only significant difference was an excess of depression in the relatively poorer children. The poor White children, however, had a significantly higher risk of diagnosis than did the nonpoor White children. When *absolute* poverty was the criterion, this was the case for any diagnosis; any emotional disorder, especially depression; and any behavior disorder, especially oppositional and conduct disorders. When *relative* poverty was the criterion, an ex-

cess of disorders was found in poorer children overall; for emotional disorders, especially anxiety; and for behavior disorders, especially oppositional disorder. Thus, the racial/ethnic differences were largely accounted for by higher rates of disorder in the poor White children.

Table 4, Model I, shows the results of logistic regression analysis, with poverty as the predictor and with age and sex included as covariates. The White children in federal poverty were 80% more likely than the nonpoor White children to have a diagnosis, but the excess risk for poor compared with nonpoor Black children was only 40%. In a test of the effect of the interaction of race/ethnicity and poverty on psychopathology, the White children in poverty were 59% more likely than Black children in poverty to have a psychiatric diagnosis (interaction odds ratio [OR]=0.12; 95% confidence interval [CI]=0.01, 1.00, $P=.049$).

Poverty, Race/Ethnicity, and Exposure to Other Risk Factors for Child Psychopathology

The 2 racial/ethnic groups had similar mean numbers of risk factors (White=2.6, SD=1.9; Black=2.7, SD=1.8), and in both groups, poverty (relative or absolute) was associated with an increase in the mean number

TABLE 3—Three-Month Prevalence of Psychiatric Disorders in Black and White Rural Children, by Income Category: North Carolina, 1997–1998

DSM-IV Psychiatric Diagnosis	Black					White				
	1 Total	Absolute Poverty		Relative Poverty		6 Total	Absolute Poverty		Relative Poverty	
		2 Poor (48%)	3 Nonpoor (52%)	4 Lower Two Thirds	5 Top One Third		7 Poor (16%)	8 Nonpoor (84%)	9 Lower Two Thirds	10 Top One Third
Any diagnosis	19.4	21.9	15.5	20.8	19.8	20.8	30.9 ^c	17.2	24.8 ^d	15.2
Any emotional disorder	5.7	7.3	4.1	7.2 ^d	4.3	10.5	18.6 ^{a,c}	8.0	12.1 ^{d,e}	7.0
Depression	1.4	1.5	1.1	2.0	0.8	4.6 ^b	8.4 ^{a,c}	2.7	4.9 ^e	4.2
Anxiety	4.7	6.0	3.5	5.7	3.5	6.7	9.3	5.6	8.9 ^d	3.4
Any behavior disorder	11.5	13.2	8.5	13.2	10.9	10.9	18.2 ^c	8.6	13.1 ^d	7.8
Oppositional defiant disorder	1.5	1.9	1.0	1.8	1.5	3.6	7.1 ^{a,c}	2.1	4.4 ^{d,e}	2.5
Conduct disorder	5.3	5.4	3.6	5.7	5.5	5.5	11.3 ^{a,c}	3.9	6.8	3.7
Attention-deficit/hyperactivity disorder	1.2	2.1	0.5	1.7	0.3	1.1	2.9	0.8	1.4	0.6
Substance abuse	5.4	6.9	3.6	6.8	4.6	4.4	4.5	4.3	5.2	2.3

Note. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.

Superscripts indicate differences significant at $P < .05$, after control for age, sex, and (where appropriate) comorbidity.

^aAbsolute poverty: prevalence higher in poor White than in poor Black children.

^bPrevalence higher in White children than in Black children.

^cAbsolute poverty: prevalence higher in poor children, within racial/ethnic group.

^dRelative poverty: prevalence higher in poorer children, within racial/ethnic group.

^eRelative poverty: prevalence higher in poorer White than in poorer Black children.

TABLE 4—Logistic Regression Models of Poverty, Risk Factors, and Psychiatric Disorder in Black and White Rural Children: North Carolina, 1997–1998

	Absolute Poverty, OR (95% CI)		Relative Poverty, OR (95% CI)	
	Black	White	Black	White
Model I	LL = 279, <i>df</i> = 478	LL = 210, <i>df</i> = 332	LL = 280, <i>df</i> = 478	LL = 210, <i>df</i> = 332
Sex	1.1 (0.7, 1.7)	1.0 (0.6, 1.6)	1.3 (0.9, 2.0)	1.2 (0.9, 1.9)
Age	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)
Poverty	1.4 (0.9, 2.2)	1.8 (1.1, 2.9)*	1.6 (0.9, 2.9)	2.8 (1.4, 5.7)**
Model II	LL = 266, <i>df</i> = 477	LL = 197, <i>df</i> = 331	LL = 264, <i>df</i> = 477	LL = 198, <i>df</i> = 331
Sex	1.1 (0.7, 1.7)	1.0 (0.6, 1.6)	1.1 (0.8, 1.7)	1.1 (0.7, 1.6)
Age	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)
No. of risk factors	1.5 (1.3, 1.7)***	1.7 (1.5, 2.0)***	1.5 (1.3, 1.7)***	1.7 (1.4, 2.0)***
Poverty	1.0 (0.7, 1.5)	1.1 (0.7, 1.6)	1.2 (0.7, 2.2)	2.0 (1.0, 4.3)*

Note. OR = odds ratio; CI = confidence interval; LL = log likelihood.
* $P < .05$; ** $P < .01$; *** $P < .001$.

of risk factors from 2 to 5. The correlation between income and number of risk factors for psychiatric disorder was -0.25 ($P < .001$) in each racial/ethnic group.

Poverty, Race/Ethnicity, Risk Factors, and Child Psychiatric Disorder

The second model in Table 4 adds number of risk factors to poverty, age, and sex. A large improvement in model fit occurred (χ^2_1 deviance change > 12 , $P < .001$ in every case). Once the number of risk factors was added, absolute poverty ceased to contribute significantly to the model for psychiatric disorder for either racial/ethnic group. In the case of relative poverty, however, risk was still significantly higher for poorer than for nonpoor White (but not Black) children.

We examined racial/ethnic differences in the relation between relative poverty and psychopathology at different levels of risk. Although the prevalence of psychiatric disorder steadily increased with increasing risk, the poor White children were especially vulnerable to the highest level of risk. Post hoc analysis showed that poorer White children with 5 or more risk factors were much more likely than equivalently disadvantaged Black children to have a psychiatric disorder (56% vs 34%, OR = 2.5; 95% CI = 1.2, 5.2, $P = .015$).

To examine which specific risk factors mediated the relation between poverty and psychopathology, we included all the variables in Table 1, along with sex, age, and poverty, in multivariate models for each racial/ethnic

group. Five risk factors contributed to the model for both racial/ethnic groups and both definitions of poverty: (1) family history of psychiatric disorder, (2) multiple (4 or more) moves of home in the past 5 years, (3) lack of warmth in the parent-child relationship, (4) poor parental supervision of the child, and (5) harsh parental disciplinary style.

DISCUSSION

This study of children in the rural South serves as a sort of natural experiment, permitting us to disentangle race/ethnicity, poverty, and inner-city residence as correlates of childhood psychiatric disorder. In this nonurban sample of children, we found that (1) Black children were 3 times as likely as White children to be living in poverty; (2) the association between poverty and a list of risk factors for psychiatric disorder was largely the same for Black and White children, even though exposure to poverty differed dramatically; (3) the prevalence of psychiatric disorder increased with the number of risk factors in all groups but most markedly in poor White children; and (4) after other risks were controlled for, poverty (especially relative poverty) continued to put White, but not Black, children at risk.

The relations among poverty, race/ethnicity, and risk for child psychiatric disorder described here replicate the associations found in our study of White and American Indian children carried out in another part of the same state.²⁹ In that case also, the minority

children were much more likely to be living in poverty than were the White children (66% vs 21%), but again poverty predicted child psychiatric disorder only in the White sample.

A small set of family and community risk factors more prevalent in poor families explains most of the effects of poverty on psychiatric disorders. This small set of variables, however, did not support any one causal pathway to the exclusion of all others. Among the adversities attendant on poverty, one that children were especially vulnerable to was the effect of having to move household (and probably school) multiple times. Among the social selection factors, a family history of mental illness was very powerful. This variable may reflect a genetic predisposition in the children, the problems of living with a mentally ill parent, or both. Child psychiatric disorder was strongly associated, in both Black and White children, with the "end-of-one's-rope" syndrome of poor parenting that may be either cause or consequence, or both, of the child's behavior.⁶

Some potential risk factors proved not to be important, however. Of note was the lack of significance of a single-parent household and of current maternal depression, once family psychiatric history was entered into the model. In general, the findings support the argument made by Rutter and Sandberg³⁰ and others that it is important to take into account the total burden of risk.

Overall, the prevalence of child psychiatric disorder was the same as that found in almost every study conducted in the United States in the past 2 decades,^{31,32} indicating that compared with living in urban areas such as Boston, Mass,³³ and Pittsburgh, Pa,³⁴ living in this nonurban area did not necessarily protect children. In this rural area, it was not the Black but the White children who emerged as most vulnerable. Two studies of adults carried out in the same geographic area found low rates of psychiatric disorders in the rural Black participants, compared with the White and urban Black participants (apart from cognitive deficits associated with aging).^{9,35} One suggested explanation is migration⁹; this area has undergone steady outmigration since World War II, particularly of Black residents. However, the hypothesis of racial/ethnic differences in selection for outmigration needs further study.

Limitations of the Study

In addition to the fact that the survey was cross sectional, and therefore suited only to correlational analysis, some methodological aspects of the study could have affected the results. The analyses were based on the reports of parents and children alone and were limited to a single geographic area. Income data came from the interviewed parent, and some were not sure how much money their partners earned. For this reason, and to reduce noncompliance, we used broad (\$5000) bands to categorize the family income, which inevitably reduced the accuracy of the estimates. However, the racial/ethnic differences and effect of poverty on other risk factors were sufficiently marked to survive a broad classification. Poverty was measured only in terms of the past year's income, whereas several researchers have associated poor outcome, especially for Black children, with persistent poverty.^{3,36} It seems highly likely, though, that in this rural area with few job opportunities, the poverty we observed was relatively chronic. Another limitation was the lack of better measures of "social capital,"¹³ such as job opportunities, community organizations, and mental health services. It seems unlikely, however, that social capital of this kind would prove to be much more readily available to Black than to White families. ■

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Contributors

E.J. Costello analyzed the data and wrote the paper. G.P. Keeler managed the database, created the data files, and generated the prevalence estimates and confidence intervals. A. Angold wrote the psychiatric interview used to collect the data, ran the study, and contributed to the writing of the paper.

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