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# **Examining Gaps** in Mathematics Achievement Among Racial-Ethnic Groups, 1972-1992

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## Summary

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With the passage of NCLB, students, teachers, and schools face great test-based accountability for ensuring that all students in the United States are meeting rigorous, challenging standards for academic work. As the name of this legislation implies, no child is to be left behind. To monitor progress toward this ambitious goal, states and districts are required to monitor the achievement gaps between students from different groups (socioeconomic, racial-ethnic, language, and disability). Although it will be a few years before states' test-based accountability systems are fully implemented to monitor students' mathematics and reading achievement, it is important to understand those factors that are related to student test score gaps. In this book we focus on the mathematics test score gaps among black, Latino, and white students.<sup>1</sup> We examine several nationally representative senior high school student cohorts between the early 1970s and early 1990s to understand trends in the mathematics scores of these different racial-ethnic groups. We also analyze how changes in family, school, and schooling measures help explain changes in the test score gaps over time.

It is our belief that systematic empirical examination of these achievement gaps may provide results that inform social theory, public policy, school improvement efforts, and future data collection efforts. We hope these analyses contribute to the ongoing discussion about the qual-

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<sup>1</sup> The focus of our analysis is on black, Latino/Latina, and non-Latino/a students. Such classifications are not without controversy and at times confusing. For example, non-Latino/as could include individuals who are black. Our analyses use the student self-reported racial-ethnic classification to create nonoverlapping categories for blacks, Latinos, and whites. Rather than use cumbersome language in the text of Latino/a and non-Latino/a, we simply refer to these student groups as blacks, Latinos, and whites.

ity of children's family environments, the quality of their schools, and how changes in families and schools are associated with student achievement, particularly for students from different racial-ethnic groups.

Our analyses aim to contribute to theory, research, and policy that address how family and school measures are related to black-white and Latino-white test score gaps over time. There are only a few studies that are able to examine the relationships between student test score gaps and family and school measures in nationally representative data over several time periods. We build on this previous work and address some of its limitations by analyzing nationally representative data in 1972, 1982, and 1992, which provides consistent measures of students' mathematics achievement and several school and family measures. We also motivate our analyses and the family and school measures we analyze by discussing several different theoretical perspectives from economics, sociology, child development, and organizational analysis. Grounded in past theory and research, the main research questions of our analyses include:

- How did the test scores of blacks, Latinos, and whites change between the early 1970s and early 1990s?
- How did selected family and school measures change over this period?
- To what extent were changes in these measures associated with the convergence of the black-white and Latino-white test score gaps that occurred during this period?
- What are the policy implications that arise from our empirical analyses examining how changes in families and schools are related to student gaps in mathematics achievement?

To address these questions, we compare the racial-ethnic test score gaps to changes in individual, family, school, and schooling measures that were comparable across several cohorts for high school seniors. The data used are nationally representative: the National Longitudinal Study of the High School Class of 1972 (NLS-72), High School and Beyond study (HSB-82, for the 1982 follow-up), and the National Education Longitudinal Study of 1988 (NELS-92, for the 1992 follow-up). Because these data are part of the Longitudinal Studies program

within the U.S. Department of Education, we refer to these data sets as the “LS cohorts” and compare our findings, when appropriate, to the trend assessment of the National Assessment of Educational Progress (NAEP). Within these LS data sets, there are common mathematics test score items across the cohorts, so we were able to equate the tests over time to make them comparable. With these equated mathematics scores, we examine how the black-white and Latino-white mathematics gap changed over time and whether changes in family and school measures are related to these trends in test score differences. We describe changes in the mathematics gap, as well as changes in several comparable family, school, and schooling measures. We relied on multivariate analyses to assess whether changes in the average levels of the family and school measures scaled to the coefficients from the earliest cohort correspond to changes in student achievement gaps.

The patterns spanning the early 1970s to the early 1990s reveal a narrowing of the black-white and Latino-white differences in mathematics achievement. In both the LS senior cohorts and NAEP data, we see a significant reduction between 1972 and 1992 in the black-white (from 1.09 to 0.87 standard deviation unit difference, or a 20 percent reduction) and Latino-white (from a 0.88 to a 0.60 standard deviation unit difference, or a 32 percent reduction) mathematics test score gaps. Although the gaps remain large, the significant convergence is something we are able to examine further in these data.

When examining the changes across the senior cohorts in the levels of family background measures and their relationships to mathematics achievement over time, we find that the socioeconomic conditions of black and Latino students improved relative to white students. Moreover, these improved socioeconomic circumstances corresponded to decreases in the black-white and Latino-white mathematics gaps. For example, the family background measures we analyze (i.e., family income, parent education, and socioeconomic status) alone corresponded to a 54 percent decrease of the black-white gap in mathematics scores between 1972 and 1992. For Latinos, our results reveal that the improved social conditions of Latino students during the 1972–1982 time frame corresponded to the convergence in mathematics scores with white students over this ten-year period. However, the family and

school conditions of Latino students did not continue to converge with white students between 1982 and 1992, which corresponded to an increase of the Latino-white mathematics gap over this later period.

In contrast to these positive family changes, the changes that occurred between schools did not correspond to the closing of the mathematics test score gaps between black and white and Latino and white students. Our analyses reveal that the increases in the minority composition of high schools that black (and Latino) students attended between 1972 and 1992 corresponded to an increase of the test score gaps. Thus, the convergence of black-white and Latino-white mathematics gap might have been even greater if the minority composition of the schools that black and Latino students attended had not increased over this 20-year period.

Although there were few positive changes between schools, the within-school experiences of black and Latino students changed for the better compared with white students when measured by student self-reported academic-track placement. In both 1972 and 1992, we find that about half of white students reported being in the academic track. By contrast, about 28 percent of black students reported academic-track placement in 1972, and 41 percent of black students reported such placement in 1992. For Latino students, 26 percent reported academic-track placement in 1972 compared with 37 percent in 1992. When these changes are scaled to the coefficients of the 1972 cohort, we find that these changes for black and Latino students reporting academic-track placement corresponded to nearly 60 percent of the black-white mathematics gap between 1972 and 1992 and 34 percent of the Latino-white gap over this 20-year period.

Our analyses do not allow us to determine the causes of the convergence of black-white and Latino-white mathematics scores. Rather, we can only examine the correspondence among family, school, and achievement measures in ways that we believe build on previous research. Our analyses have several limitations, and we point out that it is important to remember these when we discuss the policy implications of our analysis. We point out the possibilities of various policies that address improving the socioeconomic and educational opportunities of students. In addition, we argue that it will be necessary for policymakers to think in more creative, coordinated, and comprehensive ways if we are to more effectively address student achievement gaps.