

Student Performance and the Changing American Family

Critics of American education frequently blame lagging student performance on the deteriorating American family structure. Moreover, it is widely asserted that substantial spending on schools and social programs over the past two decades has failed to reverse the educational downtrend. However, a recent study conducted by RAND's Institute for Education and Training sharply challenges this view. First, the study points out that prior research—contrary to public perception—has reported gains in student performance between 1970 and 1990, as measured by nationally representative test score data. The largest gains were made by minority students, although a substantial gap still remains. Second, the study finds that demographic trends affecting the family over this time period contributed to rising test scores. Third, the minority gains cannot be fully explained by changing family characteristics, suggesting that we need to look to other factors for explanations. The most likely explanations are rising public investment in schools and families and equal educational opportunity policies.

Student performance and family environment: what's the connection?

The issue of how families affect student performance is vital to public policy. With public resources stretched thin, how can government best increase learning: by improving schools or the family environment? In *Student Achievement and the Changing American Family*, RAND researchers David W. Grissmer, Sheila Nataraj Kirby, Mark Berends, and Stephanie Williamson took a first step toward answering this complex question. They constructed comprehensive, quantitative models for determining how family characteristics affected test scores among junior- and senior-high students. Specifically, the research addressed three questions:

- What is the relationship between family characteristics and student performance?

- Given the changes in family characteristics between the early 1970s and 1990, could the changes in student test scores be predicted? How would these predictions compare to actual test score changes?
- How did these trends differ for various racial/ethnic populations?

Which family characteristics matter most?

The study drew demographic information on student families from two large databases: the National Longitudinal Survey of Youth (NLSY, 1980), from which it selected students aged 15 to 18, and the National Education Longitudinal Survey (NELS, 1988), which sampled eighth-graders.

The study estimated how specific family features affect student performance, as measured by mathematics and verbal/reading scores.¹ It examined parents' level of education, family income, mother's employment status, the number of siblings, age of mother at birth of child, and single-parent families (see Figure 1). The study found that

- The most important family characteristic influencing student performance is parents' education. For example, students with one or two college-educated parents performed significantly better than students whose parents were not high school graduates.
- Income, family size, and mother's age at child's birth were modestly significant. For instance, a student whose family earned \$40,000 annually outperformed one whose family earned only \$15,000; a student with one sibling performed better than a student with four sib-

¹Mathematics scores were used to illustrate study results; however, verbal/reading scores would have shown similar results.

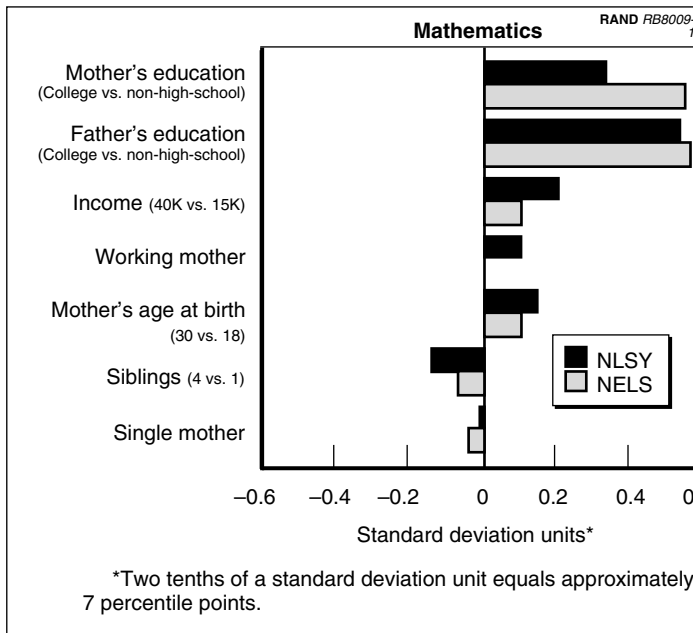


Figure 1—Net differences in mean mathematics test scores for selected groups, NLSY and NELS

- lings; and a child of an older mother scored higher than a child born to a young mother.
- Surprisingly, whether the mother worked had a negligible effect, after accounting for other family factors.
- In addition, single-parent status by itself was not significant. This result suggests that any performance gap between students from one- or two-parent families arises from other differences, such as family income or size or parents' education.

The changing family: a boost for student test scores, 1970–1990

The researchers used these results to predict the changes in test scores that would be expected from changing family characteristics. They found that students in 1990 would be predicted to score higher, not lower, on tests than youth in families in 1970. This is because the two most influential characteristics—parents' education and family size—changed for the better (see Figure 2). Mothers and fathers in 1990 were better educated than their 1970 counterparts. For example, 7 percent of mothers of 15–18-year-old children in 1970 were college graduates, compared to 16 percent in 1990. In addition, 38 percent of mothers did not have a high school degree in 1970, compared to only 17 percent in 1990. Changes in family size were also dramatic. Only about 48 percent of 15–18-year-old children lived in families with at most one sibling in 1970, compared to 73 percent in 1990. The decline in family size coupled with the unchanging average family income levels (in real terms) between 1970 and 1990 means that family income per child actually increased during this time period.

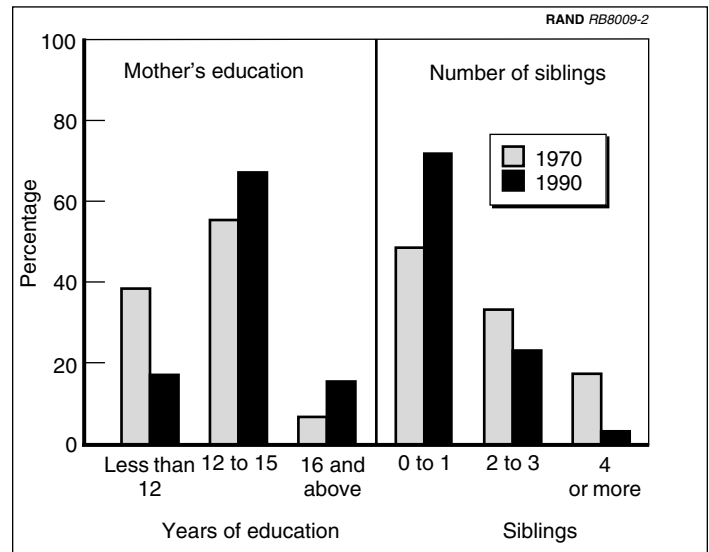


Figure 2—Changes in selected family characteristics, 1970–1990

The effect of the large increase in numbers of working mothers and single-parent families during the past two decades is more complex. The estimates imply that the large increase in numbers of working mothers had—other things being equal—a negligible effect on test scores. However, this measure was taken when the youth were approximately 14 years old, so the results may not apply to younger children. In the case of the increase in numbers of single mothers, the researchers' estimates imply no negative effects from changed family structure alone. However, such families tend to have lower incomes and mothers with lower educational attainment, so that predictions for youth in these families show a negative effect mainly because of the lower income associated with single-parent families.

The research also found that the positive changes in the family were mirrored in the National Assessment of Educational Progress (NAEP). The NAEP contains a set of standardized tests administered by the Department of Education. Since the early 1970s, the NAEP has been monitoring student achievement among nationally representative samples of students at ages 9, 13, and 17. One function of the NAEP design is to monitor achievement over time. As other researchers have reported, results from the NAEP from 1970 and 1990 indicate that the average mathematics achievement of 13-year-olds increased by about 0.18 of a standard deviation, or roughly 6 percentile points, whereas that of 17-year-olds increased by about 0.13 of a standard deviation, or roughly 4 percentile points.

The NAEP is a much more valid indicator of nationwide student performance than the oft-cited Scholastic Aptitude Test (SAT). In fact, the SAT is not designed to compare student performance over time because it is not taken by a statistically representative sample of the nation's students. The SAT is actually taken by a different mix of students each year

and moreover excludes non-college-bound students—the group registering the largest gains in scores. Therefore, using the SAT as a “national report card” on American education is at best misleading.

Larger gains for minorities

Improvements in test scores varied significantly for different racial/ethnic groups (see Figure 3). The greatest improvements in NAEP mathematics and reading test scores were posted by black and Hispanic students. This helped to narrow the minority-nonminority test score gap even though a substantial difference remains.

Subtracting the predicted gains resulting from family changes from actual overall gains in NAEP scores suggests how much the improvement in test scores among racial and ethnic groups can plausibly be attributed to the family as opposed to influences outside of the family (e.g., public investment, public policies, and schools). Scores for black students increased dramatically even after subtracting family effects, as did scores for Hispanic students (see Figure 4). By

contrast, there was a negligible difference between the actual and predicted scores for non-Hispanic whites, implying that the test score gains for these students were fully accounted for by the changes in family characteristics.

These results suggest that black student gains during this period and, to a lesser extent, those of Hispanic students may in part be attributable to public investments in families and schools and/or equal educational opportunity policies. This implies that programs targeted for minority students may have yielded important payoffs, but identifying which programs have worked and their relative cost-effectiveness especially for children placed at risk remains an important topic for future research. Project Director David W. Grissmer observes “These findings are like a caution light at an intersection, warning us to go slow in dismissing the large investments in public education, social programs, and equal opportunity policies over the past twenty years as a waste of resources and a failure of social policy. Future research in this area will allow us to target family and educational resources where they do the most good.”

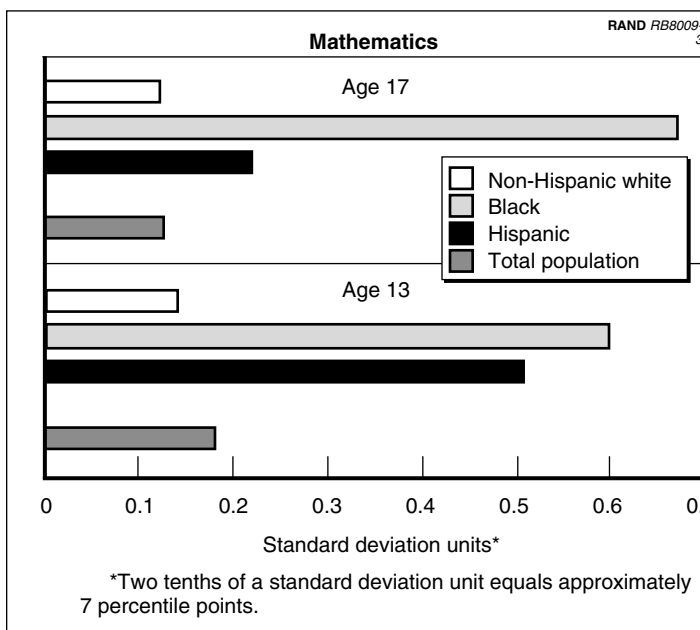


Figure 3—NAEP mathematics score differences by racial/ethnic group between 1978 and 1990 for 13- and 17-year-old students

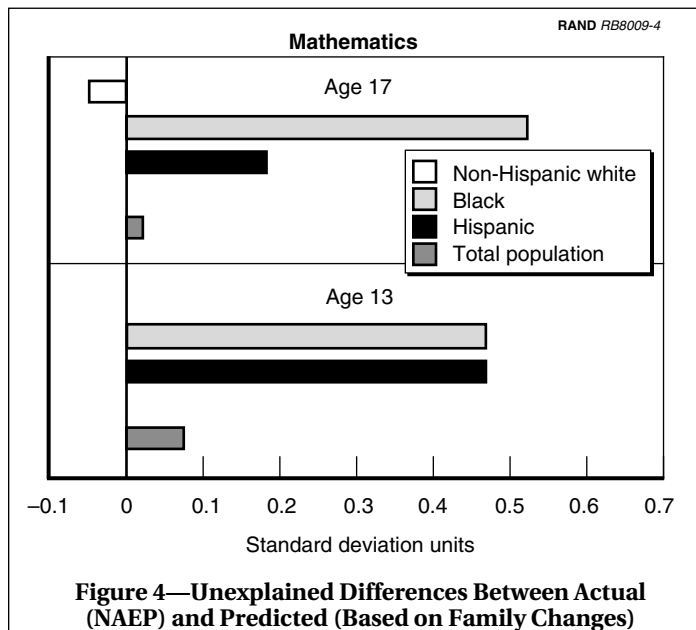


Figure 4—Unexplained Differences Between Actual (NAEP) and Predicted (Based on Family Changes)

Figure 4—Unexplained differences between actual (NAEP) and predicted (based on family changes) mathematics scores for different racial/ethnic groups, 1978–1990

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1700 Main Street, P.O. Box 2138, Santa Monica, California 90407-2138 • Telephone 310-393-0411 • FAX 310-393-4818
2100 M St., N.W., Washington, D.C. 20037-1270 • Telephone 202-296-5000 • FAX 202-296-7960