RACIAL PATTERNS IN HOW SCHOOL AND TEACHER QUALITY AFFECT ACHIEVEMENT AND EARNINGS*

Ronald F. Ferguson
Harvard University

African American and Hispanic students tend to have lower average scores than do white students on standardized math and reading exams. As young adults, they have lower earnings. This paper examines the reasons. It first summarizes findings from a project that studies schooling in Texas. The project provides new evidence about factors that improve performance on standardized reading and math exams by students in primary and secondary schools. Factors identified include (1) teachers with strong language skills, per teacher (2) of 18 or fewer students, (3) teachers with more experience, and (4) teachers with master's degrees. Second, we explore the degree to which these and other characteristics of schools and communities help to explain why districts with more African American and Mexican American students

---

* This paper was written for the Morehouse Research Institute at Morehouse College in Atlanta, Georgia, to be disseminated through its journal, *Challenge: A Journal of Research on Black Men*. Intended for a general audience, this is a largely non-technical summary of racial patterns from a broader study covering additional issues not fully addressed in this paper. A technical version of the complete study and papers focusing on particular policy-relevant findings will be available from the author. Readers who want these papers and are willing to be billed to cover reproduction costs should write to the author at: John F. Kennedy School of Government, 79 JFK Street, Cambridge, MA 02138.

This project is funded by the Meadows Foundation of Dallas, Texas. The author gratefully acknowledges helpful comments on an earlier draft from Gordon Berlin, David Ellwood, Olivia Golden, Frank Hartmann, Thomas Kane and Mark Kleiman. Thanks also go to Stephanie Hernandez, Lisa Carlos, Ruele Rogers, Teresa Sommer, LaDonna Pavetti and especially Marian Vaillant. All provided excellent research assistance in various stages of the project.

Views expressed here are those of the author and not of the Meadows Foundation nor of other institutions with which the author is affiliated.

in Texas have lower average scores on state-wide exams. The paper answers the "Why care about test scores?" question by reporting evidence that disparities in reading and math achievement, as measured by test scores, explain a large share of the difference between the races in average weekly earnings for young adult males. A final section comments briefly on some implications.

OVERVIEW

In March of 1986 the state of Texas administered the Texas Examination of Current Administrators and Teachers (TECAT) to all of its existing teachers. (See Shepard and Kreitzer, 1987, for a political analysis.) Recertification to teach required passing the test. The TECAT measured basic language skills using a standard multiple choice format. Standardized test results collected simultaneously for an entire statewide cohort of existing teachers have never been available before. (U.S. Department of Education, 1986, p. 96) Hence, when combined with the other data that this project has assembled, TECAT provides a new and unique opportunity to assess the importance of teachers' basic language skills to children's reading and math achievement.

Obviously, the TECAT and other such tests do not measure all of the skills that make teachers effective. Indeed, whether a simple language skills test like the TECAT captures *any* of the skills that contribute to teaching effectiveness is among the questions that inspired this project. A fully plausible finding would have been that, other things equal, TECAT scores are not significant predictors of student performance. This would have provided strong support for people who argue that what the TECAT measures is irrelevant to effective teaching. The findings of this study say the opposite.

The study shows that where the percentage of black and Hispanic children in a Texas school district is higher, the average score on the TECAT is typically lower for each race of teachers -- black, Hispanic and white. The fact that teachers in Texas who instruct children of color tend to have weaker language skills appears, other things equal, to account for more than one quarter of the reading and math score differential between black and white children in Texas, and about 20 percent of the gap between Hispanics and whites.

The project finds no evidence that the degree to which TECAT scores predict student achievement depends on the races of the teachers. In other words, a given increment in a district's average TECAT score predicts the same change in average student scores independent of teachers' races. This is not to say that race is necessarily irrelevant to teacher effectiveness. It appears from this analysis, for example, that African American and Hispanic teachers are more effective than white teachers at motivating black and Hispanic students to take the Scholastic Aptitude Test (SAT). Other evidence concerning racial matching of students and teachers is inconclusive at this writing but may be resolved in later work using supplementary data. The effects may in fact be important. See Irvine, 1990, for a recent and comprehensive overview of what social scientists know about how social relations in primary and secondary schools influence schooling outcomes for black youth. Also see Farkas et al., 1990.

The second part of the paper briefly reports the results of an analysis of the National Longitudinal Survey of Youth (NLSY) to show why society at large, and communities of color in particular, should be concerned about test scores. Specifically, young men in their mid-twenties who scored higher on a standardized reading and math exam administered to the NLSY participants in 1980 tended to earn more in 1984-86. This is true independent of race: a given increment in reading and math exam performance predicts roughly the same increment in weekly earnings for black men as for young white or Hispanic men of the same age and social background. Test score differences explain much of the earnings gap between young men of different races.

The following section of the paper briefly describes this study's relationship to previous research. Sections that follow describe the Texas data then address the degree to which teachers' TECAT scores, class size, teacher experience and master's degrees predict students' test scores, dropout rates and rates of taking the SAT controlling for a host of other influences. Afterwards a discussion based on findings from the NLSY concerning the extent to which test scores predict earnings for young males in their mid-twenties. A short section exploring policy implications precedes a brief conclusion.

PREVIOUS EDUCATION RESEARCH

Education is a production activity whose outputs include knowledge and reasoning skills. When economists study production processes they use mathematical expressions called "production functions" to summarize the technical relationships through which various combinations of inputs generate particular outputs. Over the past 25 years a substantial body of literature has developed from attempts to measure education production functions. Researchers use multivariate statistical techniques to estimate the effect on output (usually students' test scores) of changing the amount of any given input (e.g., class size or teacher experience) while holding other inputs (e.g., family background) constant.

Unfortunately, using these techniques, research has confirmed very few conclusions across independent studies. Indeed, a recent and authoritative review of this vast literature (Hanushek, 1986) concludes that:

> ...differences in quality [i.e., students' standardized test scores] do not seem to reflect variations in expenditures, class sizes, or other commonly measured attributes of schools and teachers.

The inability of statistical research to find that expenditures for "commonly measured attributes of schools and teachers" matter is surely among the forces responsible for a clear shift in policy discussions over the past decade. The shift is toward organization and process issues. The proposition that more money alone is not "the answer" is now widely accepted. School-based management and parental choice (e.g., vouchers) have, for good reasons, become dominant preoccupations. (See, e.g., Chubb and Moe, 1990.)

Still, a strong and widely shared conviction remains that measurable school characteristics such as class size and teachers' language skills must matter. The idea that they might be unimportant is simply too counter-intuitive. The present study finds strong new evidence that the intuitive answers are correct.

EDUCATION IN TEXAS

The Data

Each observation in the data for Texas is for an individual school district. Statistical estimates discussed below explain why school districts differ in their average reading and math scores on uniform statewide student exams. Texas has more than 1000 school districts. This project was able to assemble fairly complete data for almost 900. Districts omitted because of missing data were generally very small; therefore, more than 90 percent of the state's primary and secondary students are included in the analysis.

Social science theories suggest that educational outcomes such as grades and test scores are the products of innate ability, school inputs and inputs from families and communities. (See Hanushek, 1986.) The data for this project do not include variables that measure innate abilities. Nor do they separate family effects from community effects. Instead, family, community and innate ability effects are subsumed by school district averages for various socioeconomic indices. Most of these come from a special tabulation of the U.S. census from 1980 that provides data by school district.

Variables from the census include the following: income per household and per capita income, levels of education among the adult population, the poverty rate in households with children, the prevalence of single-parent female-headed households and the percent of households in which English is a second language. Since our school data cover only public schools, the percent of a district's children attending public (versus private) school is included as a control variable.

Data from the 1980 census are obviously from half a decade before the 1985-86 school year. This is less than ideal. Nevertheless, aside from isolated aberrations, relevant socioeconomic features are not likely to have shifted enough in so short a time to seriously distort the inter-district comparisons upon which our results depend. This seems to be confirmed by the results reported below. The results are fully consistent with standard findings for how socioeconomic background influences student performance.

Other data from the 1985-86 school year include the percent of students who are from migrant farm worker families, the percent Hispanic, and the percent Black. Also, the analysis allows for separate effects for cities, suburbs, rural districts, towns, non-metropolitan cities

(growing and stable), and districts along the Mexican border with high poverty rates. These capture effects that vary systematically by type of place and are not captured by other variables in the estimated equations.

Students' reading and math scores used in this analysis come from the Texas Educational Assessment of Minimum Skills (TEAMS). TEAMS exams are standard multiple choice tests administered to first, third, fifth, seventh, ninth, and eleventh graders. The TEAMS results that this study seeks to explain are from the second semester of the 1985-86 school year. In addition, we use results for the same cohort of children two years (1987-88) and four years (1989-90) later. The latter allow the study to check the degree to which school and community characteristics that explain differences in scores across districts at a point in time also predict how much progress children achieve over time.

As introduced above, the focal explanatory variable in the analysis is teachers' performance on a language skills exam (TECAT) administered to all teachers and administrators in March of 1986 for purposes of recertification. Passing rates were about 97 percent overall, 94 percent for Hispanics, and 81 percent for blacks. People who failed the exam were permitted to retake it. The present study uses only the March 1986 scores and is therefore not distorted by results from second and third attempts. The analysis here employs both district average scores and district passing rates from the TECAT exam. For passing rates, but not for average scores, we were able to get data separately for primary and secondary school teachers.

Several additional characteristics of each school district enter the analysis. These include teacher experience, the percentage of teachers who have master's degrees, the average school size (separately for primary and secondary schools), total district enrollment and the number of students per teacher in the district (a good approximation of average class size).

One set of indices covering the school district as a whole across all grades comprises the explanatory data for each grade. For example, the teacher test score data in the equation for any given grade is the average score for all of the teachers in the district across all grades. The same holds for other school and socioeconomic background variables. While this is primarily because available data are not disaggregated by grade level, it has the advantage of including teachers who taught current students in earlier grades. Thus, it comes

closer to measuring students' cumulative educational experience than would an equation containing data only for the current school year. These same explanatory data are used to estimate the dropout rate and the percent taking the SAT.

Using school district averages rather than data for individual children can, under certain quirky circumstances, produce misleading results because of "aggregation bias." Data measuring performance and other characteristics of individual children and their individual teachers are preferable but were not available. However, the findings reported below, based on almost 900 individual school districts, disclose a systematic and internally consistent story about what influences children's standardized test scores, dropout rates and decisions to take the SAT. This coherence and plausibility leads us to believe that aggregation bias is not a serious problem. Any subsequent analysis based on disaggregated data for individual students and teachers is likely to add interesting and important details but not to change the central findings.

General Findings Concerning Schooling Effects

Teachers matter. Controlling for all of the influences discussed above, all four of the variables in the analysis that measure teacher characteristics (TECAT scores, class size, experience, master's degrees) have statistically significant effects on student test scores. Moreover, the magnitudes of the effects are not trivial. By contrast, of the same four variables, only teachers' experience has an effect on high school dropout rates or on the percentage of students taking the SAT.

Teachers' language skill as measured by the TECAT score is the most important school input for both math and reading. (Readers with training in statistics will appreciate knowing that the coefficient on the TECAT score was typically six times its standard error.) The next most important school characteristic in the analysis is teacher experience, followed in importance by class size and master's degrees. A list of variable names and descriptive statistics and a table of coefficients and t-statistics is available in the appendix. However, this is only one of several tables that inform the following discussions. Tables detailing other results discussed below are available from the author in more technical papers.

The next few pages outline the project's general findings before discussing patterns associated with race. All of the patterns reported below are statistically significant.

1. **TECAT helps to explain variation across districts in students' average scores at a point in time.** After the first grade (when teachers' scores are relatively unimportant) teacher scores on the TECAT account for about one fifth to one quarter of all variation across districts in students' average scores on the TEAMS exam. (TECAT has virtually no influence on the dropout rate or on the percent taking the SAT; the only effects of the TECAT on the latter indices appear to be extremely small and indirect, acting through the effect of the TECAT on students' test scores.)
2. **TECAT predicts changes in students' average scores over time.** Item 1 directly above reports that TECAT scores explain variation across districts *at a point in time* even for ninth and eleventh grades. However, estimates predicting *changes over time* suggest that much of the learning that TECAT "causes" occurs between third and seventh grades. Teachers' scores have much smaller effects on *changes* in student scores from the first to the third and after the seventh grade. (These estimates, for example, compared third (or seventh) graders' scores in 1986 to their scores in 1988 when they were fifth (or ninth) graders and in 1990 when they were seventh (or eleventh) graders.)
3. **Primary teachers appear to be particularly important for establishing the reading foundation upon which students depend in later years.** Primary school teachers' passing rates on the TECAT have three times the impact of secondary teachers' passing rates for predicting eleventh graders' passing rates on the TEAMS exam. Conversely, neither the primary nor the secondary teachers passing rate is statistically significant in predicting *changes* in what students learn after the seventh grade (e.g., the difference between seventh graders scores in 1985-86 and the same cohort of students' ninth grade scores in 1987-88 or their eleventh grade scores in 1989-90).

4. **Teachers with five or more years of experience produce higher student test scores, lower dropout rates, and higher rates of taking the SAT.** Our experiments with other measures show that the percent with five or more years of experience is the best index to capture the effect of teacher experience on test scores. This index accounts for a little more than 10 percent of the inter-district variation in student test scores. Moreover, an increase of 10 in the percent of teachers with five or more years of experience leads to a drop of almost four in the dropout rate (e.g., from a 25 percent dropout rate to a 21 percent rate) and an increase of three in the percent of students taking the SAT.
5. **Master's degrees produce moderately higher scores in grades one through seven.** The percentage of teachers who have master's degrees accounts for about five percent of the variation in student scores across districts for grades one through seven. Master's degrees have no predictive power after the seventh grade.
6. **Large classes lead to lower scores in grades one through seven.** Class size, approximated here by the number of students per teacher in the district, is very important when it exceeds 18, but not when it is under 18. Each additional student over 18 causes the district average score to fall by between one-tenth and one-fifth of a standard deviation in the inter-district distribution of test scores for grades 1 through 7. This is among the stronger effects for any variable in the study. However, it is an effect that is clearly restricted to the primary grades. Class size influences neither high school test scores, dropout rates nor the percent taking the SAT.
7. **Districts that pay higher starting salaries have teachers who score higher on the TECAT.** Teacher supply equations estimated by this project show that, other things equal, districts paying higher salaries than nearby competitors attract teachers who score higher on the TECAT. Hence, from the perspective of any given district, money can affect student achievement by attracting better teachers. However, a note of caution is in order. First, within a geographic region, raising salaries may be close to a zero sum game if districts simply compete for a relatively fixed pool of skilled teachers. Also, merely raising

the salaries of existing teachers is not sufficient. Higher salaries will improve teacher quality in the aggregate only if districts use them to attract better students into teaching careers and to tie them to incentives for existing teachers to upgrade their skills and performance.

8. **Other things equal, larger schools and larger districts do slightly worse**. Tests for effects of scale -- larger schools and larger districts -- showed that bigger usually means lower student scores, but the effects are small and often not statistically different from zero. The effects on dropout rates are marginally significant for school size and highly significant for district size. Also, larger districts have marginally lower rates of taking the SAT.

Findings Concerning Home and Community Effects

Most estimates of education production functions find that conditions in home and community environments outside of the school are important determinants of schooling outcomes. The next few paragraphs review findings that are fully consistent with what other studies have found.

Parents' education in this study is represented by two variables: (1) the percent of adults living in the district with exactly four years of high school, and (2) the percent who have some college. The latter variable is by far the most important explanatory variable in the analysis aside from teachers' TECAT scores. In the overall analysis, its importance for predicting students' test scores is roughly equal to TECAT in magnitude and in statistical significance. Parental education is also important where TECAT is not: for explaining first grade reading scores, dropout rates and the percent of students taking the SAT.

Income in this analysis appears to have an effect on test scores only when parental education is omitted. Adding parental education always causes the estimated effect of income on test scores to become very small, statistically insignificant and usually negative.

A similar statement characterizes the relationship between poverty and female-headed households. The percentage of children living in poverty never has a statistically significant influence on students' test scores when the analysis controls for the rate of female headship. In fact, the percentage of children living in poverty is highly

statistically significant only when both female headship and students' race variables are omitted; its measured significance becomes very marginal when either of these is added. Female headship, conversely, is a statistically significant predictor of test scores for all grades up to and including ninth, and for dropout rates.

Hence, the general finding is that money *per se* is not a critical ingredient in home and community environments for affecting schooling outcomes.

Two additional variables capture special forms of disadvantage experienced mainly by Hispanic students. These are (1) the percent of students from homes where English is a second language and (2) the percent from migrant farm worker families. In both cases, larger percentages tend to drive down average test scores, though the statistical significance of these effects varies across grade levels.

Variables representing the percent of students who are Hispanic and the percent who are black are essentially stand-ins for factors that are correlated with race but not otherwise represented in the estimated equations (e.g., peer culture; ethnic idiosyncrasies in grammar). The coefficient for "Students Percent Hispanic" is always statistically significant and negative and its magnitude does not change much across the grade levels.

Contrast this with "Students Percent Black," where the effect is statistically insignificant for first, third and fifth grades, marginally significant for seventh grade, and highly significant for ninth and eleventh grades. This means that other variables included in the analysis explain virtually all of the difference in test scores between black and white districts in the primary grades, but not in the later grades; the magnitude of the effect for ninth grade is triple that for seventh grade and five times that for third grade. We return to this curious pattern below.

A final set of variables measures otherwise unexplained place effects. For example, are children's test scores in cities higher or lower than in other types of places for reasons not captured by other variables in the analysis? The estimates answer this question separately for cities, suburbs, rural districts, towns, and non-metropolitan cities (growing and stable). The answer is generally no. In other words, forces that cause test scores to differ by type of place are captured well by other variables in the analysis. Only districts with high poverty rates along the

Mexican border have statistically significant effects that consistently distinguish them. And there, the effects are negative for grades three through seven and positive for grades nine and eleven.

This brief summary shows patterns that fit well with what standard theories and common sense might predict. Generally, teachers matter, as do various features of the home and the community.

Now, what do these findings suggest about why average standardized test scores are lower in districts where larger percentages of the students are African American or Mexican American?

Explaining Racial Patterns

Estimates in this section come from first examining each explanatory variable to estimate how the average value of that variable differs across districts with different student racial compositions. We then combine this information with estimates discussed above that gauge each variable's impact on test scores. Variables that (a) change more as racial composition changes and (b) have larger effects on test scores will be most important for explaining why average test scores are lower in districts with more black and Hispanic students.

Using this procedure we find five basic dimensions on which more heavily black districts have patterns that tend to cause their test scores to be lower than in more proportionately white districts. More heavily black districts: (1) have higher rates of poverty and female headship; (2) are slightly larger with larger class sizes; (3) have parents with fewer years of education; (4) have teachers who score lower on the TECAT; and (5) have a remaining unexplained deficit in student test scores after accounting for the other factors that are in our analysis. Variables not represented in this list have patterns that are neutral or positive for districts that have larger percentages of black students. For example, both "Teachers with 9+ Years of Experience" and "Teachers Percent with Masters Degrees" have positive effects on student scores and higher values in districts with more black students. Hence, neither is among the variables that cause scores to be lower in districts with more black students. (As seen below, the opposite is true for districts with more Hispanic students.)

Pie diagrams are a convenient way to show the relative importance of the five categories. Figures 1 and 2 consider why test scores are lower in districts that have larger percentages of black students and smaller percentages of white students (holding the

percentage Hispanic constant). The two figures show what percentage of the difference in test scores our estimates suggest can be attributed to each of the five categories.

The most striking feature of Figure 1 is that almost half of the black-white difference for fifth graders (47.5%) is attributable to differences in teacher quality as measured by the TECAT. This number falls to 39.5% for seventh grade and 26.4% in Figure 2 for ninth grade. However, the absolute effect of TECAT on student test scores that lies behind these numbers is almost constant. For each of the three grades, the difference between an all-black district and an all-white district, due only to the difference in teacher quality (TECAT), would be about one standard deviation in the inter-district distribution of average student scores -- 1.1 standard deviations for fifth graders and 0.92 standard deviations for ninth graders. It is mainly the *relative* importance of teaching that falls in the comparison of fifth with seventh and ninth grade scores.

The primary reason for this relative change is that the percentage of the black-white difference due to the still unexplained race effect balloons from 12.9% for fifth grade (12.9% here is not statistically distinguishable from zero), to a statistically significant 19.9% for seventh grade and an astounding 43.1% for ninth grade. Based on this effect alone, the average score for ninth graders in an all-black district would be 1.5 standard deviations behind that in an all-white district. Adding the TECAT effect pushes this to almost 2.5 standard deviations. (Tests for non-linearities in the equations used to estimate these relationships show that the effects are quite linear. Hence, while there are no literally all-black districts in Texas, these estimates are quite in line with the data.)

Figures 3 and 4 are for Mexican Americans. These diagrams have six categories rather than the five in the diagrams for blacks. The sixth represents teachers' experience and master's degrees. These effects are positive (though small) for blacks relative to whites and therefore are not shown in Figures 1 and 2. However, they are negative for Hispanics relative to whites and therefore belong in these diagrams that show why scores are lower in Hispanic districts. Also, the "poverty and female-headed" cell for Hispanics includes effects of English as a second language and migrant farm worker families.

Figures 3 and 4 show changes from the fifth through the ninth grades that are similar to those for blacks but not as dramatic. The main difference between black and Hispanic districts in the pattern of change between fifth and ninth grades is that Hispanics do not experience such explosive growth in the "still unexplained" racial differential. The "still unexplained" cell for Hispanic districts is always large but it grows only slightly. The poverty cell grows noticeably more, driven mostly by the growing disadvantage of English as a second language.

The relative importance of TECAT falls only slightly between Figures 3 and 4. This is because the absolute effect of TECAT is rather stable, and it is not being swamped by other categories that are exploding in importance as is the case for the "still unexplained" effect in black districts. (Specifically, hold all else constant and considering only the effect due to TECAT, the difference between an all-white and an all-Hispanic district would be 0.63 standard deviations in the inter-district distribution of average student scores for fifth grade, and 0.53 for the seventh and ninth grades. The analogous numbers for blacks are 1.10 and 0.92.)

Before leaving this section, the fifth to ninth grade jump in the "still unexplained" race effect for black students deserves an additional comment. Other work that this author and others are doing explores changes in black youth culture (particularly that of males) that occurs at the transition from childhood to adolescence -- roughly the fifth to ninth grade years. (See, e.g., Ferguson, 1990; Kunjufu, 1983) Boys begin to adopt what they consider to be manly attitudes and behaviors. Among some youth, this can include mockingly confrontational communication styles that teachers may find difficult to understand and manage. A self-fulfilling prophecy of poor academic performance may ensue wherein teachers and certain students give up on the hope for productive collaboration in learning.

Related to this, is the anti-achievement ethic with which early adolescents of all races flirt as they mount the obligatory challenge to adult authority. For black youth, the confrontation may be against more than simply adult authority. It may also reject white authority and "white values" as it becomes ever more clear that society refuses to view African Americans as social equals. Unfortunately, academic excellence is seen by some black youth (both girls and boys) as a peculiarly white aspiration. Aside from having peers call them "nerds,"

a risk for academically zealous youth of all races, youth who are African American face the additional allegation from peers that they are "acting white." These attitudes are currently hot issues among researchers seeking to understand black youth perspectives and behaviors. (See, e.g., Ferguson with Jackson, 1990; Fordham, 1988; Fordham and Ogbu, 1986; Kunjufu, 1983) If we could measure the force of these social pressures we might explain a significant share of the fifth to ninth grade growth in the "still unexplained" race effect for black students in Texas.

TECAT Scores in Districts with More Students of Color

Why are teachers' average TECAT scores lower in districts with more students of color? How much lower are they?

Consider two hypothetical districts. In the first, all students are black or white. In the second, all students are white or Hispanic. Imagine increasing by 10 (say from 20 to 30) the percentage of students who are black (in the first district) or Hispanic (in the second district). According to our estimates, this increase in representation predicts a drop of .45 standard deviations in the average TECAT score for the first district and .26 standard deviations for the second district. To understand intuitively what this means, consider ranking all of the districts in this analysis by their average scores on the TECAT. Using this ranking, lowering a district's average TECAT score by .45 standard deviations could move it, for example, from the 50th to the 29th percentile or from the 77th to the 50th percentile among districts. For the second district, the drop of .26 standard deviations could move it from the 50th to the 36th or from the 64th to the 50th percentile. Hence, the differences in average TECAT scores among those who teach children of different races is not trivial.

A disproportionate share of the explanation for this pattern is that black and Hispanic teachers have lower average scores and teach more often in black and Hispanic schools. However, this fact should not be seen or reported in isolation. The average scores of white teachers who teach in proportionately more black and Hispanic districts tend to be lower than the scores of white teachers in "whiter" districts. In fact, for all three races of teachers, adding students of color predicts a drop in the districts average TECAT. For example, an increase of 10 (as in the paragraph above) in the percent of a district's students who are black (versus white) typically brings a drop of .15 standard

WHY 5TH GRADE READING SCORES ARE LOWER

IN DISTRICTS WITH MORE BLACK STUDENTS

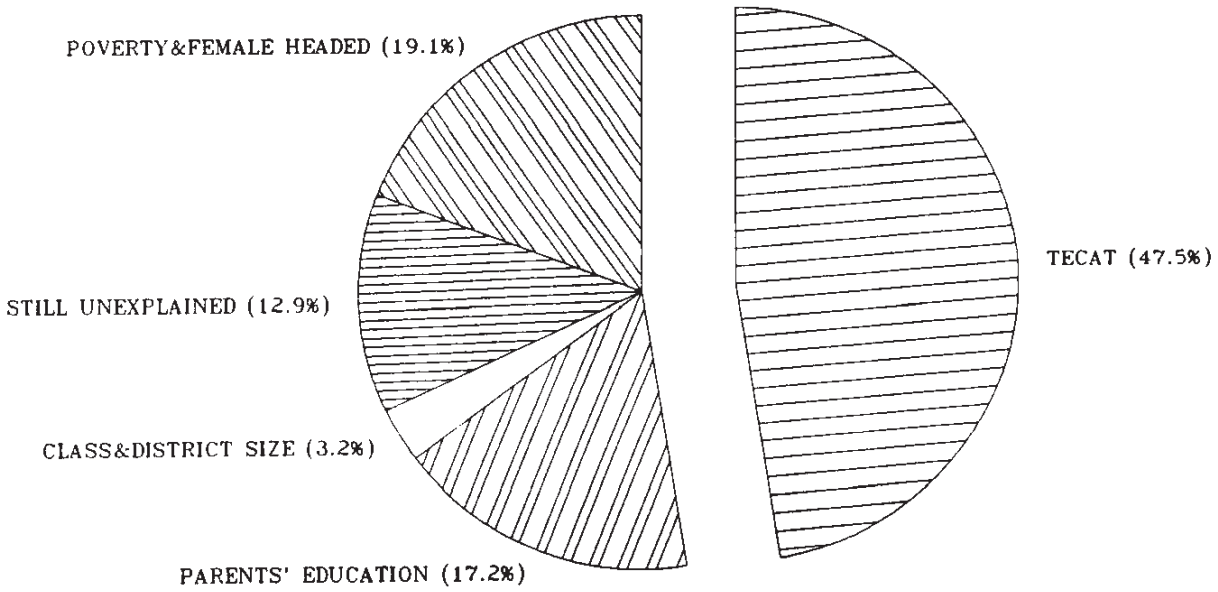

FIGURE 1

WHY 9TH GRADE READING SCORES ARE LOWER

IN DISTRICTS WITH MORE BLACK STUDENTS

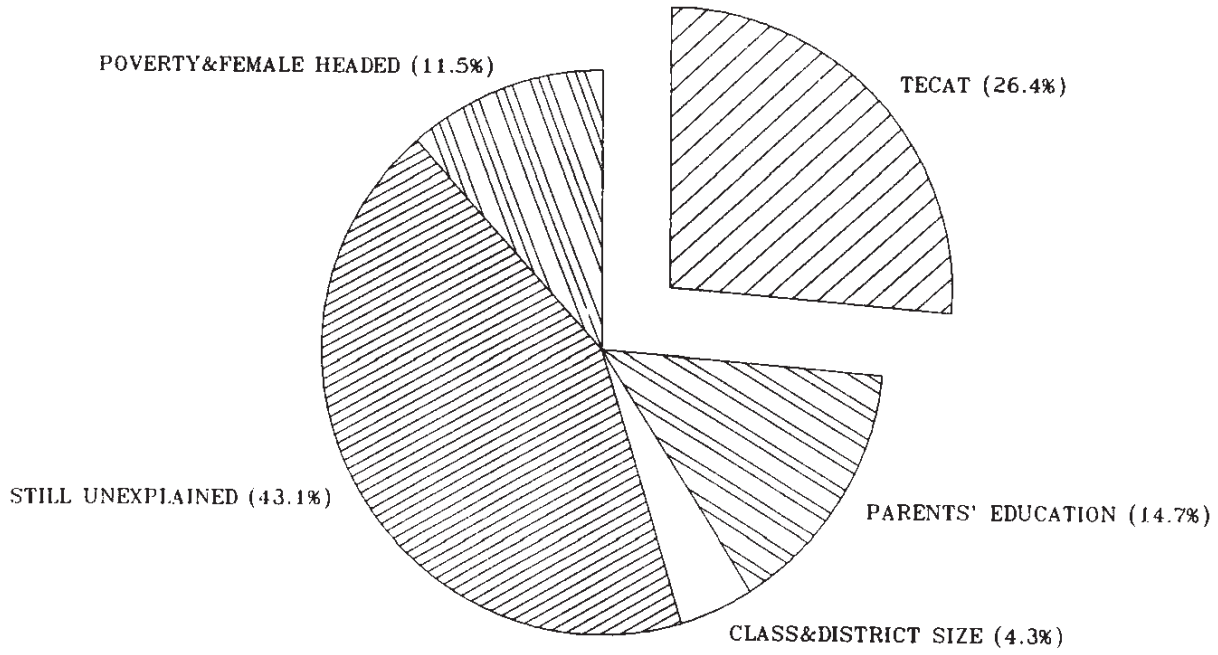

FIGURE 2

WHY 5TH GRADE READING SCORES ARE LOWER

IN DISTRICTS WITH MORE HISPANIC STUDENTS

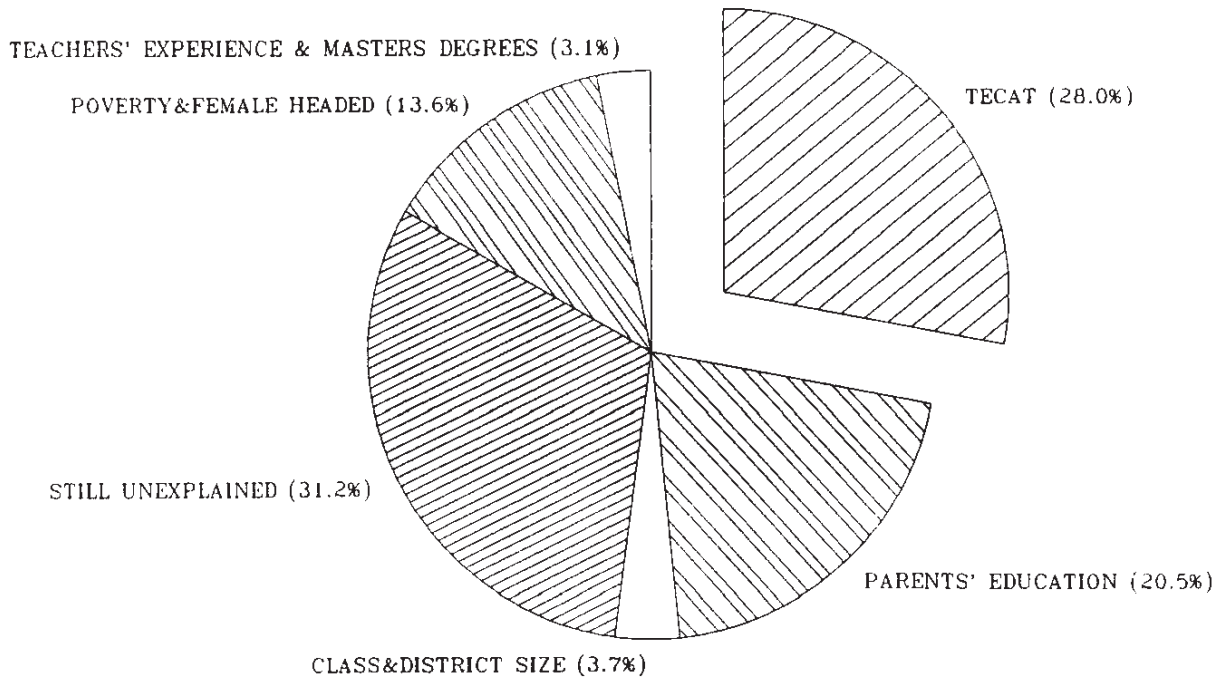

FIGURE 3

WHY 9TH GRADE READING SCORES ARE LOWER

IN DISTRICTS WITH MORE HISPANIC STUDENTS

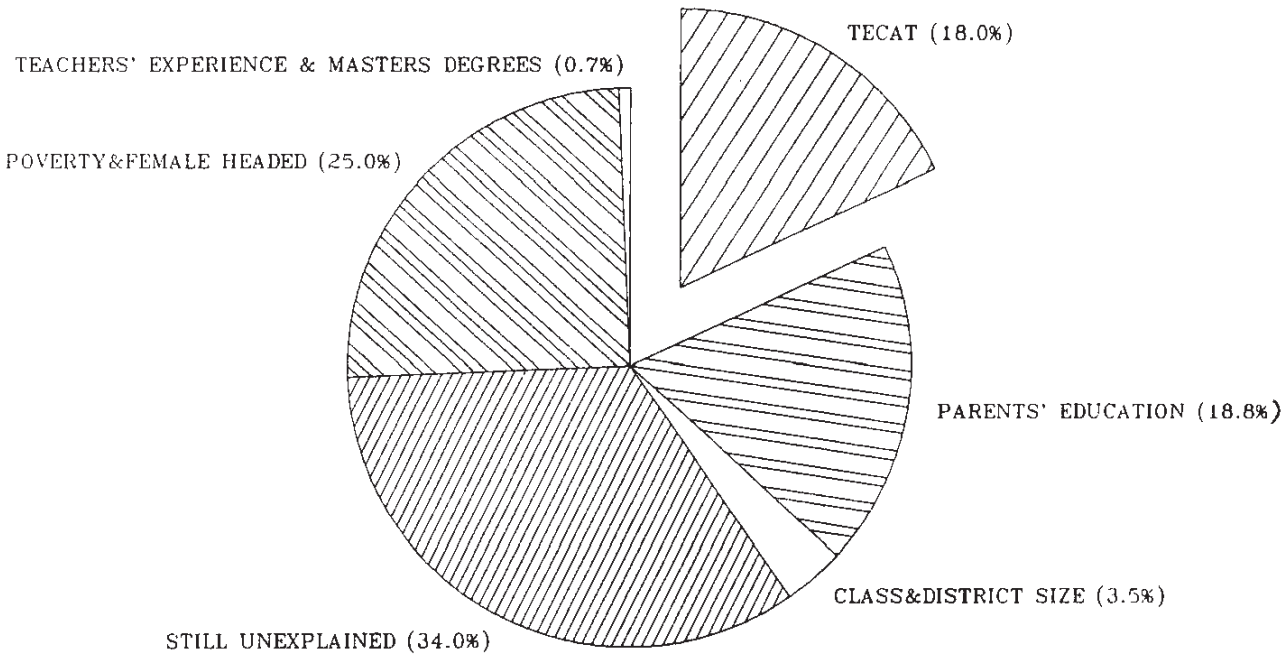

FIGURE 4

deviations in the average TECAT score for white teachers, .18 for black teachers and .27 for Hispanic teachers. Similarly, a 10 percent increase in Hispanic students (versus white) brings a drops of 0.08, 0.06, and 0.17 standard deviations respectively in white, black and Hispanic teachers' scores.

Thus, districts with more black and Hispanic students tend to have lower scores for two reasons. First, they have proportionately more teachers from groups (i.e., black and Hispanic teachers) whose scores are lower. Second, within each race of teachers, the average TECAT score is lower for those who teach in districts with more black and Hispanic students.

If salaries were systematically lower in districts with more black or Hispanic students, this could help to explain why, even for white teachers, average TECAT scores are lower in such districts. Parts of the analysis not emphasized in this paper show that, other things equal, districts that pay higher salaries tend to attract teachers who do better on the TECAT. The same analysis, however, shows that it is not generally true that salaries are systematically lower in districts with more black or Hispanic students. Hence, lower salaries are not the primary reason for the lower TECAT scores in districts with more students of color. (Of course, higher salaries could nevertheless be effect tools for attracting teachers with stronger verbal skills to teach in black and Hispanic school districts.)

To summarize, existing salary differentials are not the primary explanation for why teachers' scores are lower in districts with more black and Hispanic students. Instead, because salaries are quite similar, the TECAT differentials appear to be due to (a) systematic differences in the language skills of people who supply themselves to districts where larger numbers of students of color attend, and (b) differences across districts in the standards by which teachers are selected. The paper returns below to some thoughts concerning policy implications.

It moves along now to address the "So what?" question.

WHY CARE ABOUT TEST SCORES?

Many reasons exist to care about test scores. Here, we consider only one: test scores measure the speed and accuracy of reading and calculating skills that employers value. Hence, people with higher scores tend to have higher earnings. Ideally for the present

paper, we would want to examine the relationship of the student scores studied above to later earnings for the same students. Unfortunately, such data are not available. Data from other sources, however, provide strong evidence that test scores can be important predictors of earnings.

At least three recently published analyses (O'Neal, 1990; Berlin and Sum, 1988; Bishop, 1988) and a fourth currently underway by this author have investigated the relationship of test scores to earnings for young men. (Other than some discussion of young women in Berlin and Sum, this author is unaware of analogous studies for young women.) Each of these four uses the National Longitudinal Survey of Youth (NLSY). This is currently the best available data with which to test whether reading and math skills affect earnings. The NLSY follows a nationally representative sample of youth who were ages 14 through 21 in the first year of the survey, 1979. During July through October of 1980, 94 percent of the sample completed a battery of 10 tests known as the Armed Services Vocational Aptitude Battery.

Only in the past few years have men in the NLSY sample been old enough to permit testing of the hypothesis that people's test scores as adolescents might predict their earnings as adults. Given that data of this quality and completeness have not been available in the past, the number of good studies addressing the link between earnings and test scores is relatively small. (See Jencks et. al., 1972, for discussion of early studies that correlated the AFQT with earnings for military veterans.)

The four recent studies sited here use an index computed from scores on the four sub-tests that directly measure standard reading and math skills. The sub-tests are: word knowledge, paragraph comprehension, numerical operations, and coding speed. The index, called the Armed Forces Qualification Test (AFQT), sums the scores from the first three tests plus one-half of the score from the fourth. Two studies, that by Bishop and work in progress by the present author, discussed below, also use the separate sub-test scores. Bishop makes much of the fact that the math scores appear more important than the reading scores. However, because the sub-test scores are highly correlated with one another, this author remains skeptical that this distinction is reliable. In multivariate analyses that this author has conducted with all of the control variables listed below, any of the four sub-test scores entered without the other three contributes statistically significantly to explaining earnings for men in their mid-twenties.

The important point for the present paper is that each of these studies, using both simple correlations and multivariate statistical techniques, finds a strong relationship between the AFQT score and earnings. Bishop and the present author find that this relationship grows stronger as men get older. For example, Table 1 shows correlations between AFQT scores and weekly wages for men who work at least part year and are not enrolled in school. Just as Bishop has found, the relationship between test scores and earnings is weak during the first few years after high school. Nevertheless, the table shows that by age 23 the correlation is firmly established. Also, controlling for age, O'Neal finds evidence that the marginal payoff to higher scores grew during the 1980s. This is consistent with conventional wisdom that reading and math skills are becoming more highly valued by employers in the "knowledge based economy."

Measuring the link between test scores and earnings while holding other important factors constant requires multivariate statistical techniques. All four of the studies cited have conducted such analyses. O'Neal and the present author have focused on men in their mid-twenties. O'Neal examines hourly wages for young black and white men ages 22 through 29 in 1987. All of the men in her analysis work full time. She finds that the hourly wage for blacks is 82.9 percent of the hourly rate for whites. Controlling for years of schooling takes this percentage up to 87.7 percent, and then further controlling for AFQT scores takes it to 95.5 percent. The jump from 87.7 to 95.5 is 46 percent of the difference between 82.9 (the actual ratio of black to white wages) and 100 (what the ratio would be if equality prevailed).

It would be premature, however, to conclude that the AFQT score explains 46 percent of the difference between black and white wages. For example, at least part of this 46 percent might be capturing the effects of background factors that are correlated with the AFQT score but are not controlled in the analysis -- the AFQT score might be measuring family background effects on earnings instead of reading and math-skill effects. Conversely, the actual effect could be more than 46 percent. The 46 percent was the *additional* earnings that AFQT explained after years of schooling were already controlled. But schooling itself has a positive effect on the AFQT. Hence, if the AFQT were added first (i.e., before schooling) its apparent effect would be larger.

TABLE 1

SIMPLE CORRELATIONS OF TEST SCORES WITH AVERAGE WEEKLY EARNINGS FOR OUT-OF-SCHOOL MEN WITH EARNINGS, AGES 20 THROUGH 27 IN 1985 (Races Pooled)*

AGE:	20	21	22	23	24	25	26	27
AFQT (INDEX)	.10	.21	.28	.41	.44	.41	.40	.45
ARITHMETIC REASONING	.05	.17	.22	.38	.39	.38	.37	.45
WORD KNOWLEDGE	.09	.19	.24	.36	.40	.33	.33	.37
PARAGRAPH COMPREHENSION	.06	.13	.23	.35	.34	.31	.35	.35
NUMERICAL OPERATIONS	.15	.20	.29	.36	.43	.42	.41	.41

* Tabulations by author using National Longitudinal Survey of Youth.

The present author has conducted a separate analysis of the NLSY that reduces these sources of ambiguity. This analysis examines the relationship between weekly earnings and test scores controlling simultaneously (rather than adding variables sequentially) for a host of family background and life-style variables. The data set, on hand from another study that the author is conducting, was not initially assembled to study how test scores influence earnings nor to be comparable to O'Neal's data. It does not include hourly wages for full time workers (O'Neal's dependent variable). However, the data do include weekly earnings, come from the same source as O'Neal's (the NLSY) and cover males for the years 1984 through 1986. The estimates summarized below explain weekly earnings for men ages 23 through 28 who work at least 26 weeks per year, but not necessarily full time.

Beside AFQT scores and education, this analysis controls for a number of other personal background factors that we hypothesize to affect weekly earnings through their impacts on opportunity, life styles, attitudes and productivity. Indices such as work experience or occupation, whose relationship to earnings O'Neal examines in parts of her paper not discussed here, are themselves likely to be functions of the background and context variables that the present analysis includes.

Though discussing how each of these variables affects earnings is beyond the scope of the present paper, we list them in order to provide some context for results that we report below concerning the AFQT. Specifically, the equation estimating the effect of reading and math skills (the AFQT) on weekly earnings includes as explanatory variables in addition to the AFQT all of the variables listed below. The variables are:

> ***Education***: years of schooling; high school graduate (no=0, yes=1); increment for years beyond high school; college graduate (0,1); educational resources in the home at age 14.
> ***Family Background***: lived with working adult male when age 14 (0,1); lived with working adult female when age 14 (0,1); father's years of schooling; mother's years of schooling; lived with two adults (including father) at age 14 (0,1); lived with two adults (but not father) at age 14 (0,1); currently enrolled in school (0,1).

Respondent's Age.

Marital and Fatherhood Status: number of children; married (0,1); separated (0,1); divorced (0,1); child support obligation (0,1).

The Local Unemployment Rate.

Life Style And Attitudes: age when first tried cocaine; self esteem (measured in 1980); sense of efficacy (measured in 1980); resistance to using food stamps (measured in 1979); age when first had sex; frequency of heavy drinking; illegal income (1980).

Results

The estimated equations include all of the 24 variables listed immediately above. Even when controlling for all of these influences, the AFQT score has a large and highly statistically significant effect on weekly earnings for men in their mid-twenties. Estimates are from separate equations for each group: blacks, Hispanics, and whites. Other things equal, a change of 10 points on the AFQT causes weekly earnings to rise by 6.08 percent for whites (t-ratio=7.98), 7.57 percent for Hispanics (t-ratio=6.14), and 7.70 percent for blacks (t-ratio=5.87). The average AFQT scores for blacks, Hispanics, and whites in the analysis respectively are 50, 59 and 76.

To summarize the effect of AFQT scores on earnings differences among the races, we consider men ages 23 through 27 in 1985 who worked at least 26 weeks per year. The average Black man in this group earns $275 per week: 77 percent of what whites earn. For Hispanic males the average is $326, which is 93 percent of the $356 per week that whites earn.

Using the estimated coefficients for AFQT, one can calculate how much higher the average earnings of black and Hispanic males in the analysis would be if their AFQT scores were equal to those for whites. For blacks, closing the AFQT gap closes 70 percent of the weekly earnings gap: black men's weekly earnings would be 93 percent ($331) of white men's weekly earnings instead of 77 percent if black men scored as high as whites on the AFQT. For Hispanics in the analysis, closing the AFQT gap would push weekly earnings to $372. This is 104 percent of average earnings for whites in the sample.

To conclude, the analysis summarized immediately above as well as results from the Berlin and Sum, Bishop, and O'Neal studies find strong relationships between earnings and AFQT scores in the NLSY. The basic similarity between most multiple choice reading and math exams leads this author to suspect that the results would be quite similar if some exam other than the AFQT (e.g., the exam that 11th graders in Texas take) were used. This paper's analysis above of education in Texas suggests some of the factors that help to determine such scores. We turn now to briefly consider some of the policy implications of the Texas results.

POLICY IMPLICATIONS

Teacher Salaries

Discussion earlier in the paper reported that all of the measures in the analysis that concern teachers -- teachers' test scores, class size, teacher experience, and master's degrees -- help to predict student test scores. It is not difficult to figure out that smaller classes, more experienced teachers, and more teachers with advanced degrees requires paying more salaries and higher salaries. Teachers with stronger language skills cost more as well: our results show that salaries are very important in Texas for rationing teacher quality across school districts. Hence, an implication of these results is that schools may require additional funds to attract and retain enough skilled, experienced and well-trained teachers to provide children with higher quality instruction.

It would be wrong, however, to interpret these results as justification for across-the-board pay increases to primary and secondary school teachers. Instead, higher salaries should be used carefully as (a) inducements for existing teachers to upgrade their skills, (b) incentives for the best teachers to remain in the classroom, and (c) means of attracting stronger students, of all races, to adopt teaching as a career. Higher salaries used in these ways are likely to improve student achievement rather than simply teachers' incomes.

Certification Standards

This study examines only one certification test, the TECAT. Our findings are not proof that all standardized multiple choice teacher certification examinations measure potential teaching effectiveness.

However, the rudimentary language skills that TECAT measures appear to matter and to vary enough among teachers that the effects on student skills show up strongly in our statistical estimates.

Further, patterns in these results show no indication that there is a point of diminishing returns. Consider the following two patterns, not discussed earlier. First, the average TECAT score totally dominates the passing rate in predicting student test scores -- what matters is not how many teachers passed, but how well on average they scored. The passing rate has strong predictive power only when it enters as a proxy for the average score: its measured effect disappears when the TECAT average is added to the equation being estimated. Second, the relationship between teacher scores and student scores appears to show increasing returns at the top end.

More specifically, the effect on student scores of a small change in the average teacher score is roughly constant when the average teacher score is less than one standard deviation above the inter-district mean. However, past this point, the magnitude of the coefficient roughly triples, suggesting a much larger effect of improving teacher scores on student scores when teacher scores are already high. While too ambiguous to be the basis of policy decisions, this pattern is highly suggestive. It implies that current standards may be substantially below the point where raising minimum standards would not make a positive difference for student achievement.

The idea of raising standards on certification exams is troubling for those of us who worry about racial diversity among teachers. Hispanic and especially black teachers had lower average scores on the TECAT in March of 1986 than did white teachers. Most people would agree that if a tradeoff exists between the interests of children and teachers, children must win. However, the issue is clouded because the language skills measured by the TECAT are not the only things about teachers that matter. Children clearly benefit, in ways measured here (e.g., SAT taking rates) and in other ways, when exposed to teachers from their own racial and ethnic groups. School districts need ways to upgrade teaching quality while maintaining and increasing racial balance. Here, alternative certification is an approach that holds promise.

Alternative Certification

As suggested above, the challenge is to attract academically stronger teachers of all races. Alternative certification programs are a way to give a racially diverse and academically talented pool of potential teachers access to the classroom. (See Stein, 1990; Feistritzer, 1990.) They give candidates who have college degrees in fields other than education opportunities to become teachers. Candidates typically teach, take education courses and get on-the-job training in route to becoming formally certified to teach. Some states have very poorly run programs that deserve to be abolished. Others, however, take seriously this opportunity to draw on a larger and possibly stronger pool of teaching candidates. California, New Jersey and Texas are states in the lead.

California has abolished education as an undergraduate major and is therefore atypical. The standard route into teaching in California is now a Masters Degree in education. The state's alternative certification program allows candidates who do not have master's degrees to take courses and train while they also teach and receive a salary. Teachers coming through California's alternative certification pipeline are well qualified and more racially diverse than those who come through the regular route. Surveys suggest that one reason for this pattern is that alternative certification is a more practical route in California for people (often racial minorities) who cannot afford to postpone earning until after graduate school.

Texas and New Jersey are more typical of other states. Both rely primarily on recruits whose undergraduate major is education. Each has evidence that alternative certification attracts a larger percentage of minorities than the normal pipeline, and that the minorities who come the alternative route perform better on certification exams. (New Jersey State Department of Education, 1990; Texas Education Agency, 1990) The programs are relatively small and no guarantee exists that current patterns would persist if the programs were scaled up. Nevertheless, experience so far is encouraging. It provides hope that schools can raise skill requirements and thereby the classroom effectiveness of new teachers while maintaining and expanding racial and ethnic diversity.

We must acknowledge, however, that we may be wrong about the superiority of alternative certification. The statistical estimates in this paper do not distinguish certification modes and therefore do not

bear directly on whether alternative certification per se is superior. For example, undergraduate education programs may teach important skills that teachers in alternative certification programs are likely to miss. Though this author suspects otherwise, it is conceivable that standard undergraduate education programs provide skills that are more important than any improvement in language or other skills that might come from drawing more on alternative certification candidates. Resolving these questions will require studies comparing the classroom effectiveness of teachers certified by the various routes.

CONCLUSION

The evidence in this paper is both discouraging and hopeful. It is discouraging because it identifies conditions that will be terribly difficult to confront and, once confronted, to ameliorate. The paper is also hopeful, however, because it concludes that improving student performance and narrowing racial gaps are not beyond the reach of public policy. Reducing to 18 the number of students per teacher, retaining teachers with five or more years of experience, supporting the acquisition of master's degrees, helping existing teachers to upgrade their language skills, and implementing measures to attract and retain teachers with strong language skills are all strategies that evidence here suggests can improve academic performance in primary and secondary schools. Moreover, our findings from the NLSY show that improvements in academic performance can have positive consequences for productivity and earnings. If society can confront the issues that this paper raises and master the challenges that they present the payoffs will be substantial.

APPENDIX

DESCRIPTIVE STATISTICS

VARIABLE NAME	MEAN	S.D.	MIN	MAX
STUDENTS' READING SCORES:				
FIRST GRADE	0.00	1.00	-9.09	4.79
THIRD GRADE	0.00	1.00	-5.34	4.05
FIFTH GRADE	0.00	1.00	-5.19	4.06
SEVENTH GRADE	0.00	1.00	-4.32	3.94
NINTH GRADE	0.00	1.00	-3.98	4.59
ELEVENTH GRADE	0.00	1.00	-3.77	3.81
TEACHERS' AVERAGE TECAT SCORE	0.00	1.00	-6.09	2.57
TEACHERS PERCENT 5+ YEARS EXPERIENCE	70.01	10.41	31.25	100.00
TEACHERS PERCENT MASTER'S DEGREES	33.11	10.25	0.00	84.93
STUDENTS PER TEACHER	17.16	1.92	6.60	22.70
STUDENTS PER PRIMARY SCHOOL (Hundreds)	5.61	1.85	.06	11.66
STUDENTS PER HIGH SCHOOL (Hundreds)	14.48	7.44	.22	34.97
STUDENTS PER DISTRICT (Thousands)	18.31	19.11	.07	66.46
ADULTS PERCENT HS GRAD & NO COLLEGE	29.17	5.74	5.90	45.90
ADULTS PERCENT WITH SOME COLLEGE	32.64	13.15	6.10	77.00
STUDENTS PERCENT POVERTY	14.57	9.92	0.00	90.00

DESCRIPTIVE STATISTICS (Continued)

VARIABLE NAME	MEAN	S.D.	MIN	MAX
PERCENT FROM FEMALE HEADED HOUSEHOLDS	13.56	4.99	1.30	35.20
STUDENTS PERCENT ENGLISH 2ND LANGUAGE	3.76	5.50	0.00	36.70
STUDENTS PERCENT MIGRANT	1.45	3.83	0.00	27.99
STUDENTS PERCENT HISPANIC	30.67	30.32	0.00	100.00
STUDENTS PERCENT BLACK	10.18	11.79	0.00	81.40
STUDENTS PERCENT IN PUBLIC SCHOOLS	95.39	3.79	56.59	100.00

WEIGHTED LEAST SQUARES REGRESSION ESTIMATES
OF AVERAGE READING SCORES ON THE TEAMS EXAM FOR SCHOOL DISTRICTS IN TEXAS
(Dependent variable standardized to have mean=0 and Standard Deviation=1.)
1985-86 SCHOOL YEAR

(t-ratios in parentheses)

DEPENDENT VARIABLE: DISTRICT'S AVERAGE SCORE ON TEAMS READING EXAM	FIRST GRADE	THIRD GRADE	FIFTH GRADE	SEVENTH GRADE	NINTH GRADE	ELEVENTH GRADE
TEACHERS' AVERAGE TECAT SCORE	-.024 (-0.38)	.248 (6.03)	.245 (6.10)	.206 (5.82)	.204 (5.60)	.233 (6.80)
TEACHERS' AVERAGE TECAT SCORE >1	1.94 (3.41)	.646 (1.76)	.889 (2.48)	.691 (2.18)	.553 (1.67)	.678 (2.04)
TEACHERS PERCENT 5+ YEARS EXPERIENCE	.013 (2.37)	.016 (4.76)	.014 (4.22)	.010 (3.43)	.013 (4.37)	.013 (4.33)
TEACHERS PERCENT MASTER'S DEGREES	.013 (3.50)	.006 (2.57)	.004 (1.82)	.005 (2.46)	-.002 (-1.05)	-.003 (-1.30)
STUDENTS PER TEACHER	-.005 (-0.17)	.049 (2.49)	.036 (1.91)	.012 (0.71)	.018 (1.06)	-.023 (-1.37)
STUDENTS PER TEACHER >18	-.152 (-2.20)	-.196 (-4.39)	-.180 (-4.14)	-.119 (-3.01)	-.033 (-0.83)	.044 (1.19)
STUDENTS PER PRIMARY SCHOOL	-.077 (-3.15)	-.050 (-3.16)	-.009 (-0.56)	-.007 (-0.51)	.023 (1.63)	-.002 (-0.13)
STUDENTS PER HIGH SCHOOL	- -	- -	- -	- -	-.003 (-0.85)	-.007 (-1.97)
STUDENTS PER DISTRICT	.002 (0.62)	-.006 (-2.80)	-.002 (-1.23)	-.002 (-1.11)	-.005 (-2.96)	.004 (2.26)
ADULTS PERCENT HS GRAD & NO COLLEGE	-.000 (-0.04)	.018 (3.30)	.010 (2.01)	.010 (2.20)	.005 (1.15)	-.001 (-0.19)
ADULTS PERCENT WITH SOME COLLEGE	.018 (3.83)	.021 (7.02)	.018 (6.13)	.019 (7.36)	.026 (9.46)	.032 (12.38)
STUDENTS PERCENT POVERTY	-.008 (-0.78)	.003 (0.47)	-.005 (-0.82)	-.001 (-0.24)	-.003 (-0.55)	-.008 (-1.51)
PERCENT FROM FEMALE HEADED HOUSEHOLDS	-.047 (-3.87)	-.019 (-2.41)	-.013 (-1.69)	-.017 (-2.46)	-.013 (-1.89)	-.001 (-0.20)

(CONTINUED NEXT PAGE)

(CONTINUED FROM PREVIOUS PAGE)

DEPENDENT VARIABLE: DISTRICT'S AVERAGE SCORE ON TEAMS READING EXAM	FIRST GRADE	THIRD GRADE	FIFTH GRADE	SEVENTH GRADE	NINTH GRADE	ELEVENTH GRADE
STUDENTS PERCENT ENGLISH 2ND LANG	.004 (0.21)	-.009 (-0.77)	.012 (1.06)	-.015 (-1.45)	-.025 (-2.30)	-.013 (-1.32)
STUDENTS PERCENT HISPANIC	-.006 (-2.09)	-.007 (-4.02)	-.007 (-3.89)	-.009 (-5.38)	-.010 (-5.77)	-.009 (-5.88)
STUDENTS PERCENT BLACK	-.000 (-0.05)	-.004 (-1.28)	-.003 (-0.93)	-.005 (-1.83)	-.015 (-5.70)	-.017 (-6.67)
STUDENTS PERCENT MIGRANT	.024 (1.86)	-.006 (-0.67)	-.028 (-3.44)	-.006 (-0.82)	-.018 (-2.34)	-.007 (-1.04)
STUDENTS PERCENT IN PUBLIC SCHOOLS	.022 (2.04)	.017 (2.51)	.015 (2.21)	.016 (2.80)	.006 (0.97)	.016 (2.72)
BORDER POVERTY	.110 (0.59)	-.321 (-2.65)	-.393 (-3.35)	-.199 (-1.93)	.203 (1.91)	.167 (1.67)
CITY (METRO)	.192 (1.40)	.155 (1.74)	.129 (1.49)	-.058 (-0.76)	.020 (0.25)	-.022 (-0.29)
SUBURB	.171 (1.40)	.097 (1.22)	.293 (3.82)	.033 (0.49)	-.082 (-1.14)	-.055 (-0.81)
RURAL	-.169 (-1.04)	.112 (1.07)	.234 (2.30)	.127 (1.41)	.295 (3.15)	.017 (0.19)
TOWN	.145 (1.12)	.132 (1.58)	.003 (0.04)	-.080 (-1.12)	-.129 (-1.72)	-.027 (-0.38)
NON-METRO GROWING CITY	-.003 (-0.02)	.001 (0.01)	.083 (0.86)	.002 (0.03)	.043 (0.50)	-.008 (-0.10)
CONSTANT	-2.25 (-1.78)	-3.49 (-4.28)	-3.19 (-4.02)	-2.45 (-3.50)	-1.58 (-2.18)	-2.01 (-2.94)
GOODNESS OF FIT[1]	14	44	46	52	52	55
GOODNESS OF FIT[2]	0.55	0.84	0.85	0.88	0.88	0.89
NUMBER OF DISTRICTS	889	888	885	884	856	856

[1] The regression equations reported here are weighted by the square root of the number of students in the district in order to take care of heteroskedasticity. The standard R^2 statistic is biased upward in weighted regressions. Hence, we use different measures of fit. This measure is one hundred times the quantity one minus the ratio of the standard error of the residual to the standard error of the dependent variable. Hence it measures the percent of variation explained.
[2] This measure is the simple correlation (weighted by district size) of the predicted with the actual value of the dependent variable.

REFERENCES

Bishop, John. 1989. "The Productivity Consequences of What is Learned in High School." Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies. Working Paper #88-18.

Berlin, Gordon and Andrew Sum. 1988. *Toward A More Perfect Union: Basic Skills, Poor Families, and Our Economic Future*. New York: Ford Foundation Project on Social Welfare and the American Future.

Chubb, John E. and Terry M. Moe. 1990. *Politics, Markets, and America's Schools*. Washington DC: The Brookings Institution.

Farkas, George, Robert P. Grobe, Daniel Sheehan and Yuan Shuan. 1990. "Cultural Resources and School Success: Gender, Ethnicity, and Poverty Groups Within an Urban School District." *American Sociological Review*, Vol. 55 (February), pp. 127-142.

Feistritzer, C. Emily. 1990. *Alternative Teacher Certification: A State-By-*
State Analysis 1990. Washington DC: National Center for Education Information.

Ferguson, Ronald F. with Mary Speed Jackson. 1990. "Nurturing Environments, African American Males, and Drugs." Cambridge MA: Harvard University, John F. Kennedy School of Government, Center for Health and Human Resources Policy, Working Paper.

Ferguson, Ronald F. 1990. "The Case for Community Based Programs that Inform and Motivate Black Male Youth." Research Paper, The Urban Institute, Washington DC.

Hanushek, Eric A. 1986. "The Economics of Schooling: Production and Efficiency in Public Schools," *Journal of Economic Literature*, Vol. 24 (September 1986), pp. 1141-77.

Irvine, Jacqueline J. 1990. *Black Students and School Failure*. New York: Greenwood Press.

Jencks, Christopher, Marshall Smith, Henry Acland, Mary Jo Bane, David Cohen, Herbert Gintis, Barbara Heyns and Stephan Michelson. 1972. *Inequality: A Reassessment of the Effect of Family and Schooling in America*. New York: Harper Colophon Books.

Kunjufu, Jawanza. 1983. *Countering the Conspiracy to Destroy Black Boys*. Chicago, Illinois: Afro-Am Publishing Co.

Kunjufu, Jawanza. 1988. *To be Popular or Smart: The Black Peer Group*. Chicago, Illinois: African American Images.

New Jersey State Department of Education. 1990. *Annual Report on Certification Testing*.

O'Neal, June. 1990. "The Role of Human Capital in Earnings Differences Between Black and White Men." *Journal of Economic Perspectives*, Vol. 4, No. 4 (Fall 1990), pp. 25-45.

Stein, Sheryl E. 1990. *Teacher Education Policy in the States: a 50-State Survey of Legislative and Administrative Actions*. Washington DC: American Association of Colleges for Teacher Education, State Issues Clearing House.

Shepard, Lorrie A. and Amelia E. Kreitzer 1987. "The Texas Teacher Test." *Educational Researcher*. August-September, pp. 22-31.

Texas Education Agency, Division of Teacher Education. 1990. *Alternative Teacher Certification in Texas*.

U.S Department of Education, Office of Educational Research and Improvement 1986. *The Condition of Education: A Statistical Report*.

THE EDUCATIONAL EXPERIENCES OF BLACK MALES: THE EARLY YEARS

Antoine M. Garibaldi
Xavier University of Louisiana

INTRODUCTION

While our nation's cities and communities are experiencing numerous problems such as high unemployment, low educational achievement, increasing levels of crime and rampant drug cultures, one segment of the population in this country is being disproportionately affected by these negative circumstances. That group of individuals is young black men. Their current condition has been poignantly portrayed in the media and their future is being characterized by pejorative modifiers such as "disappearing," "endangered," and "vanishing." But no matter how appalling and gloomy the situation is and may seem, there are viable solutions which can bring about the gradual resolution of this overwhelming problem. The remedies though must span the entire developmental, educational and social continuum of the lives of these young men and will require the assistance of parents, teachers, college students and other significant individuals and groups in the communities where we live.

THE NATIONAL PERSPECTIVE

Most persons will agree that there is a direct correlation between the educational achievement and attainment of young black men and their future vocational success and earning potential. And it is for that reason that I contend that *education is the primary solution to improving the self concept, self esteem, academic ability and future economic opportunities of these young men.* There is no one magic solution to the many adverse conditions which these young men are experiencing because the symptoms of the problem are too widespread. The following national data, for example, very clearly demonstrate that we have indeed reached a crisis of epidemic proportions.