Family Structure, Schoolmates, and Racial Inequalities in School Achievement

This study examines the influence of schoolmate family structure, racial concentration, and socioeconomic status on the academic achievement of individual African American and White students. The data are drawn from the 1990 test results of 18,000 10th graders who took the Louisiana Graduation Exit Examination. The study finds that being surrounded by schoolmates from female-headed families had the second largest negative association with the academic achievement of African Americans, greater in effect than the association of academic achievement with individual family structure. It appears that the negative effect of concentrations of African Americans in schools may be largely attributed to the association of minority concentration schools with high percentages of female-headed families.

Despite a narrowing of the gap in educational attainment between African American children and White children, there are still disturbing inequalities in the educational outcomes of the two major racial groups in the United States. According to a 1994 report of the U.S. Department of Education, African Americans are at a disadvantage in pre-school attendance, grade retention, academic achievement, dropout rates, parental involvement, school climate, course-taking patterns, educational aspirations, labor market outcomes, and adult literacy patterns” (p. 9).

Not only do African American and White children have unequal outcomes from their school years, they often spend these years in different educational and familial environments. According to the National School Boards Association, about two thirds of African American school children were attending segregated schools in the 1990s (Orfield & Monfort, 1992). African American students are more likely to report that they feel unsafe in their schools, that their learning is disrupted by other students, and that they have problems getting along with teachers (U. S. Department of Education, 1994, p. 11). Finally, the majority (65%) of African Americans in 1990 who were younger than 18 years old lived in single-parent households, but the majority (76%) of White minors lived in households with two parents (U.S. Bureau of the Census, 1992).

Thus, African American children tend to go to segregated schools with disruptive and unsafe environments, and the majority of them are in single-parent households. If single-parent households, which are overwhelmingly headed by women, characterize the background of students in schools where African Americans predominate and if the social environments of African American schools inhibit educational excellence, then it seems reasonable to hypothesize that students from single-
parent households somehow are producing social environments in schools with minority concentrations that prevent young minority members from fully realizing their capabilities.

THEORETICAL BACKGROUND

In the mid-1960s, Coleman and his associates (1966) provided support for the view that schoolmates play an important part in shaping the education of young people. Studies of the academic achievement of minority children generally have provided evidence that these children do better in racially mixed schools. (See, for example, results of the studies of the influences of desegregation on achievement in Bankston & Caldas, 1996; Bridge, Judd, & Moock, 1979.)

Coleman attributed racial differences in achievement to socioeconomic differences between the races. Because schools that are predominantly White tend to contain students from higher socioeconomic backgrounds, Coleman expected schools with majority White populations to be beneficial for minority children. Studies, however, have found that the concentration of African American young people in schools has a negative effect on achievement, independent of socioeconomic status (Bankston & Caldas, 1996; Caldas & Bankston, 1997; Rumberger & Willms, 1992).

If African Americans do show lower levels of achievement than Whites and if the concentration of African Americans in de facto segregated schools is related to these lower levels of achievement, then we should ask why segregation seems to lower the scholastic performance of minority students. If social relations among African American adolescents in schools do play any part in depressing academic achievement, then we must ask what major shared trait can be identified among these adolescents that distinguishes them from their White peers and that can logically be related to the development of attitudes and forms of behavior that could shape a school environment. Asking these questions forces us to consider the controversial issue of family structure.

In 1965, Moynihan sparked an emotional debate by arguing that families headed by single females were becoming a source of disadvantage for African American children (Moynihan, 1965). The Moynihan report has been criticized by feminists (see Stack, 1974), as well as by those who accuse it of taking a blame-the-victim approach (Rainwater & Yancey, 1967; Ryan, 1971). In our view, it is a mistake to view the consequences of family structure as a matter of apportioning blame. Certainly, there are historical and continuing reasons, all involving oppression, for a predominance of female-headed families among African Americans (Massey & Denton, 1993; Wilson, 1980, 1987). Social structures, including family structures, do not exist because individuals just happen to make "good" or "bad" decisions. The historical and social pressures that produce racial variations in families constitute one legitimate subject of study; the objective consequences of family types constitute another. This study takes the second approach.

What, then, are the objective consequences of female-headed families for students? Mulkey, Crain, and Harrington (1992) found that students from one-parent households have significantly lower grades and test scores than do students from two-parent households. Children from mother-only families are not only more likely to achieve lower levels of education and to drop out of school than children from two-parent families, but also are more likely to have psychological problems, to become addicted to drugs and alcohol, and to engage in aggressive and disruptive behavior (Dornbusch et al., 1985; Featherstone, Cundick, & Jensen, 1992; Garfinkel & McLanahan, 1986; McLanahan & Booth, 1989; Pearson, Ialongo, & Hunter, 1994; Vaden-Kiernan, Ialongo, & Kellam, 1995).

However, a few studies have found either no negative association between coming from a female-headed family and academic achievement (Entwistle & Alexander, 1992) or mixed results (Aquilino, 1996). Where there has been a negative association, these unfortunate consequences have been linked to being poor (Acock & Kiecolt, 1989; Blechman, 1982; Herzog & Sudia, 1973; McLanahan, 1985; Takeuchi, Williams, & Adair, 1991) because the poverty rate of families headed by women is six times that of other families in the U.S. (U.S. Bureau of the Census, 1992). Nevertheless, much previous research suggests that family structure can have a strong, direct effect on school performance, independent of socioeconomic status (Mulkey et al., 1992) and on behavior and attitudes relevant to school performance (Li & Wojtkiewicz, 1992; Sandefur, McLanahan, & Wojtkiewicz, 1992; Wojtkiewicz, 1993).

The literature on the influence of family structure on school performance and adolescent behavior has concentrated on the effects of coming from single-mother families. When we take into account the repeated finding that peers are the greatest influence on adolescent behavior and attitudes, though, it becomes evident that school is a
place where young people share their backgrounds with one another (Bankston, 1995; Coleman, 1961; Kilborn, 1993). We suggest that if school environments are social contexts constructed from the backgrounds of students, then, following Coleman's logic, the social environment of any particular school is constructed from the family backgrounds prevailing in that school. Along these lines, Bankston and Palmer (in press) have found that the percentage of single-mother families in schools is a powerful predictor of levels of school violence and discipline problems. If it can be shown that female-headed families are characteristic of schools with minority concentrations and that individual achievement is strongly and negatively influenced by the proportion of female-headed families (whether or not individuals come from this type of family), then we have grounds for concluding that in segregated African American schools the predominance of students from households headed by single females is an important factor in creating a social environment that depresses African American achievement.

Hypotheses

Hypothesis 1: African American students score substantially below White students on standardized achievement tests.

Hypothesis 2: The concentration of African American students in schools has a strong negative relationship with scores on standardized achievement tests for all students, independent of socioeconomic characteristics.

Hypothesis 3: The concentration of African American students in schools is strongly associated with the concentration of students from families headed by single females.

Hypothesis 4: The concentration of female-headed families has a strong negative relationship with standardized test scores that is independent of socioeconomic characteristics and independent of the family structure of individual students.

Methodology

Student Population Data

All public high school students in Louisiana must take and pass all five subject components of the Louisiana Graduation Exit Examination as a prerequisite to being awarded a diploma. The first three components of the exam—math, English language arts, and written composition—are taken when the students are 10th graders. The last two components—science and social studies—are taken when the students are 11th graders. The exam was first administered to 10th graders in April, 1989. Rich demographic information was collected from only 10th graders testing for the first time in April, 1989, and April, 1990. The collection of much of this information was discontinued after 1990. Therefore, we decided to use the most recent year and grade for which demographic data existed: 10th graders tested in 1990.

The data set was provided by the Louisiana Department of Education. Because the majority (more than 96%) of students in this data set were either African American or White and because we wanted to create a dichotomous independent variable, race, to be used in our multilevel regression models, we excluded all students who were neither White nor African American from this analysis. We also excluded the 3,078 students classified as special education students because the conditions under which they tested might not be identical to the rest of the population. These exclusions reduced the number of 10th graders for whom usable test score data were available to 42,041. Due to the computer-intensive requirements of our Proc Mixed SAS model, we were forced to limit this to a random sample of 18,310 students. Still, the number is large enough that generalizing to the whole student population poses no problem.

Dependent Variable

The dependent variable in our analysis is a measure of student achievement on the Louisiana Graduation Exit Examination. After looking closely at the high intercorrelations of both the raw and scaled scores of the three 10th-grade components of the exam, as well as doing principal component analyses on the same, we determined that the three scores were, in reality, measures of a single underlying construct, which we call “academic achievement.” Using raw scores for math, language arts, and written composition, the first factor accounted for almost 73% of the total variance, which decreased to about 16% for the second factor, and to only about 11% for the third. Thus, we used the output of the first weighted factor—academic achievement—as the dependent variable in our analysis.
Variables

Female-headed family structure. Students from single-parent, female-headed families were coded as 1; others were coded as 0.

Race. African American students were coded as 1; White students as 0.

Parents’ educational level. We created this variable by combining students’ responses to questions about mother’s and father’s levels of education. There were five hierarchically arranged categories for each parent, from lowest parental educational level (completed 8 or fewer years of school) to the highest parental educational level (graduated from college). A deceased parent’s educational level was set to that of the living parent. For single-parent families without a deceased parent, the educational level was equal to the education of the sole parent.

Family poverty status. This indicated whether or not the student participated in the federal free or reduced lunch program. Students were coded 0 if they were not participants and 1 if they were participants.

Characteristics of schoolmates. The family structure composition of schools was defined as the percentage of the student population in each school with single parents. The racial composition was defined as the percentage of the student population that was African American. Mean parental education is the average educational level of parents of the student population. The poverty-level variable is defined as the percentage of students in each school participating in the free or reduced lunch program.

Method of Analysis

We use SAS Proc Mixed to create multilevel unconditional means and random coefficient models. Our multilevel models also are referred to as “random coefficient regression models,” “mixed-effects models,” “random-effects models,” or “multilevel linear models” (Bryk & Raudenbush, 1992). They are analogous to both hierarchical linear models and multilevel linear models (Littell, Milliken, Stroup, & Wolfinger, 1996). Multilevel linear modeling overcomes two major shortcomings of ordinary least squares (OLS) regression. First, it avoids the aggregation problems associated with assigning the same school mean to every student in a school as a Level-2 variable. Second, it allows us to distinguish fixed from random effects, something OLS cannot do. SAS Proc Mixed provides essentially the same results as other, popular multilevel software programs, such as HLM and ML4 (Kreft, DeLeeuw, & Van Der Leeden, 1994).

RESULTS AND DISCUSSION

Table 1 provides means and standard deviations for the study variables. Seventy-one percent of African American students scored below the median on the study’s measure of academic achievement. This compares with only 34% of White students. On this and every other measure of the Louisiana Graduation Exit Examination (e.g., unreported average raw and scaled scores), African American students did markedly poorer than White students.

In Table 2, bivariate correlation coefficients are provided for all variables in the study. Here, we see that there are strong negative correlations between academic achievement and African American race ($r = -0.363$), percentage of African American race in school ($r = -0.303$), female-headed family ($r = -0.373$), and percentage of female-headed families in schools ($r = -0.352$).

The largest, and perhaps most problematic, bivariate correlation is between two variables central to the study: percentage of African Americans in schools and percentage of students from female-headed families in schools ($r = 0.797$). In spite of this large coefficient and the multicollinearity concerns that it raises, we decided to include both variables in our regression models. However, we do so in a strategic fashion, both entering and removing the percentage of African Americans in different steps in order to examine how its presence and absence affects the other variables. This can be useful because it, in part, enables us to determine if the influence of the percentage of African Americans in schools is due to the prevalence of female-headed families among African Americans. It also

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\bar{x}$</th>
<th>$SD$</th>
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<tbody>
<tr>
<td>Academic achievement (factor score)</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>Female-headed family</td>
<td>26%</td>
<td>44</td>
</tr>
<tr>
<td>Poverty status</td>
<td>41%</td>
<td>49</td>
</tr>
<tr>
<td>Parental education</td>
<td>3.15</td>
<td>1.17</td>
</tr>
<tr>
<td>African American</td>
<td>43%</td>
<td>50</td>
</tr>
<tr>
<td>Percentage of female-headed families</td>
<td>26%</td>
<td>13</td>
</tr>
<tr>
<td>Percentage of African Americans</td>
<td>43%</td>
<td>30</td>
</tr>
<tr>
<td>Mean level of parental education</td>
<td>3.14</td>
<td>.37</td>
</tr>
<tr>
<td>Mean poverty level of school</td>
<td>41%</td>
<td>22</td>
</tr>
</tbody>
</table>

Note: Useable cases in full mixed model are $n = 18,310$ students from 342 schools.
TABLE 2. ZERO-ORDER CORRELATIONS AMONG VARIABLES IN ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Academic achievement</td>
<td>-.373</td>
<td>-.358</td>
<td>-.244</td>
<td>-.363</td>
<td>-.352</td>
<td>-.303</td>
<td>.217</td>
<td>-.293</td>
</tr>
<tr>
<td>2. Female-headed family</td>
<td>.381</td>
<td>-.196</td>
<td>.299</td>
<td>.297</td>
<td>.240</td>
<td>-.124</td>
<td>.227</td>
<td>.227</td>
</tr>
<tr>
<td>3. Poverty status</td>
<td>-.269</td>
<td>.524</td>
<td>.352</td>
<td>.377</td>
<td>-.288</td>
<td>.458</td>
<td>.320</td>
<td>.192</td>
</tr>
<tr>
<td>4. Parental education</td>
<td>-.152</td>
<td>.126</td>
<td>-.090</td>
<td>.320</td>
<td>.192</td>
<td>.490</td>
<td>.797</td>
<td>.434</td>
</tr>
<tr>
<td>5. Percentage of African American</td>
<td>.478</td>
<td>.600</td>
<td>-.203</td>
<td>.490</td>
<td>.817</td>
<td>.623</td>
<td>.764</td>
<td>.817</td>
</tr>
</tbody>
</table>

Note: All correlations are statistically significant at the p < .0001 level.

makes it possible to determine the relative importance of racial composition and prevailing family structure on academic achievement.

Table 3 considers fixed effects (gammas) and random effects (from the tau matrix) of individual-level variables and of the percentage of minority students in schools. The fixed effects represent the overall correlation of each independent variable with the measure of school achievement. The random effects represent variations from school to school. The intercept represents variations among schools in achievement test scores after all the variables in the equation have been controlled. For each independent variable, we present the coefficient representing variations among schools in the slopes of the relations of each variable with school achievement.

Coming from a female-headed family, in general, has a significant negative relationship with school achievement. Both minority race and poverty status also have significant negative associations with scores on standardized tests. Because these three variables are all dichotomous, their coefficients are comparable, and we can conclude that minority race has the strongest negative correlation with test performance. Parental education is positively related to test results. Although this variable has a different metric from the others, we can use the magnitude of the r statistic as a rough indicator of relative contributions to performance. This suggests that minority race is most strongly correlated with the dependent variable, followed by parental education, poverty status, and then single-parent family structure.

In looking at the random effects, the correlations of female-headed family structure and minority race with test scores vary among schools. In some schools there was a greater gap between the scores of African Americans and Whites than in other schools, and the gap between scores of children

TABLE 3. FIXED AND RANDOM EFFECTS OF FEMALE-HEADED FAMILY AND FAMILY SOCIOECONOMIC STATUS ON ACHIEVEMENT TEST SCORES

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
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<tbody>
<tr>
<td></td>
<td>t Statistic (Coeficient (SE))</td>
</tr>
<tr>
<td></td>
<td>(z Statistic for Random Effects)</td>
</tr>
<tr>
<td>Fixed effects</td>
<td>5.58</td>
</tr>
<tr>
<td>Test scores (intercept)</td>
<td>.114*** (.020)</td>
</tr>
<tr>
<td>Female-headed family</td>
<td>-.137*** (.018)</td>
</tr>
<tr>
<td>Minority race</td>
<td>-.408*** (.018)</td>
</tr>
<tr>
<td>Poverty status</td>
<td>-.147*** (.015)</td>
</tr>
<tr>
<td>Parental education</td>
<td>.097*** (.005)</td>
</tr>
<tr>
<td>Parentage minority in school</td>
<td>19.39</td>
</tr>
<tr>
<td>Percentage of school in poverty</td>
<td>2.80</td>
</tr>
<tr>
<td>Mean parental education</td>
<td>3.01</td>
</tr>
<tr>
<td>Percentage of African Americans</td>
<td>2.99</td>
</tr>
<tr>
<td>Poverty status</td>
<td>.0064 (.0005)</td>
</tr>
<tr>
<td>Speed</td>
<td>.010* (.005)</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01. ***p < .001.
from mother-only families and other children varied among families. The education of parents has a strong correlation with school performance, but this correlation differs little from one school to another. The coefficient for poverty status is small but statistically significant, indicating that the relationship between coming from a low-income family and test performance varies only slightly across schools. The connection between test scores and socioeconomic factors, then, appears to be fairly consistent from one school to another.

Model 2 brings the percentage of African American students in schools into the equation. This has a statistically significant fixed effect. The greater the percentage of African American students, the lower students’ test scores, controlling for minority race. The coefficient for minority race decreases by about 7%, a small but significant amount. It appears that not only does the proportion of African American students have a negative correlation with test scores, but also that a small amount of the achievement gap between African Americans and Whites is associated with the fact that African Americans are, by definition, more likely to be found in schools with large numbers of minority students.

Model 3 of Table 4 brings the percentage of students coming from female-headed families in schools into the equation, and we see a strong negative and statistically significant association with test performance. Comparing the coefficient for family structure in this model with that of the percentage of minority students in the previous table, we see that the prevalence of students from single-parent families in schools is a better predictor of academic outcomes than the racial composition of schools. After family structure is introduced, the coefficient for racial composition actually turns positive, something that should be treated with extreme caution. As we have observed, the percentage of female-headed families is highly correlated with the percentage of African American students in schools. Thus, the changing of signs for racial composition may be a consequence of “partialing” (Gordon, 1968), rather than an indication of a positive association between test scores and minority composition. When two independent variables are more strongly correlated with each other than either is with the dependent variable, which is the case with the percentage of female-headed families and the percentage of minority students, then coefficients may switch signs. The strong correlation between racial composition and family structure also may create problems for the interpretation of the family structure prevailing in schools. We attempt to address these problems by looking at the percentage of female-headed families when other variables of school composition are included and excluded.

Model 4 of Table 4 includes the percentage of minority students in schools, the poverty status of schools, and the mean parental education in
schools. Once we leave the school-level family structure variable out of the equation, the proportion of minority students again shows a strong, significant association with test scores. The percentage of low-income students is insignificant, but we should remember that this school-level variable is highly correlated with the percentage of minority students. The mean parental education in each school shows a strong, positive association with test scores.

In Model 5 of Table 5, we include all of the school-level variables. Again, the family structure prevailing in schools has the strongest correlation of all the school-level variables with our measure of academic achievement. Curiously, the percentage of low-income students in schools is positively related to test performance. However, because both racial composition and the percentage of students from single-parent families are closely related to the poverty level of schools, we should treat this finding with caution. It is conceivable, also, that special programs directed specifically at low-income schools compensate, in some small measure, for the socioeconomic and familial disadvantages of these schools. This is pure speculation, but it does warrant further investigation.

Finally, in Model 6, we provide results for an equation in which the percentage of students from female-headed families is the only school-level variable included. This variable shows a strong, negative association with academic achievement. Moreover, the relationship between test scores and the family structure prevailing in schools remains fairly consistent, whether we include or exclude indicators of racial composition or school socioeconomic status. Further, using the t statistic as a rough indicator of strength of association, we find that the percentage of students from single-parent families appears to be more closely related to achievement scores than is individual family structure.

We can summarize our major findings as follows: (a) The percentage of students from single-parent families in schools has a strong negative relation to standardized test scores. This does not appear to be the consequence of the fact that the individual students in those schools are likely to come from single-parent families, nor does it appear to be attributable to socioeconomic factors. (b) The percentage of African American students, a school characteristic closely related to the percentage of students from single-parent families, does show a negative association with school achievement. However, the connection between test scores and racial composition is weaker than the connection between test scores and prevailing family structures. (c) Socioeconomic characteristics of schools, as well as socioeconomic characteristics of individuals, are related to test performance. However, the socioeconomic levels of schools also show much weaker associations with standardized test performance than prevailing family
structures do. This suggests that the negative association between the percentage of students from one-parent families and academic achievement should not be attributed simply to the fact that schools with high proportions of children from one-parent families have high proportions of students from poor families. (d) Although difficulties with collinearity lead us to treat some of our results with caution, the process of systematically including and excluding school-level independent variables provides evidence that prevailing family structure is consistently the most important school-level predictor of academic achievement.

CONCLUSIONS

It is difficult to draw causal conclusions from cross-sectional data. One major limitation of this study is our measure of family structure. We do not have information about the length of time spent in single-parent families, ages when children became part of one-parent families, or whether single-parent family structure was the consequence of divorce or out-of-wedlock birth. However, the study does strongly suggest that going to school with peers from female-headed families is a major source of the comparatively weak academic achievement found in schools with a concentration of minority students. It does not provide evidence on how female-headed families can lead to problematic school environments. This type of family structure may provide inadequate socialization for children, or it may be that having only one parent in the family provides inadequate supervision and social control. It is also possible that one-parent families are unable to furnish large amounts of parental involvement, as McLanahan and Bumpass (1988) and Astone and McLanahan (1991) have suggested. It also may be the case that mother-only families are frequently found in social environments of extreme disadvantage and disruption and that young people from these families, therefore, carry the problems of their neighborhoods to school with them.

We believe that, if our findings can be corroborated by longitudinal studies and field work, this can help us to understand how segregated schools continue to depress African American achievement. This line of investigation can help us to understand how the institution of the family may be related to that of education through the shaping of social environments within schools. Female-headed families have become the norm among African American youth. Research, with some exceptions (notably Aquilino, 1996; Entwisle & Alexander, 1992), has consistently found that female-headed families are associated with low academic achievement and forms of behavior detrimental to school performance.

In addition to establishing the causal nature of these associations, it will be important to investigate whether there is a threshold of concentration of female-headed families at which students coming from this type of family begin to create a problematic school environment. Does the family structure prevailing in the school begin to exercise a negative influence on students when 20% or 80% of the students come from mother-only families? If there is a threshold, does it interact with the school's socioeconomic environment so that students in poorer schools are more susceptible to the effects of prevailing family structure? Researchers also may be able to consider more detailed measures of family structure than we had available.

We believe that further research should take as its starting point our finding that many of the educational disadvantages of segregated minority schools are related to the fact that students from single-parent families predominate in these schools. Replicating and confirming our results with nationally representative data sets or with data sets from other regions will help to establish the advisability of pursuing policies to address this situation.

NOTE

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