ETS

Policy Information Report

Parsing the Achievement Gap

Baselines for Tracking Progress



Research & Development

Policy Information Center

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PREFACE

As a nation, we are well into the era of educational accountability. States, schools, teachers, instructional programs, and curricular materials all are being evaluated in terms of their effectiveness—which translates into their impact on measures of academic achievement. While there is vigorous debate about the appropriateness of specific measures, and their intended and unintended consequences, the passage of the No Child Left Behind Act demonstrates a consensus commitment to the reduction, if not the elimination, of the achievement gap.

A hallmark of NCLB is a concomitant commitment to base educational policy on established research findings. In *Parsing the Achievement Gap*, Paul Barton synthesizes a large body of research that identifies those factors associated with educational attainment and then looks at their relationship to differential performance by groups in our society.

The picture is both motivating and daunting. It is daunting because it is clear that educational achievement is associated with home, school, and societal factors, almost all having their roots in socioeconomic forces affecting this country. Persistent educational inequality comes very early, as is so evident in the recent Institute for Educational Leadership report *Leaving Too Many Children Behind: A Demographer's View on the Tragic Neglect of America's Youngest Children* by Harold Hodgkinson. But the Barton report also is motivational because it shows that we know how to reduce many of these problems—if we have the political will.

To narrow and eventually eliminate achievement gaps, we first must understand the gaps. We know that skin color has no bearing on the ability to achieve. And we know that income itself does not determine whether any individual child will achieve in the educational system; all around us we see children from families with low income who excel, and most of us know of someone born into privilege who emerges into mediocrity.

The political will to narrow these achievement gaps seems to be more abundant as the new century opens. The President and the Congress have united to focus national effort on reducing such gaps. So the question becomes: *the political will to do what, specifically?* Establishing standards for achievement, testing students to see whether those standards are being attained—by student subgroups as well as by student bodies as a whole—has been a largely agreed-upon starting point. But where do we look beyond this?

Barton, in this report, looks at what research has told us about the life and educational experiences associated with continual development and school achievement. He searches for areas where reasonable agreement exists in the research community—recognizing that in academe the trick is to add a bit to knowledge rather than to sum it all up.

And then he goes a step further. He asks a second question: *For each of the correlates of educational achievement found so far, what do we know about the* ***differences*** *in experience, on the average, among subgroups of the population, by race/ethnicity and some measure of income?* If low birthweight adversely affects cognitive development, is there a greater incidence of low birthweight in minority populations? If changing schools frequently is associated with achievement, in which population subgroups do children most frequently do this? And if length of teachers' experience is associated with achievement, what are the differentials in experience for students in different population subgroups?

With such large questions being raised, it is not surprising to find qualifications surrounding the answers. But while these qualified answers are clearly stated, the author suggests a greater purpose: stimulating a more comprehensive effort, with a resulting set of statistical indicators, for "parsing" the achievement gap. It is these indicators, Barton argues, that will enable the tracking of progress in the life and educational experiences that underlie the unacceptable gaps in student achievement. Identifying them will focus the political will on what really needs to be changed to eliminate persistent educational inequality.

Drew Gitomer
Sr. Vice President
Research & Development
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Introduction

The gaps in school achievement among racial and ethnic groups and between students from poor and non-poor families are well documented. They are large and have been persistent; this is well known and widely accepted.

From a public policy perspective, these gaps were elevated in priority during the Presidential campaign in the fall of 2000, with the President and presidential candidates vowing to seek federal legislation to close them. After the election, action by President Bush and the Congress resulted in the No Child Left Behind Act, with strong accountability requirements and the tracking of scores of key population subgroups, not just averages for all students in the schools.

This publication is about conditions that help create and perpetuate achievement gaps. It is about the many antecedents of differences in school achievement and college-going rates. The effort begins with identifying school and home conditions that the research community, to a reasonable extent, agrees are closely associated with school achievement. Sometimes this does not mean complete agreement. Research is a continuing process of thesis and antithesis, and what seems to be established may be challenged. In the physical world, this is seen in a continuing debate over whether birds are descended from dinosaurs and what is causing global warming.

Achievement differences in school among subgroups of the population have deep roots. They arrive early and stay late—beginning before the cradle and continuing through to graduation, if that happy outcome is obtained. This is a search for the roots—those aspects of the life and school experience found to be correlated with school achievement. It is important to bear in mind, however, that this report is not about specific school interventions or programs to improve instruction, or evaluations of their effectiveness.

We refer throughout the report to the correlates of achievement. For each of the 14 correlates examined, data were sought that would permit disaggregation by race/ethnicity and some measure of family income or socioeconomic status. In all 14 cases, such data were available for race and ethnicity; in 12 cases, data were also available for some measure of income.

The report begins with a description of the process used, the sources of research findings, and a brief overview of the 14 correlates of achievement, along with whether there are racial, ethnic, or income differences. A detailed review of the research follows.

This information should be useful in helping to unravel the threads in the fabric of different subgroup educational outcomes. A larger purpose is to encourage a periodic assessment of progress in closing the gaps, which is critical to achieving equality.

Correlates of Achievement, and Gaps

Identifying correlates of achievement established by substantial research involves looking at individual research studies, perhaps as few as the high hundreds to as many as the low thousands, evaluating those available, and synthesizing them. What would be a formidable undertaking—possibly requiring years—is speeded by finding and relying on the compilations, evaluations, and syntheses that have already been done by competent researchers. This is the approach used for this report.

For school factors, the most exhaustive and reliable effort to date is a recent one, carried out by the National Center for Education Statistics (NCES), through a contract with Mathematica Policy Research, titled *Monitoring School Quality: An Indicators Report*.[1] For non-school factors correlated with achievement, we relied extensively on data from Child Trends, a research organization that conducts and synthesizes research across the broad area of child well-being. Other research syntheses addressing specific factors were also useful.

By organizing and condensing the available research on the correlates of achievement, we hope to shed light on the sources of the gaps that show up in the schools among students of differing race and ethnicity, and of different levels of family income or socioeconomic status. Some caveats are in order, however, because the available information does not tell us all that we want to know.

- The final product is the result of what researchers, pursuing their work in different disciplines, have thought important to pursue. Class size has been deemed important; there are hundreds of studies on this topic. But there is little research about the rigor of the curriculum, where the measurement problem is huge and where course titles tell little about what happens in the classroom. In other words, there is the happenstance of what is chosen for research, and what is relatively easy and what is difficult and expensive.

- There is also the happenstance of whether there have been enough studies of a particular factor to enable a reasonable degree of consensus that it is related to educational achievement. In research, replication is always needed.

- There is also a real problem of quality in educational research, relative to research in many other fields. Large, carefully done studies are expensive and take a long time to do; yet the investment in education research has been relatively meager. It is therefore necessary to operate from a knowledge base that does not inspire as much confidence as desired.

- For purposes of this project, there is also the happenstance of whether all the research in a particular area has been synthesized by highly qualified people. What is provided in this report is necessarily dependent on such work. And while there is confidence in the sources of the syntheses included herein, it is possible that other research could be considered, or other correlates could be included as well.

The Correlates

Based on a careful review of the syntheses of research described earlier in this section, the author identified 14 correlates of elementary and secondary school achievement. While each one stands alone in being found related to educational achievement, none of them are in an important sense, unique.

For example, we know that a child's educational development can be affected by a variety of environmental factors. One such factor is exposure to lead, typically from the era of lead paint, causing lead to be in a child's bloodstream. This is one of the 14 factors in this report. But lead is only one of many environmental factors lately in the news, such as proximity to hazardous waste sites. Thus a single factor such as lead

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[1] Daniel P. Mayer, John E. Mullins, and Mary T. Moore, *Monitoring School Quality: An Indicators Report*, National Center for Education Statistics, John Ralph, Project Officer, NCES 2001-030, December 2000.

poisoning is likely a marker for a set of environmental hazards to which children may be exposed, and if research had been more extensive, their correlation would likely have been identified too.

The 14 correlates are therefore viewed as the best researched representatives of a group of related or similar factors. To avoid any suggestion that each is unique in a demand for attention in the world of policy and practice, the correlates are presented in the context of clusters that include other related variables. The 14 correlates of achievement are shown in bold.

School

Teaching and Learning. The instructional infrastructure, including the quality of leadership, pedagogy, professional development, **rigor of the curriculum, teacher preparation, teacher experience and attendance, class size, and availability of appropriate technology-assisted instruction.**

The Learning Environment. The general conditions and ambiance of the school, such as expectations, commitment of teachers and staff, and **school safety**.

Before and Beyond School

The Development Environment. The early experiences and conditions of life and living, including **weight at birth**, exposure to environmental hazards such as **lead**, environmental stimulation necessary for cognitive development, and **hunger and nutrition**.

The Home Learning Connection. Generally, the support for learning in the home, including parental expectations for academic achievement, **reading to young children**, access to quiet study space, attention to physical and health needs, **amount of TV watching**, and **parent availability**.

The Community. The extent to which the community, and its essential institutions, support or hinder the efforts of families and schools.[2] **Student mobility** (that is, how frequently children change schools) is related to socioeconomic status and can result in a myriad of problems in school.

The Home School Connection. The two-way street of parents trying to be supportive of school efforts and schools reaching out to inform, encourage, and show receptivity to **parent participation**. It includes getting children to attend school regularly and encouraging them to do their homework.

As noted earlier, these categories are an effort to put the 14 correlates into a broader perspective. It says nothing about the state of research knowledge in other related areas. Further, it is important to note that one is likely to find intercorrelations both within and among the clusters, to varying degrees. For example, the development environment is likely to be closely related to community characteristics and support for education.

The Indicators of Gaps

For each of the 14 correlates of achievement, we want to know about gaps. If there are gaps in school achievement, are there also gaps in the characteristics of schooling, in the conditions of growing up, and in the conditions of living that have been found to be associated with school achievement? If low birthweight is linked to slower cognitive development and lower achievement in school, do Black or Hispanic children, or poorer children, have a higher incidence of low birthweight? If the subject matter knowledge of teachers is linked to student achievement, are there gaps with regard to the certification of teachers in the subject matter they teach?

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[2] Included here is the concept of social capital developed by James Coleman and Robert Putnam.

It was possible, in most instances, to find the necessary data. If they were available, the identification of appropriate data was a relatively straightforward process, in contrast to identifying the correlates. In some cases, an extended search was required. Sometimes what was available was not an ideal measure. And it was not always possible to find current data. However, these gaps are unlikely to change substantially over relatively short periods of time; their roots are deep in the social and economic fabric. In some cases, such as the degree of poverty, data were not found.

Putting it Together

In the pages that follow, we marry the correlates of school achievement and the statistics on gaps by race, ethnicity, and income or poverty status. A summary of the results is provided below.

The results are unambiguous. In all 14 correlates of achievement, there were gaps between the minority and majority student populations. In the 12 cases where data were available, 11 of those showed clear gaps between students from low-income families and higher income families. The gaps in school achievement mirror inequalities in those aspects of schooling, early life, and home circumstances that research has linked to school achievement.

The following section provides an in-depth look at these findings. For each correlate, there are two pages. The research establishing a correlation with achievement is summarized on the left page, and the gaps are charted on the right page.

Table 1: Correlates of Achievement, and Gaps

Correlates	Are There Gaps Between Minority and Majority Student Populations?	Are There Gaps Between Students from Low Income Families and Higher Income Families?
School:		
Rigor of Curriculum	Yes	Not Available
Teacher Preparation	Yes	Yes
Teacher Experience and Attendance	Yes	Yes
Class Size	Yes	No*
Technology-Assisted Instruction	Yes	Yes
School Safety	Yes	Yes
Before and Beyond School:		
Parent Participation	Yes	Yes
Student Mobility	Yes	Yes
Birthweight	Yes	Not Available
Lead Poisoning	Yes	Yes
Hunger and Nutrition	Yes	Yes
Reading to Young Children	Yes	Yes
Television Watching	Yes	Yes
Parent Availability	Yes	Yes

*See discussion on page 14.

Rigor of Curriculum

Not surprisingly, research evidence shows that students' academic achievement is closely related to the rigor of the curriculum. Chubb and Moe, using longitudinal data from the *High School and Beyond* study, found that "academic program participation has a strong, independent effect on achievement gains... All things being equal, academic programs promote academic achievement." Another analysis of the same data by Bryk, Lee and Holland came to similar conclusions.[3]

In the research literature, terms such as challenging curriculum, academic environment, and academic press are used to denote rigor. While "challenging curriculum" generally refers to course taking, "academic press" refers to schools having strong goals emphasizing academic achievement, an area where research is relatively new.

Typically, the only measure of rigor available is the title of courses. In kindergarten through eighth grade, students are often taking what nominally seems to be the same curriculum. Little data are available on the depth of the studies in these courses, though, so it is hard, statistically, to measure differences in rigor among population subgroups. There is also the matter of expectations held for students; even when students are taught the same content, expectations for achievement may differ greatly.

At the high school level, there is the same problem in comparing participation in courses. For example, different geometry courses may offer different content. High school students also have some choices in what they take, so motivation is involved. And some students are simply foreclosed from taking rigorous courses because their prior preparation was inadequate, or courses are not offered.

The only information we have is based on course titles—such as "geometry"—from periodic transcript studies. Since the recommendations of the National Commission on Excellence in Education Report of 1983, increasing course requirements has been a focus.[4] As can be seen on the facing page, there appears to have been a revolution in course taking in high school. The trend toward students taking a more comprehensive curriculum is way up. Furthermore, it is up for all racial and ethnic groups, although the percentages for White and Asian American students still exceed those of Black, Hispanic, and American Indian/Alaskan Native high school graduates. There is only a six-percentage point difference between Blacks and Whites, but there is a 14 percentage point difference between Hispanics and Whites.

While this trend from 1982 to 1998 is good news, it is not confirmed in actual achievement. While math scores have risen somewhat, scores in other subjects are generally flat or up only slightly in this period. Certainly, these steep upward trends in courses taken are not matched by results. Many courses likely don't live up to their names, and rapid expansion of enrollment in advanced offerings may have required the use of less prepared teachers.

Also on the facing page is a chart comparing Advanced Placement Examinations taken and population shares in high school. These Advanced Placement exams are accepted as being rigorous and are used for the award of college credit. While there have been large increases in test and course taking by all groups, large differentials remain for Black and Hispanic students.

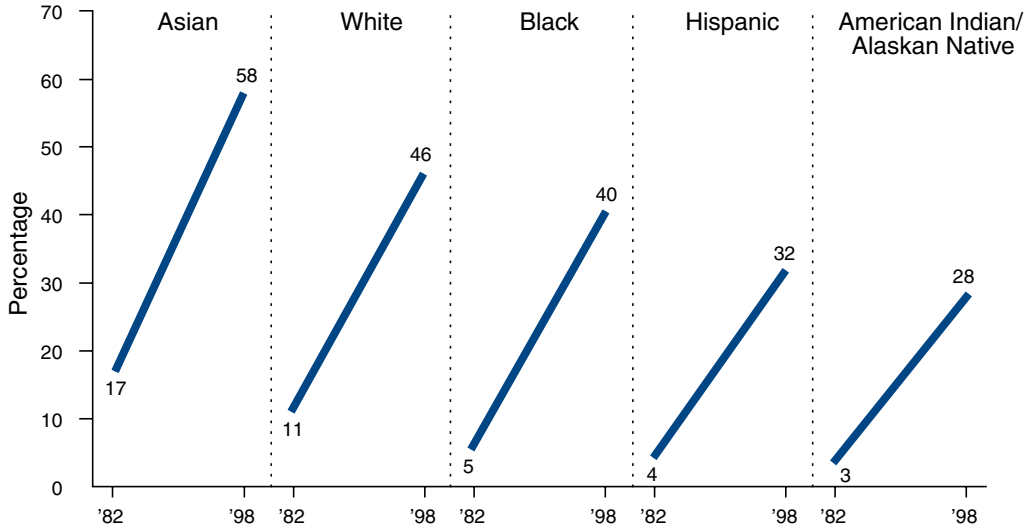
3 Mayer et al., op. cit. cite the following works:
- J.E. Chubb and T.M. Moe, *Politics, Markets, and America's Schools*, Washington, D.C., The Brookings Institution, 1990.
- A.S. Bryk, V.E. Lee, and P.B. Holland, *Catholic Schools and the Common Good*, Cambridge, MA and London: Harvard University Press, 1993.

4 *A Nation at Risk: The Imperative for Educational Reform*, The National Commission on Excellence in Education, 1983.

Rigor of Curriculum

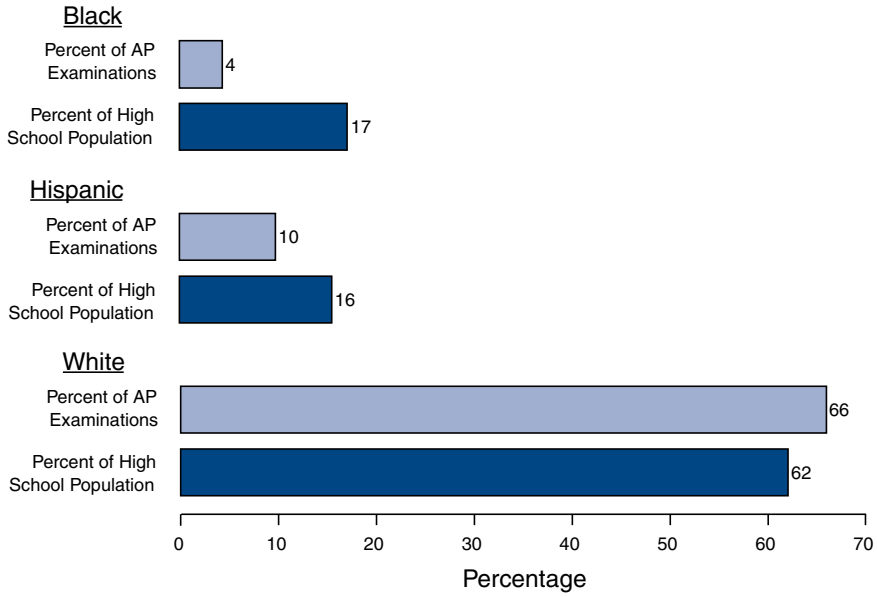
Percentage of High School Graduates with Substantial Credits in Academic Courses, 1982 and 1998

Percentage with four years of English, three years each of social studies and mathematics, and two years of a foreign language



Source: National Center for Education Statistics, *Digest of Education Statistics 2001*, Table 143. Original data from National Center for Education Statistics, *High School Transcript Study*.

Distribution of Advanced Placement Examinations Compared with the Distribution of the High School Population, by Race/Ethnicity, 1999/2002*



*AP examinations are for 2002; high school population data are for 1999.
Sources: AP data are from the College Board; high school population data are from National Center for Education Statistics, *Digest of Education Statistics 2001,* Table 42.

Teacher Preparation

Researchers have found that the academic skills and knowledge of teachers make a difference in student achievement. After looking at all the studies, the NCES report *Monitoring School Quality* said:

> *These studies show a consistent trend and suggest that there is a need to monitor closely the supply and distribution of teacher academic skills. Better nationally representative data are needed to gauge several aspects: how the academic caliber of teachers compares with that of other professionals; how the existing teaching talent is distributed throughout the country; and how teachers' academic skills have a cumulative impact on student academic performance.*[5]

A recent study by the Education Trust found that "one out of four secondary classes in core academic subjects (24 percent) is assigned to a teacher lacking even a college minor in the subject being taught. In the nation's high-poverty schools, that rate skyrockets to over one third of classes (34 percent) . . . Similarly, 29 percent of classes in high-minority schools are assigned to an out-of-field teacher."[6]

States Arthur Wise, president of the National Council for the Accreditation of Teacher Education: "The dirty little secret is there are large numbers of unqualified individuals teaching, and they are disproportionately assigned to teach children of color and children from impoverished backgrounds. It's a secret of major consequences."[7]

The data from the Education Trust study are shown on the facing page. The rate of out-of-field teaching in high-poverty schools is double that in low-poverty schools, and the rate for high-minority schools is substantially above that for low-minority schools. According to the Education Trust study, no improvements were made between 1993-1994 and 1999-2000.

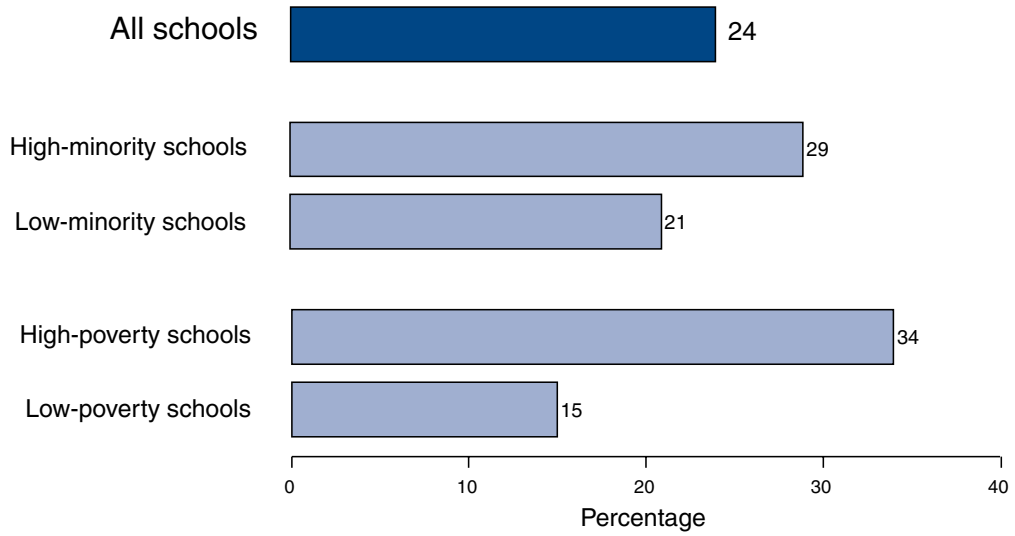
Also shown is the percentage of eighth graders whose mathematics teachers lack certification in either middle/junior high school or secondary school mathematics. The percentages are much higher for minority students and poor students. Between 1996 and 2000, these percentages increased for White, Black, and Hispanic students, and also increased for poor students.

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[5] Mayer et al., op. cit., pp. 5-6.
[6] Craig D. Jerald (data analysis by Richard M. Ingersoll), *All Talk, No Action: Putting an End to Out-of-Field Teaching*, Education Trust, August 2002.
[7] *Chicago Sun-Times*, September 7, 2001.

Teacher Preparation

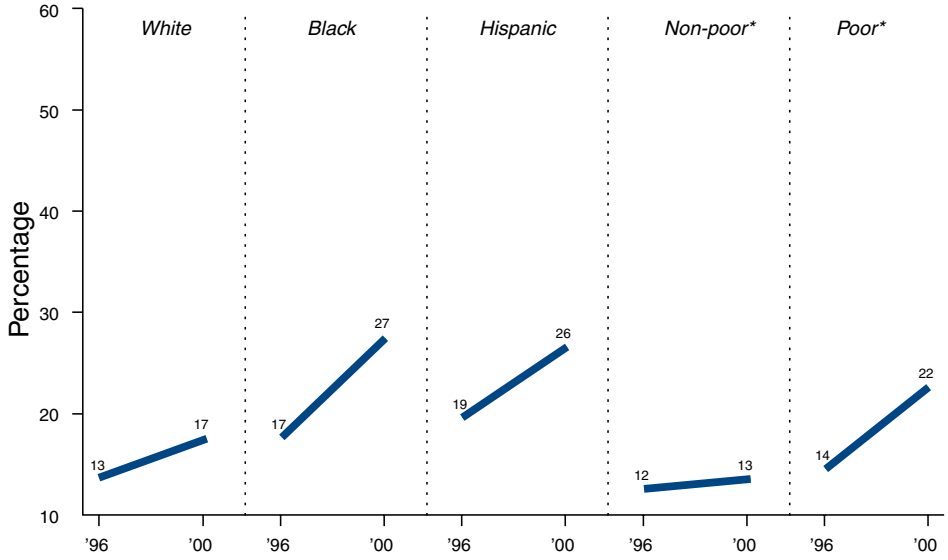
Percentage of Secondary-level Core Academic Courses Taught by a Teacher Without at Least a Minor in the Subject, 1999-2000



Note: High-minority schools contain 50 percent or more minority students; low-minority schools contain 15 percent or fewer minority students. High-poverty schools contain 50 percent or more poor students; low-poverty schools contain 15 percent or fewer poor students.

Source: Craig D. Jerald (data analysis by Richard M. Ingersoll), *All Talk, No Action: Putting an End to Out-of-Field Teaching*, Education Trust, August 2002

Percentage of Eighth Graders Whose Math Teachers Lack Certification in Middle/Junior High School or in Secondary School Mathematics, by Race/Ethnicity and Poverty, 1996-2000



*as measured by whether eligible or ineligible for free/reduced school lunch.
Source: http://nces.ed.gov/nationsreportcard/naepdata

Teacher Experience and Attendance

Mayer and colleagues sum up the evidence on the effects of experienced teachers this way:

> *Murnane and Phillips reported that in a large city in the Midwest, after controlling for other student characteristics . . . children taught by a teacher with five years of experience make three to four months more progress in reading skills during a school year than do children taught by a first-year teacher. A more recent study conducted by Rivkin, Hanushek and Kain found that fourth, fifth and sixth grade students in more experienced teachers' classrooms in Texas over the course of one year gained about 0.10 of a standard deviation in reading and math compared with their peers in classrooms where teachers had less than two years experience. The benefits of experience, however, appear to level off after five years (based on research by Linda Darling-Hammond) and there are no noticeable differences, for example, in the effectiveness of a teacher with 5 years of experience versus a teacher with 10.*[8]

Experienced teachers are not spread evenly among the schools. As shown on the facing page, teachers with three or fewer years of experience are twice as likely to be in schools with a high level of minority enrollment than in schools with a low level. Higher turnover is likely an important factor in this. Also, fourth-grade students who are Black or Hispanic are much less likely to be in schools where the same teachers who started the year were there when the year ended. Black and Hispanic twelfth-grade students are more than twice as likely as White students to be in schools where 6 to 10 percent of their teachers are absent on an average day.

As seen on the facing page, the same pattern holds for students from low-income families. These students are more likely to have less experienced teachers, greater turnover of teachers, and higher rates of teacher absence.

Many states are using incentives to aid in the recruitment of teachers, or to retain high quality teachers. In few cases, however, is this effort directed at getting or keeping teachers for high-need schools. For example, 35 states have retention bonuses, but in only three states are these bonuses targeted at attracting or keeping teachers in high-need schools.[9]

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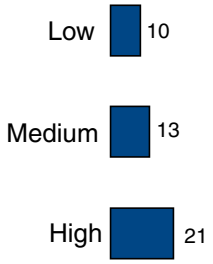
8 Mayer et al., op. cit., pp. 13-14. Mayer et al. cite the following studies:
- R.J. Murnane and B.R. Phillips, "Learning by Doing, Vintage and Selection: Three Pieces of the Puzzle Relating Teaching Experience and Teaching Performance," *Economics of Education Review*, 1 (4):453-465, 1981.
- S.G. Rivkin, E.A. Hanushek, and J.F. Kain, *Teachers, Schools and Academic Achievement*, paper presented at the Association of Public Policy Analysis and Management, New York City, NY, 1988.
- L. Darling Hammond, "Teacher Quality and Student Achievement: A Review of State Policy Evidence," *Educational Policy Analysis Archives*, 8 (1), 2000. Available at http://olam.ed.asu.edu/epaa/v8n1/.

9 "Quality Counts 2003," *Education Week*, January 9, 2003, p. 56.

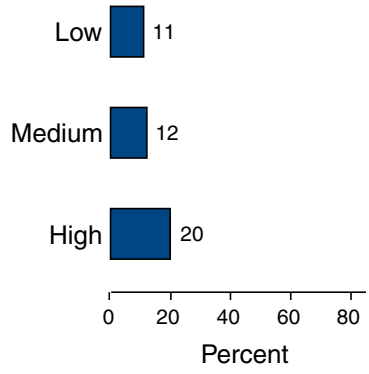
Teacher Experience and Attendance

Percentage of Teachers with Three or Fewer Years of Experience, 1998

Level of Minority Enrollment



Level of Low Income Enrollment

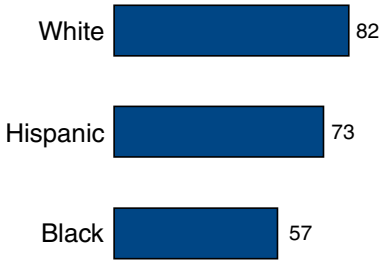


Note: Low, medium, and high are defined as the schools in the bottom quartile, the middle two quartiles, and the top quartile, respectively. Low income is defined as the percent of students eligible for free or reduced-price lunch.

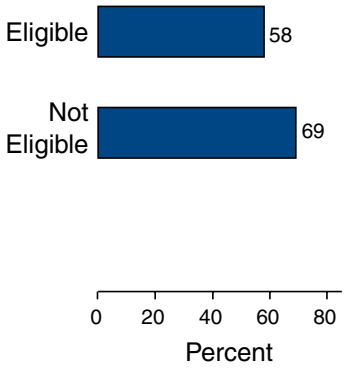
Source: From Mayer, et al., 2000, which cites the Fast Response Survey System's *Teacher Survey on Professional Development and Training*, NCES, 1998.

Percentage of Fourth-Grade Students in Schools Where Same Teachers Started and Ended the Year, 2000

Race/Ethnicity



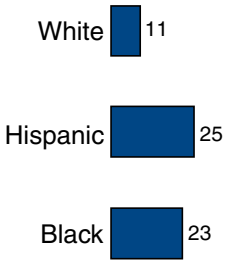
School Lunch Program



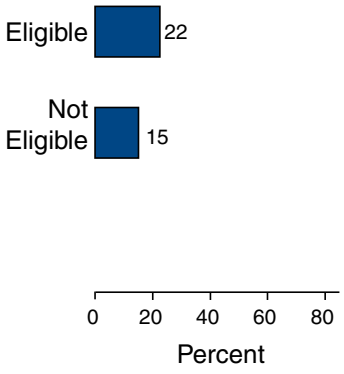
Source: http://nces.ed.gov/nationsreportcard/naepdata/getdata.asp, 1/12/03. Data are for public schools.

Percentage of Twelfth-Grade Students Where 6 to 10 Percent of Teachers Are Absent on Average Day, 2000

Race/Ethnicity



School Lunch Program



Source: http://nces.ed.gov/nationsreportcard/naepdata/getdata.asp, 1/12/03. Data are for public schools.

Class Size

In 1978, Marshall Smith and Gene Glass synthesized the results of 77 studies of class size, finding benefits of higher achievement in smaller classes, mainly in classes of fewer than 20 students.[10] Other benefits were identified, as well. Reanalysis by others came to different conclusions.

Project STAR (1985) is the only large scale class size study to use control groups. These findings are also still being examined. Dr. Jeremy D. Finn, an external evaluator of STAR concluded that "Project STAR and related studies provide compelling evidence that small classes in the primary grades are educationally superior to regular-size classes. The findings were confirmed for every school subject tested."[11]

The data from Project STAR and other studies have been extensively re-analyzed, most notably by Eric A. Hanushek and Alan B. Krueger; the two have engaged in a debate for several years over whether smaller classes resulted in higher achievement.

In *The Class Size Debate*, the editors concluded:

> *"A careful reading of the papers that follow cannot fail to lead readers to the conclusion that there is substantial agreement between the antagonists. It is perhaps best expressed by Dr. Hanushek when he states, "Surely class size reductions are beneficial in specific circumstances—for specific groups of students, subject matter and teachers."*
>
> *Similarly, in his paper, Dr. Krueger states: The effect sizes found in the STAR experiment and much of the literature are greater for minority and disadvantaged students than for other students.*[12]

While the debate continues, the different viewpoints in the policy world have more to do with cost and alternative measures to reducing class size than with whether the studies show any benefits to reducing class size. In the meantime, many class size reduction programs are going on throughout the country. As used in this report, the issue is one of equality among racial and ethnic groups, and the poor and non-poor with respect to class size. There is likely more of a consensus on the value of such equality.

The distribution of class size is unequal, as shown on the facing page. A higher percentage of classes with a high proportion of minority students experience larger classes as compared with those with a low proportion. Comparable differences were not found for school-lunch-eligible students compared to non-eligible students. One possible explanation may be that rural schools have smaller class size, and a high proportion of them, particularly in the South, may be eligible for the school lunch program. Also, compensatory money available to the poorest school districts under Title I may be an additional explanation. Where classes have a higher proportion of students with limited English proficiency, class size is also higher.

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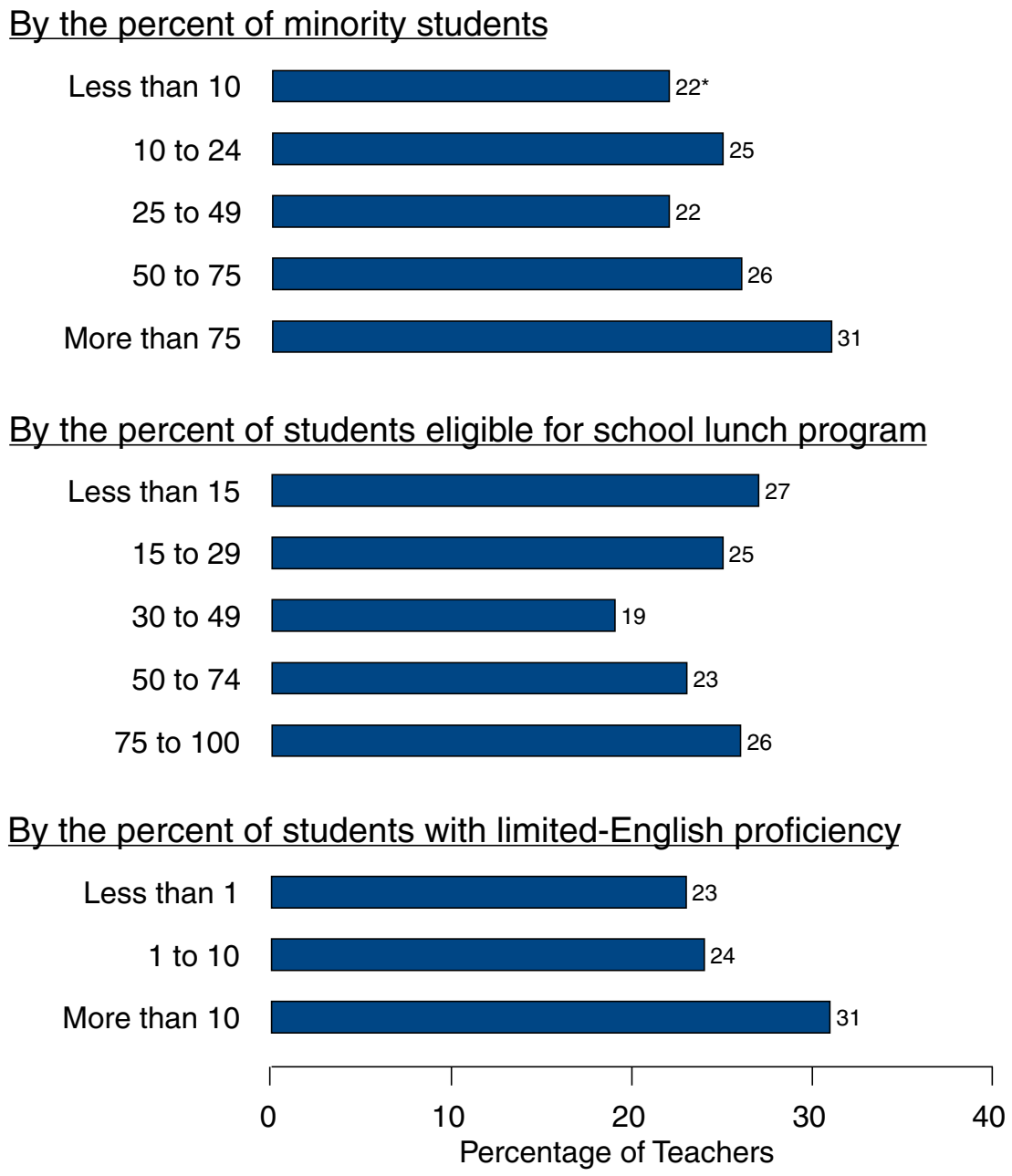
10 Gene Glass and Marshall Smith, "Meta-Analysis of Research on the Relationship of Class Size and Achievement," *Educational Evaluation and Policy Analysis*, 1 (1), pp. 2-16, 1978.

11 Jeremy D. Finn, *Class Size and Student Risk: What is Known? What is Next?*, a paper commissioned by the Office of Educational Research and Improvement, U.S. Department of Education, April 1998 (http:///www.ed.gov/pubs/classsize/title:html).

12 Lawrence Mishel and Richard Rothstein (Eds.), *The Class Size Debate*, The Economic Policy Institute, Washington, D.C., 2002.

Class Size

Percentage of Teachers with Classes of 25 or More Students, 1999-2000



*In classes with less than 10 percent minority students, 22 percent of the teachers have 25 or more students in their classes.

Source: National Center for Education Statistics, *School and Staffing Survey (SASS)*, 1999-2000.

Technology-Assisted Instruction

Computers are becoming ubiquitous in the schools, and Internet access is steadily increasing. A lot of data have been collected about quantities, but much less about specific uses and how computers and the Internet are integrated into instruction. There is research on the effectiveness of the uses of the computer, but little on the use of the Internet.

A lot of studies have been conducted on the use of computers for "drill and practice." In 1997, the President's Committee of Advisors on Science and Technology summed up the results and the findings of four "meta-analyses" (syntheses) of the existing studies.[13] The magnitude of the effect on achievement was consistently positive and considerable, and strongest for students from lower socioeconomic status and for students who were low achievers. Mayer, et al., report that "Research on the application of computers for developing higher-order thinking skills, problem-solving, group work, and hands-on learning activities, however, is less extensive and less conclusive." Two studies show positive effects, and one concluded that it was not known whether computers for such instruction would be cost-effective.[14]

How equally is this resource distributed? When the question is about computers, and whether they are somewhere in schools, and whether students use them sometimes, they seem to be well spread around. But when the questions about availability and usage get more specific, the "digital divide" reveals itself.

A few examples of inequality are shown on the facing page. Based on a survey of teachers, in schools with a higher percentage of minority students there is a lower percentage of students who have computers available in the classroom than in schools with a smaller percentage of minorities—77 percent compared with 84 percent. The same is true for Internet access in the classroom. And in low minority schools, 61 percent of students are given assignments to do research on the Internet, compared to just 35 percent in high minority schools. The results by income mirror these results. Where students are in schools with less than 11 percent eligible for the school lunch program, they have more access to computer and Internet-based instruction than where 71 percent or more are eligible.

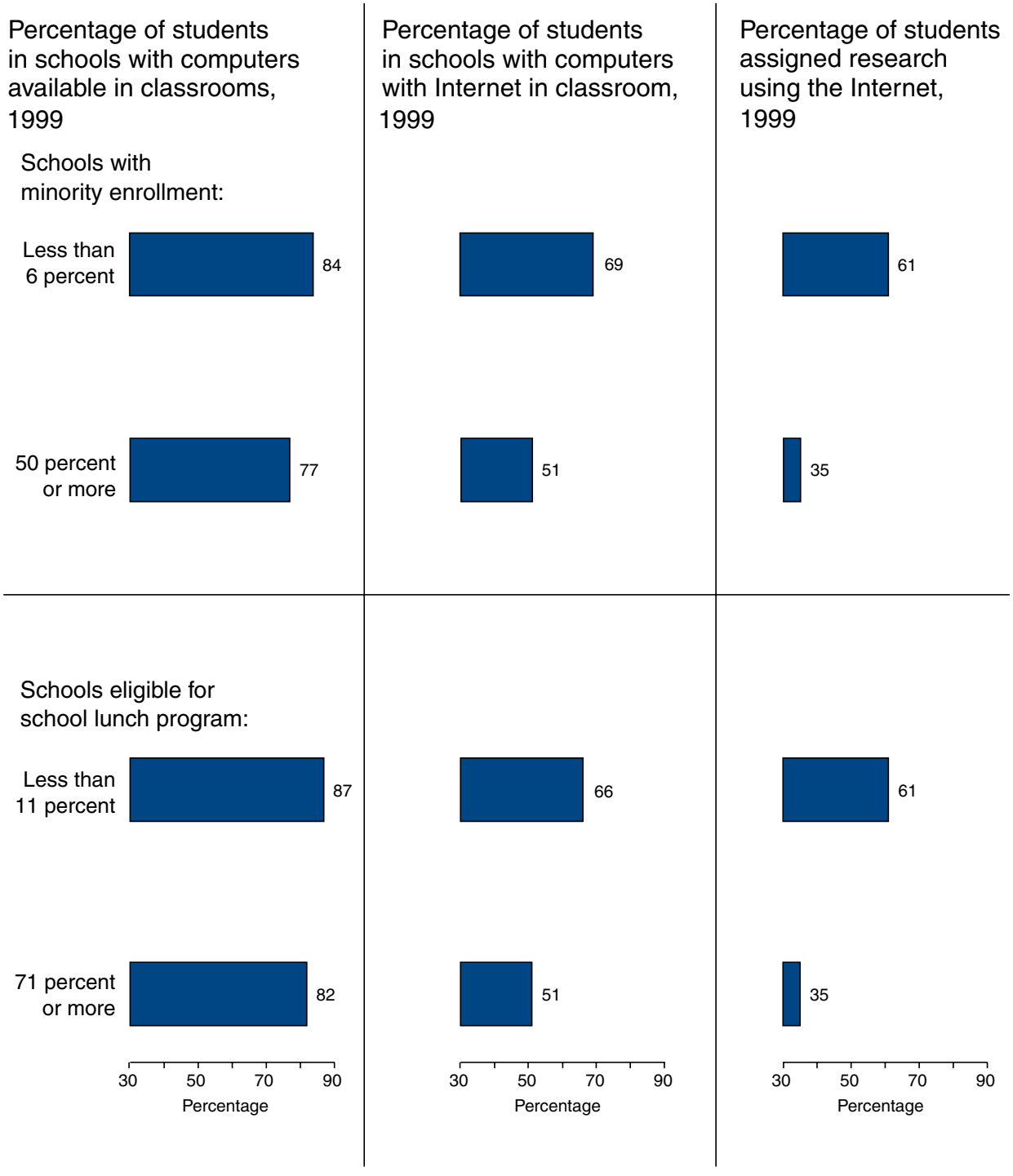
The kinds of software available and its quality, the way computer instruction is integrated into curriculum to reflect state content standards, and the effectiveness of teachers in using what is available are largely unknown, in terms of national data. It is not just a matter of hardware and connections to the Internet; it is also the kinds of assignments that students are asked to do.

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13 President's Committee of Advisors on Science and Technology, Panel on Educational Technology, *Report to the President on the Use of Technology to Strengthen K-12 Education in the United States*, 1997, as cited in Mayer, et al., op. cit.

14 Mayer et al., op. cit., cites these studies:
- T.K. Glennan and A. Melmed, *Fostering the Use of Educational Technology: Elements of a National Strategy*, Santa Monica, CA: Rand, 1996.
- H. Wenglinsky, *Does It Compute? The Relationship Between Educational Technology and Student Achievement in Mathematics*, Policy Information Center, Educational Testing Service, Princeton, NJ, 1998.
- President's Committee of Advisors on Science and Technology, op. cit.

Technology-Assisted Instruction



Source: Becky Smerdon, et al., *Teachers' Tools for the 21st Century: A Report on Teachers' Use of Technology*, National Center for Education Statistics (NCES 2000-102), 2000, pp. 26, 42, and 44.

School Safety

A general lack of student discipline and an atmosphere that produces fear in students are not conducive to learning. The research synthesis *Monitoring School Quality: An Indicators Report* had this to say:

> *Researchers have found that a positive disciplinary climate is directly linked to high achievement (Barton, Coley, and Wenglinsky, 1998; Bryk, Lee, and Holland, 1993; Chubb and Moe, 1990). An orderly school atmosphere conducive to learning could be an example of a 'necessary but not sufficient' characteristic of quality schools. Quality schools with high levels of student learning may have an accompanying high level of orderliness and discipline throughout the school as students are actively engaged in educationally productive activities... The issues that school discipline policies are designed to address are well known and range from the disconcerting to the dangerous. They include student disrespect for teachers, absenteeism, tardiness, use of alcohol and controlled substances, fighting, and possession of firearms.*[15]

On the facing page are several charts showing differences among racial and ethnic groups, and in household income levels, in student exposure to conditions that impede learning. About twice the percentages of Black and Hispanic students reported that street gangs were present in their schools, as compared with White students. Three in ten of these minority students report the presence of gangs, compared with one in six White students. The reporting of fear of an attack at school or on the way to school was about twice as frequent for Black and Hispanic students as for White students, with a tenth of the minority students reporting such fears. And more minority students than White students avoided going to one or more places in the school.

Student experiences with such conditions also vary with income. For example, students from lower income households were more likely to report the presence of gangs in the school than were those from higher income households.

Less attention is given to the ordinary garden variety of disruptive student behaviors that handicap learning in the classroom, and less current data exist on that type of behavior. In 1992, the National Assessment of Educational Progress (NAEP) asked fourth graders how much they agreed or disagreed with the following statement: "Disruptions by other students get in the way of my learning." Forty-three percent of White students agreed or strongly agreed, compared to 56 percent of Black students and 52 percent of Hispanic students.[16]

In a recent edition of *School Crime and Safety, 2001*, the U.S. Departments of Education and Justice reported that the rates of victimization have been generally down, although exposure to "bullying" at school is up and the differentials by race and ethnicity persist.

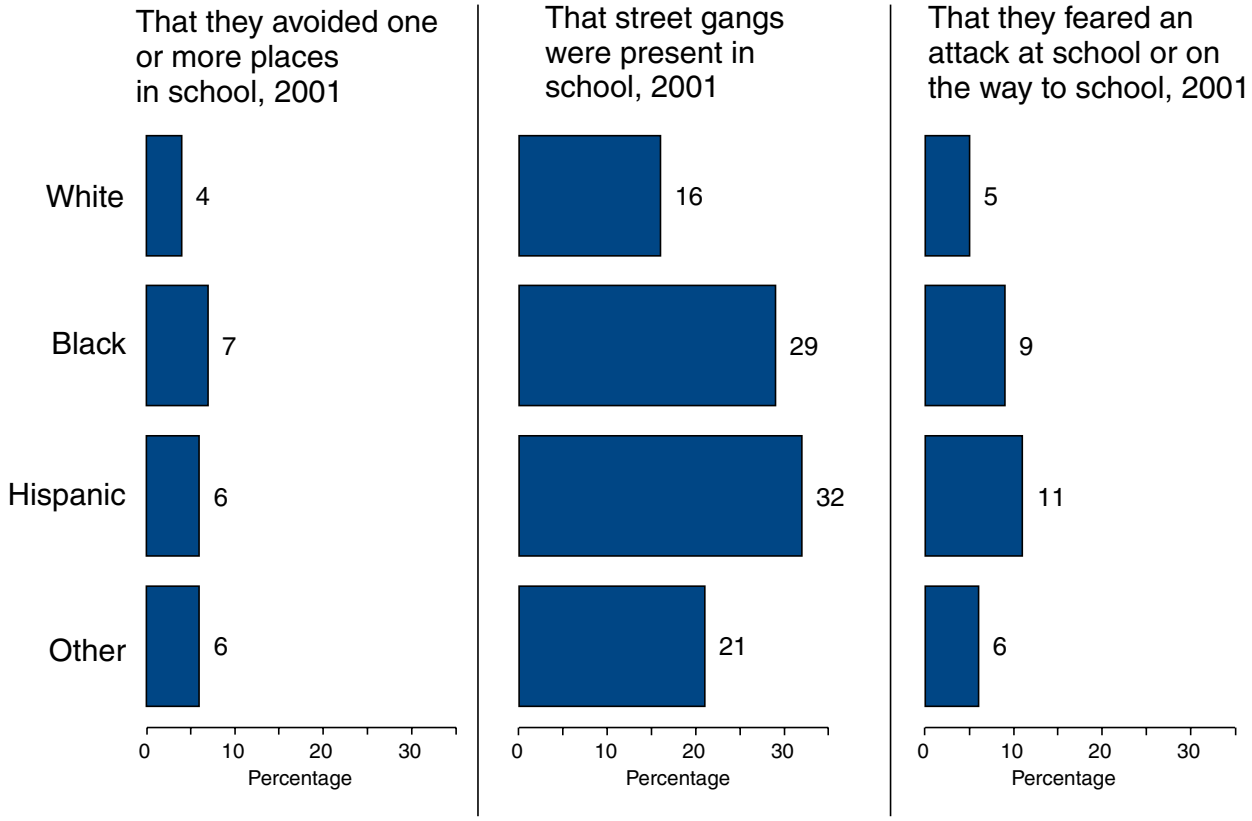
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[15] Mayer, et al., op. cit., pp. 42-43. The research cited is as follows:
- Paul Barton, Richard Coley, and Harold Wenglinsky, *Order in the Classroom: Violence, Discipline and Student Achievement*, Policy Information Center, Educational Testing Service, Princeton, NJ, 1998.
- A.S. Byrk, V.E. Lee, and P.B. Holland, *Catholic Schools and the Common Good*, Cambridge, MA, and London: Harvard University Press, 1993.
- J.E. Chubb and T.M. Moe, *Politics, Markets and America's Schools*, Washington, D.C., Brookings Institution, 1990.

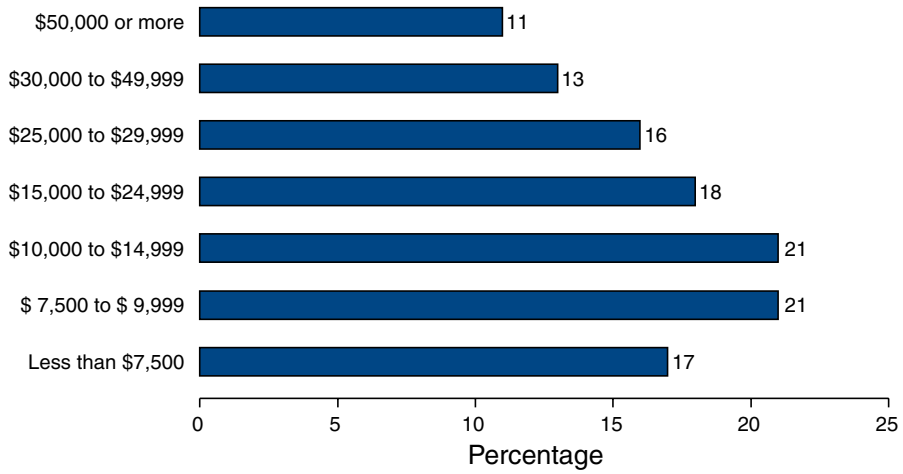
[16] http://nces.ed.gov/nationsreportcard/naepdata/getdata.asp

School Safety

Percentage of Students Ages 12 to 18 Who Report that in the Previous Six Months:



Percentage of Students Ages 12 to 18 Reporting the Presence of Street Gangs at School, by Household Income, 1995



Sources: *Indicators of School Crime and Safety: 2002*, National Center for Education Statistics and U.S. Department of Justice, NCES 2003-009, Jill F. Devoe et al., 2002, Tables 12.1, 13.1, and 15.1; and *Student Reports of School Crime, 1989 and 1995*, March 1998, Table 4.

Parent Participation

The Child Trends Data Bank gives this summary of the research.

> *"Students with parents who are involved in their school tend to have fewer behavioral problems and better academic performance, and are more likely to complete secondary school than students whose parents are not involved in their schools. Parental involvement allows parents to monitor school and classroom activities, and to coordinate their efforts with teachers. Teachers of students with highly involved parents tend to give greater attention to those students, and they tend to identify problems that might inhibit student learning at earlier stages. Research has found that students perform better in school if their fathers as well as their mothers are involved, regardless of whether the father lives with the student."*[17]

A Child Trends publication contains this synthesis of the research:

> *"Studies report that children whose parents are involved in their schooling are more likely to earn high grades and enjoy school than children whose parents are not involved in their children's schooling. This result holds for students in both elementary and secondary school. Children of involved parents are also more likely to have higher educational aspirations and motivation to achieve. In addition, parent involvement in school is related to fewer student suspensions and expulsions and higher levels of student participation in extracurricular activities. Data also suggest that schools that welcome parental involvement are likely to have highly involved parents."*[18]

On some measures of parental involvement, such as whether parents attend a scheduled meeting with a teacher, there is little difference by race/ethnicity, or measures of family income. However, as the degree of involvement increases, large differences emerge. As the accompanying figures show, parents who are Black or Hispanic are much less likely to attend a school event or to act as a volunteer or serve on a committee. This is also true of parents with lower household incomes. Teachers are much more likely, in the case of parents from high-poverty schools, to report that lack of parental involvement is a moderate or serious problem.

A recent poll conducted in New Jersey found that urban and minority parents are far more likely to feel unwelcome in their children's schools; 20 percent of suburban parents feel unwelcome, compared to 44 percent of urban parents.[19]

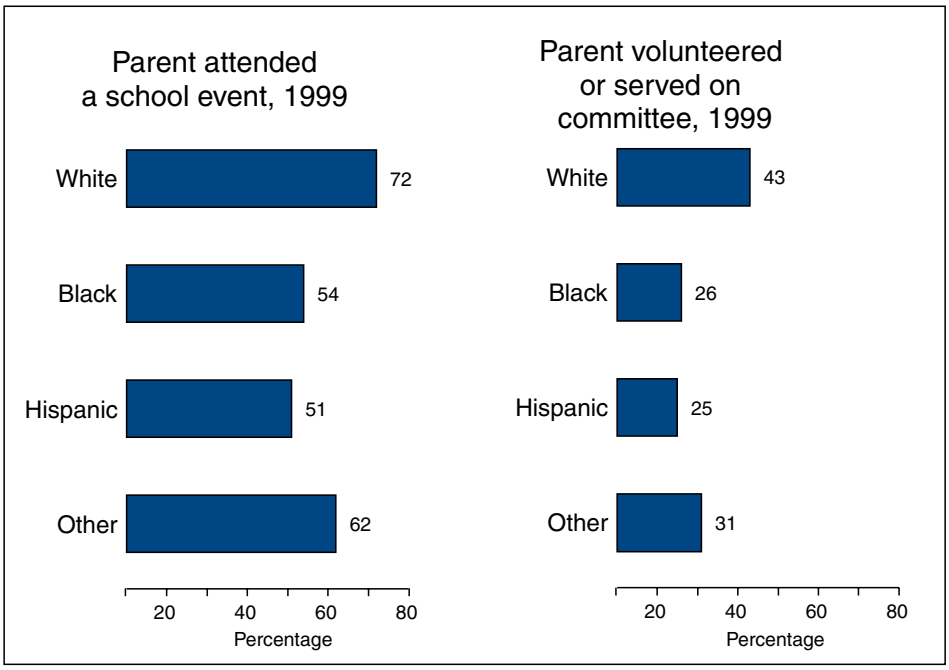
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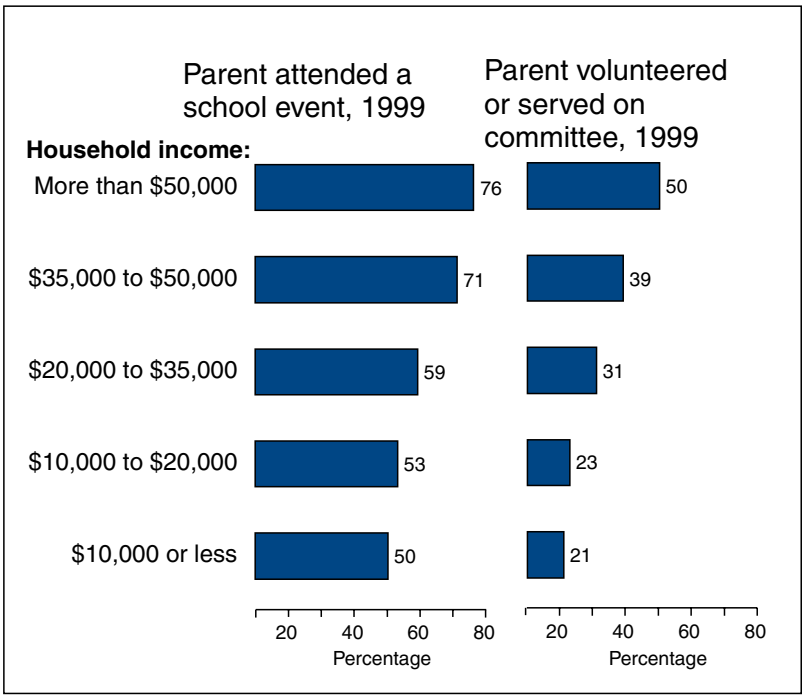
17 Child Trends Data Bank, http://www.childtrendsdatabank.org/family/thefamily/39parentalinvolvementinschools.htm, cites:
- A.T. Henderson and N. Beria, *A New Generation of Evidence: The Family is Critical to Student Achievement*, National Committee for Citizens in Education, Washington, DC, 1994.
- N. Zill and C.W. Nord, *Running in Place: How American Families Are Faring in a Changing Economy and Individualistic Society*, Child Trends, Washington, D.C., 1994.
- C.W. Nord and J. West, *Fathers' and Mothers' Involvement in Their Children's Schools by Family Type and Residence Status*, National Center for Education Statistics, Washington, D.C., 2001 (NCES 2001-032).

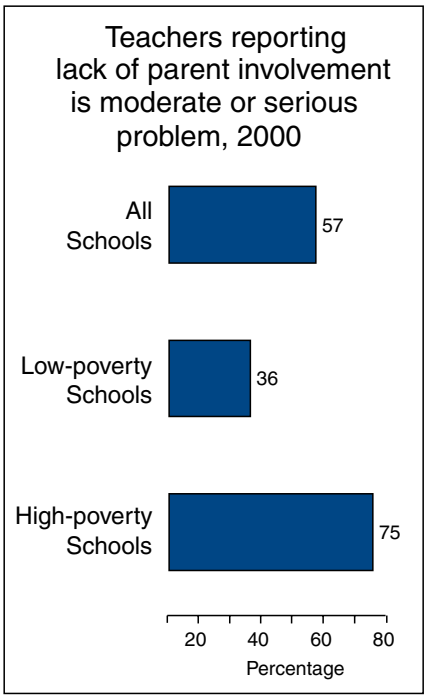
18 *Charting Parenthood: A Statistical Portrait of Fathers and Mothers in America*, produced by Child Trends, Tamara Halle, Project Director, 2002. Research cited and not included above:
- K.R. Wentzel, "Social-Motivational Processes and Interpersonal Relationships: Implications for Understanding Motivation at School," *Journal of Educational Psychology*, 91 (1), 76-97.
- J. Epstein and S. Dauber, "School Programs and Teacher Practices of Parent Involvement in Inner City Elementary and Secondary Schools," *The Elementary School Journal*, 91, 189-305.

19 Catherine Gewertz, *Education Week*, March 3, 2003.

Parent Participation







Sources: Child Trends Data Base (original source - NCES, *The Condition of Education, 2001*) and *Education Week*, "Quality Counts," 2003, p. 62.

Student Mobility

According to a 1994 General Accounting Office (GAO) report, "about 17 percent of all third-graders—more than a half million—have changed schools frequently, attending three or more schools since first grade."[20] A change in schools can mean that a student faces work he or she is not prepared for, a teacher who is not familiar with the student's prior learning, and an environment where the student has to deal with being an outsider who has to make all new friends. As seen on the facing page, the percentage of Black and Hispanic students who are frequent school changers is double that of White students, and the percent of students from low-income families is triple that of high-income families. Families who rented their homes showed much higher rates of school changing than families who owned their homes; minority and low-income families are much more likely to be renters. The GAO analysis was based on a nationally representative sample used in the Department of Education's *Prospects Study* of 1990-91.

The GAO study reported that 41 percent of these frequent school changers were below grade level in reading and 33 percent in math, compared with 26 percent and 17 percent respectively of students who had never changed schools.

In 2002, a volume published by the Citizens Commission on Civil Rights included a chapter titled "High Classroom Turnover: How Children Get Left Behind" which synthesized the extensive number of research studies that have examined school changing and its effect on student achievement. The conclusion was:
High student mobility has consequences for mobile students, teachers and schools. For students, the long term effects of high mobility include lower achievement levels and slower academic pacing, culminating in a reduced likelihood of high school completions.[21]

An extensive analysis of school changing based on 14 commissioned studies appears in the Winter 2003 issue of *The Journal of Negro Education*, edited by Chester Hartman and Todd Franke.

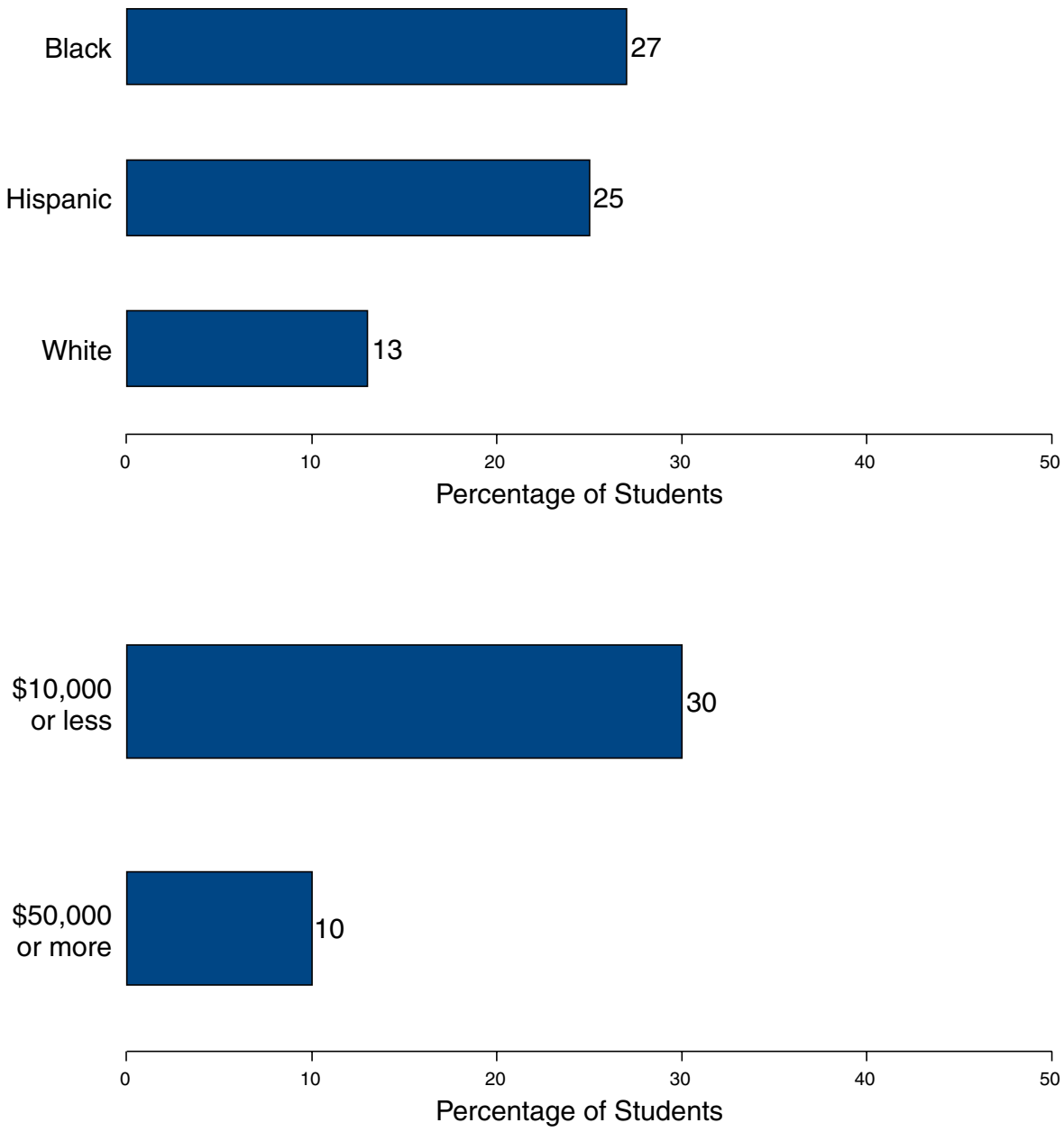
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20 United States General Accounting Office, *Elementary School Children: Many Change Schools Frequently, Harming Their Education*, February 1994, p. 8.

21 Chester Hartman, "High Classroom Turnover: How Children Get Left Behind" in *Rights at Risk: Equality in a Age of Terrorism*, edited by Dianne M. Piche, William L. Taylor and Robin A. Reed, Citizens Commission on Civil Rights, p. 229.

Student Mobility

Percentage of Third-Graders Who Changed Schools Three Times or More Since First Grade, by Race/Ethnicity and Income, 1990-1991



Source: U.S. General Accounting Office, *Elementary School Children: Many Change Schools Frequently, Harming Their Education,* February 1994, pp. 27-28. Percentages for race/ethnicity are interpolated from bar chart.

BIRTHWEIGHT

Low birthweight can lead to severe problems, ranging from mortality to learning problems. Child Trends summarizes the findings of research this way:

> *Infants born low-birthweight are at risk of long term disability and impaired development. Infants born under 2,500 grams are more likely than heavier infants to experience delayed motor and social development, children aged 4-17 who were born at low birthweight were more likely to be enrolled in special classes, to repeat a grade or to fail in school than children who were born at a normal birthweight.*[22]

The variation in the incidence of low birthweight by race and ethnicity is shown on the facing page. The highest incidence is among Black infants, at 13 percent in 2000. This is about double the incidence for White and Hispanic infants. There is considerable variation within groups. For example, the rate for Puerto Rican infants is considerably higher than for other Hispanic infants.

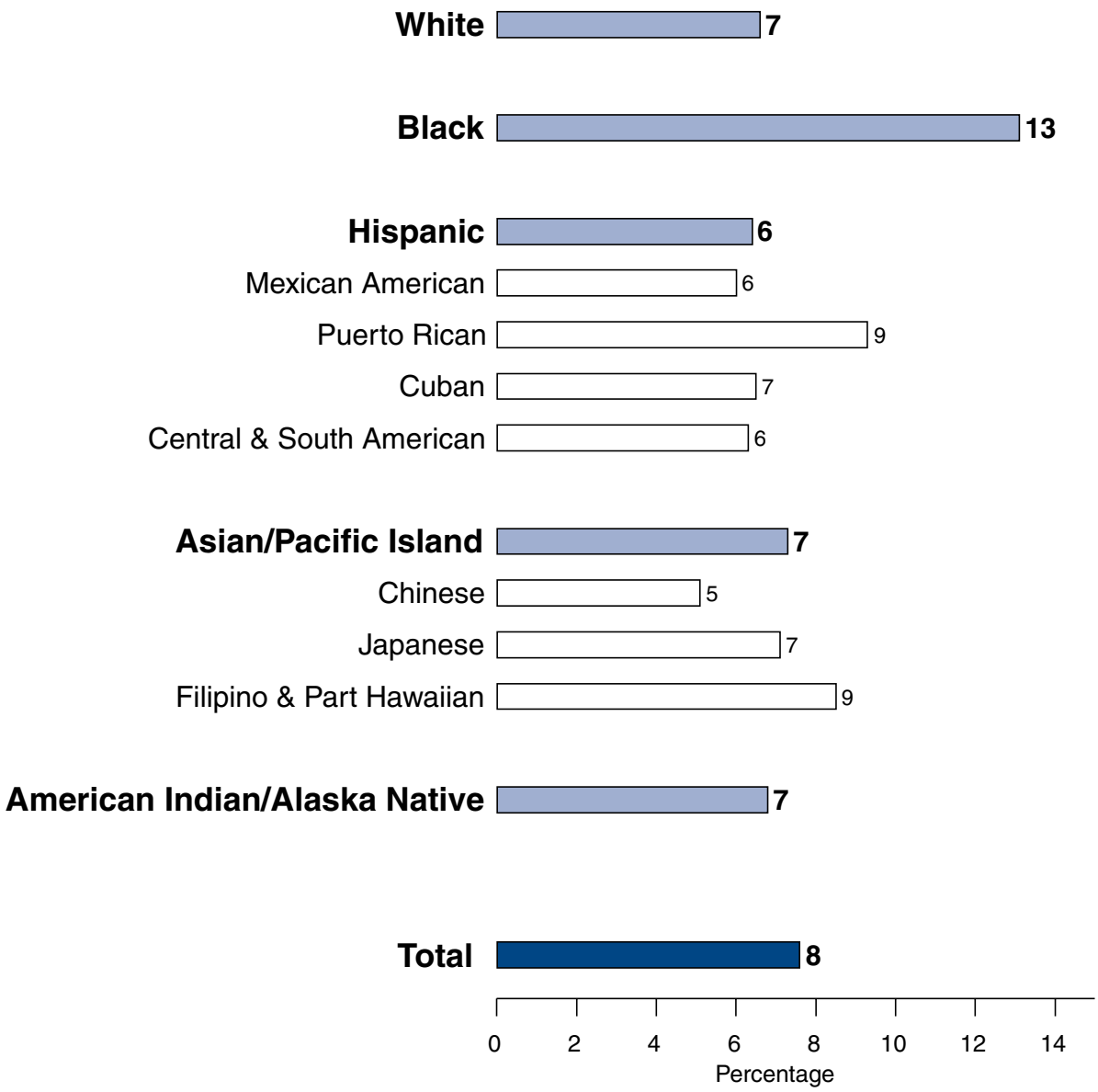
While there was a decline in the incidence of low birthweight babies from 1970 to 1980, it has risen since, from 7 percent in 1990 to 8 percent in 2000. It rose for all racial/ethnic groups, except for Chinese and Hawaiian mothers.

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22 Child Trends Data Bank, http://childtrendsdatabank.org/demo/outcomes/57low_birthweight.htm. The research summarized by Child Trends is as follows:
- M. Hack, N.K. Klein, H.G. Taylor, "Long-Term Developmental Outcomes of Low Birth Weight Infants," *The Future of Children: Low Birthweight*, Vol. 5 (1): 19-34, Center for the Future of Children, the David and Lucile Packard Foundation, Los Altos, CA, http://www.futureofchildren.org/pubs-info2825/pubs-info.htm?doc_id=79872.
- M.L. Hediger, M.D. Overpeck, W.J. Ruan, and J.F. Troendle, "Birthweight and Gestational Age: Effects on Motor and Social Development," *Pediatric and Prenatal Epidemiology*, 16:33-46, 2002.
- National Education Goals Panel, *Special Early Childhood Report*, 1997, http://www.negpgov/reports/spcl.pdf.

Birthweight

Percentage of Infants Born of Low Birthweight, by Race/Ethnicity, 2000



Source: *America's Children: Key National Indicators of Well Being, 2002*, Federal Interagency Forum on Child and Family Statistics, p. 92 (original data from the Centers for Disease Control and Prevention and National Vital Statistics Reports).

Lead Poisoning

The United States has had a program intended to eliminate lead poisoning since enactment of the Lead Contamination Control Act of 1988.[23] For children, the primary source of lead exposure is living in old houses covered with lead-based paint. Although the number of children exposed to lead has been declining, approximately 434,000 children younger than six years of age have blood levels of lead "high enough to adversely affect their intelligence, behavior and development," according to the Centers for Disease Control (CDC).

Levels that exceed the CDC's standard cause "reductions in IQ and attention span, reading and learning disabilities and behavior problems," according to a 1999 report by the General Accounting Office. Fewer than 20 percent of children most at risk have ever been screened,[24] however, so we do not know how many among the remaining 80 percent have lead poisoning. Further, a recent study reported in *The New England Journal of Medicine* finds that blood levels even below the threshold used by the CDC "are inversely associated with children's IQ scores at three and five years of age, and associated declines in IQ are greater at these concentrations than at higher concentrations. These findings suggest that more U.S. children may be adversely affected. . . than previously estimated."[25] Children in minority and low-income families have a higher risk of being exposed to lead than do other children. They are more likely to live in older houses that still have lead paint and in old dwellings that are painted less often than others. On the facing page this higher risk is illustrated. While 6 percent of White children under six years of age live in houses constructed before 1946, this is the case for 22 percent of Black children and 13 percent of Mexican American children. Also, children who are poor are three times more likely to have high levels of lead in their blood than are non-poor children.

Boston has had a program of lead screening in 16 neighborhoods. In neighborhoods where the risk levels of lead were high, 31 percent of the children under age 6 were in families below the poverty line. This compares with 9 percent where there was a medium risk level, and 4 percent where there was a low risk level.[26]

Many children who are behind in school have been affected by lead, and most of them will never have been screened and diagnosed. While the problem is generally receding, the differentials by race/ethnicity and poverty persist. The lead problem can still make the news, and in school buildings, not just in homes. Recently, all the water fountains in Baltimore, Maryland, schools were shut off after the school board learned that many were tainted with lead.[27] In November 2002, the New York City school system shut off drinking fountains and posted warning signs on sinks in one in five of its elementary schools. Lead exceeding limits had been found in 222 of 950 elementary schools.[28]

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23 Centers for Disease Control Lead Fact Sheet, http://www.cdc.gov/nceh/lead/about/about.htm

24 U.S. General Accounting Office, *Lead Poisoning: Federal Health Care Programs Are Not Effectively Reaching At-Risk Children* (GAO/HEHS 99-18), Washington, DC, 1999 (as cited in Richard Rothstein, *Out of Balance: Our Understanding of How Schools Affect Society and How Society Affects Schools*, the Spencer Foundation, 2002).

25 R.L. Caufield, et al., "Intellectual Impairment in Children with Blood Concentrations Below 10 µg per Deciliter," *The New England Journal of Medicine*, Volume 348:1517-1526, April 17, 2003, Number 16.

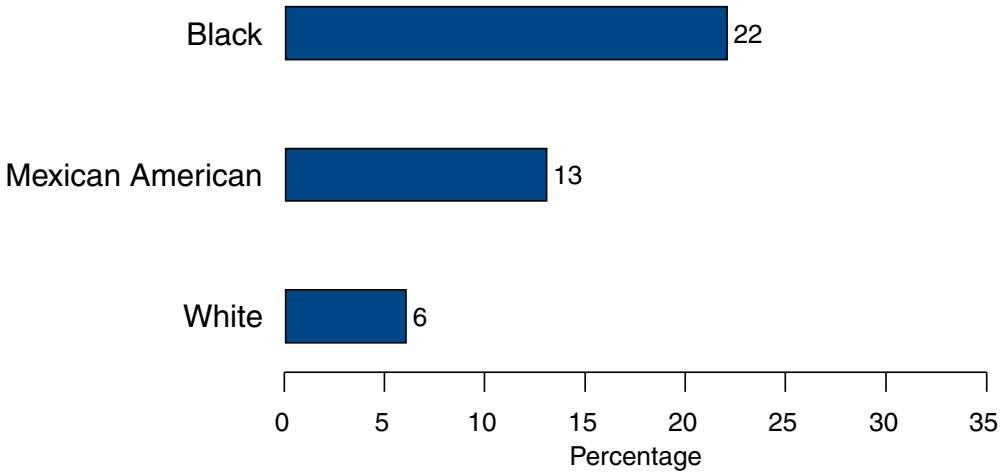
26 http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5017a3.htm.

27 John Gehring, "Lead Worry Prompts Shutoff of School Drinking Fountains," *Education Week*, 2/3/2003.

28 Robert F. Worth, "Lead Levels in Schools' Water Prompt Warnings and Shutoffs," *The New York Times*, November 9, 2002.

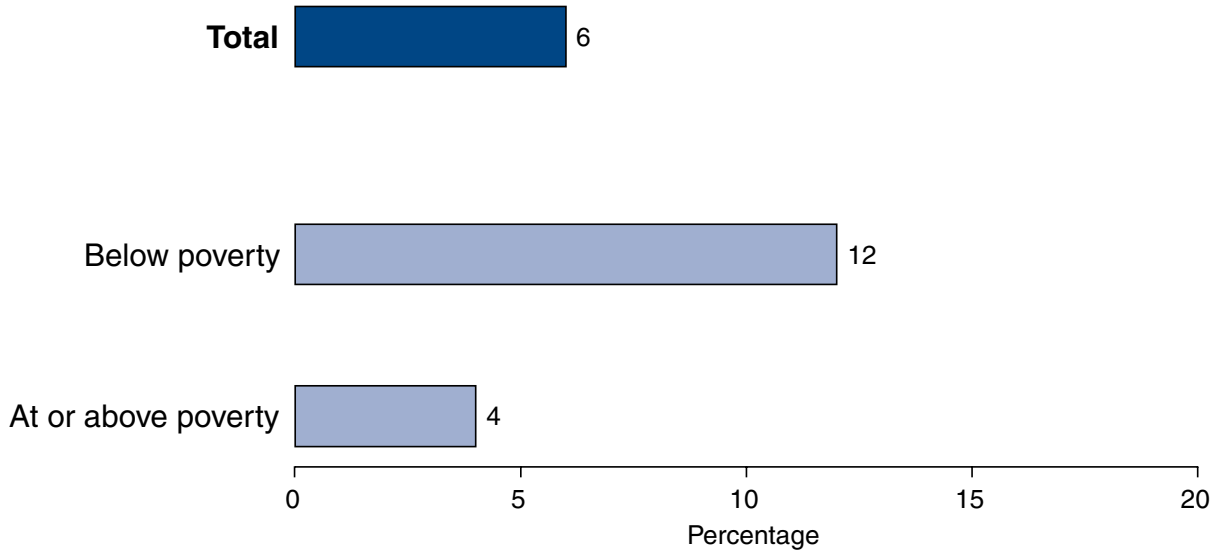
Lead Poisoning

Percentage of Children Under Age 6 Living in Housing Built Before 1946 Who Are Affected by Lead, 1991-1994



Source: http://www.cdc.gov/nceh/lead/factsheets/childhoodlead.htm, 2/8/03

Percentage of Children Under Age 6 with High Lead Levels, by Poverty Status, Average for 1988 to 1994



Source: *America's Children: Key National Indicators of Well Being*, 1998 (original data from Centers for Disease Control and Prevention, National Center for Health Statistics, Second and Third National Health and Nutrition Information Surveys).

Hunger and Nutrition

The importance of adequate nutrition for the development of the mind and body is broadly accepted on a commonsensical basis. Also, it is a matter of common sense that young people with empty stomachs are likely to find it difficult to concentrate on their studies. There are studies that get at aspects of the nutrition-achievement relationship.

- Experimental studies with control groups found that children given vitamin and mineral supplements had test score gains that exceed those of the control group (Neisser, et al., 1996).[29]

- A study of inner-city kindergarten children found that those who were underweight tended to have lower test scores (Karp, et al., 1992).[30]

- Poor children given a free breakfast at school gained about three percentile points on standardized test scores and had improved attendance, compared to children who were eligible but did not participate (Meyers, et al., 1989).[31]

The U.S. Department of Agriculture conducts regular surveys of food insecurity and hunger. The results for 2000, by race/ethnicity and poverty status, are on the opposite page. Households classified as "food insecure without hunger" have food-related concerns, have had to make adjustments in food management, and have reduced variety and desirability in their diets. Those who are "food insecure with hunger" report reduced food intake and hunger.

Black and Hispanic households have two to three times the food insecurity and hunger than do White households. Of all households with children under age 18, 14 percent have food issues, and 4 percent also report having hunger. Thirteen percent of households below the poverty line experience hunger, compared to just 1 percent of households 85 percent or more over the poverty line.

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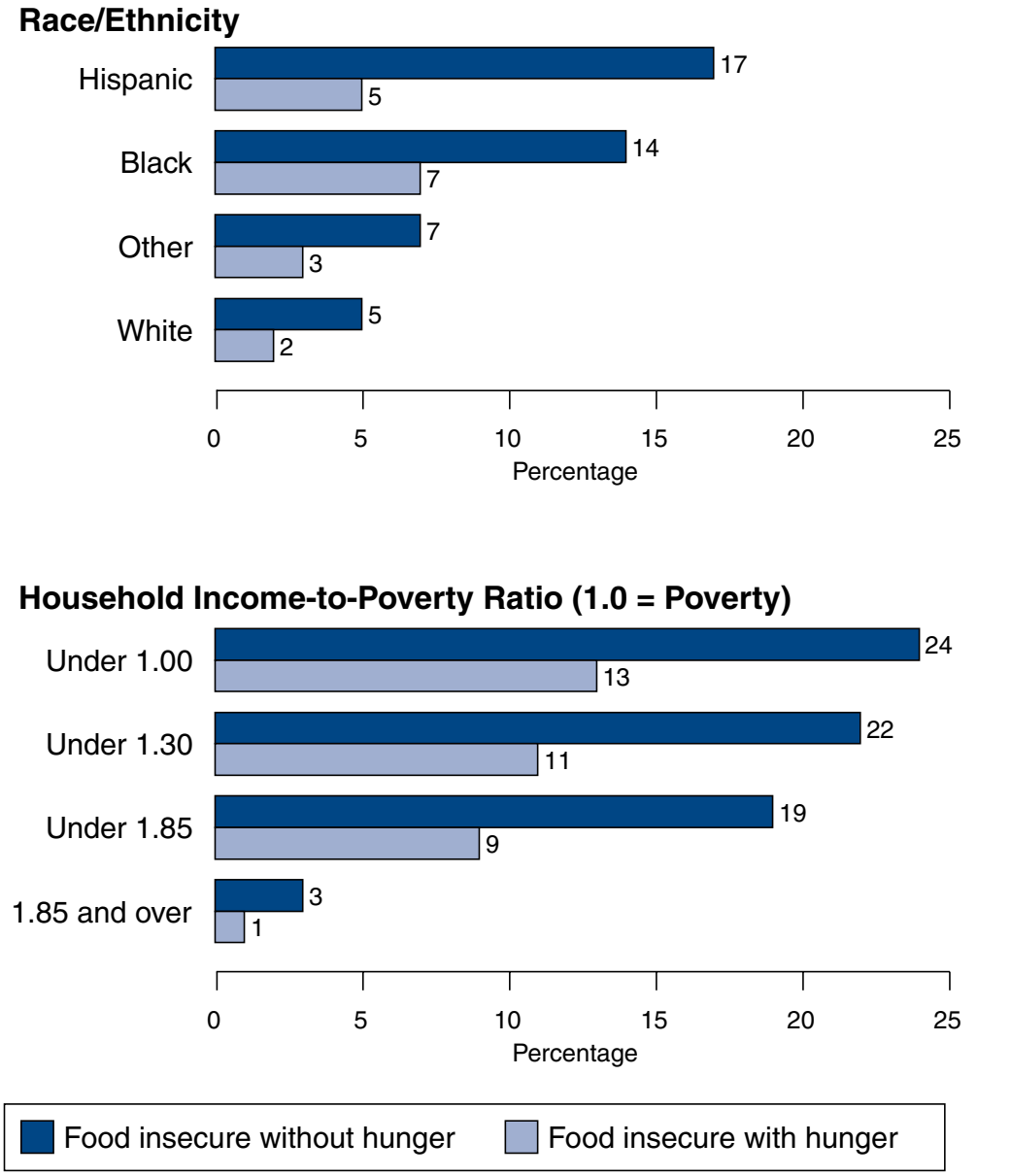
29 U. Neisser et al., "Intelligence: Knowns and Unknowns," *The American Psychologist*, 51, 77-101 (cited in Richard Rothstein, *Out of Balance: An Understanding of How Schools Affect Society and How Society Affects Schools*, Spencer Foundation, 2002).

30 R. Karp et al., "Growth and Academic Achievement in Inner-City Kindergarten Schools," *Clinical Pediatrics* (Philadelphia), 31, 336-340.

31 A.F. Meyers et al., "School Breakfast and School Performance," *The American Journal of Diseases of Children*, 143, 1237.

Hunger and Nutrition

Percentage of Households with Children Under Age 18 That Are Insecure in Food Supply and Hungry, by Race/Ethnicity and Income, 2000



Source: U.S. Department of Health and Human Services, *Indicators of Welfare Dependency, Annual Report to Congress,* 2002, p. III-19. Data come from the CPS Current Population Survey of Food Security, with calculations made by the Economic Research Service of the Department of Agriculture.

Reading to Young Children

The benefits of early home support for literacy are widely acknowledged. The Federal Interagency Forum on Child and Family Statistics has this to say in its 2002 report: "Reading to young children promotes language acquisition and correlates with literacy development, and later on, with achievement in reading comprehension and general success in school," citing the work of Wells.[32]

The Child Trends Data Bank sums up the results of research this way: "By reading aloud to their young children, parents can help them acquire the prerequisite skills they will need to learn to read in school. Being read to has been identified as a source of children's early literacy development, including knowledge about the alphabet, print, and characteristics of written language. In addition, shared parent-child book reading during children's preschool years leads to higher reading achievement in elementary school."[33]

As seen on the opposite page, Black and Hispanic children are read to considerably less than White children, giving them a relative handicap in school achievement. Also, children in poverty are read to less than children who are not in poverty.

While all three groups of children gained in being read to from 1993 to 2001, the gain for Black children was more substantial, with a 9-point gain compared to a 5-point gain for White children and Hispanic children. However, large differentials remain.

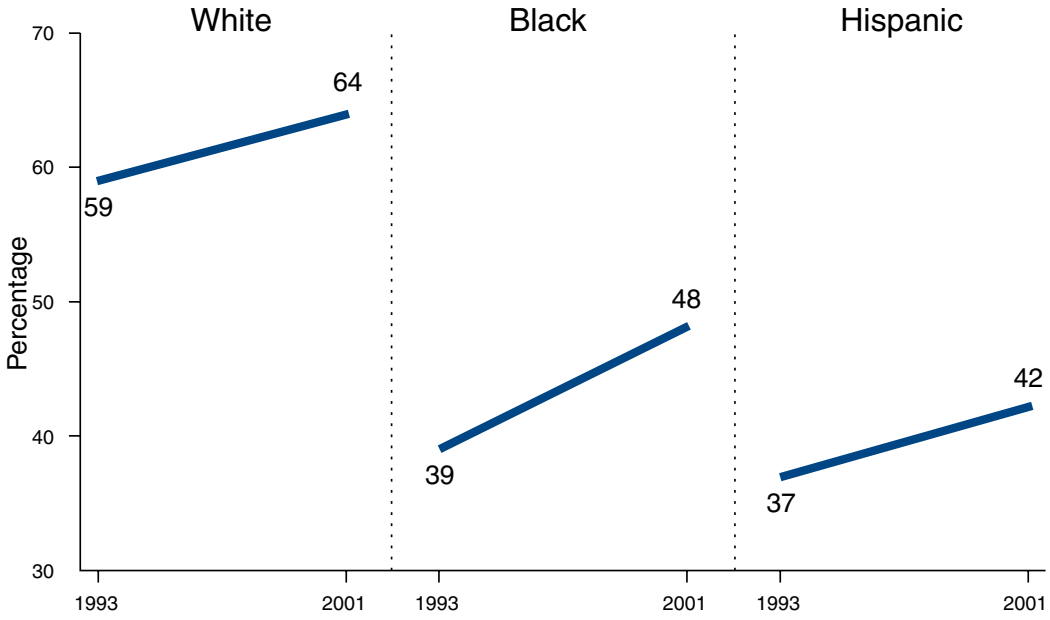
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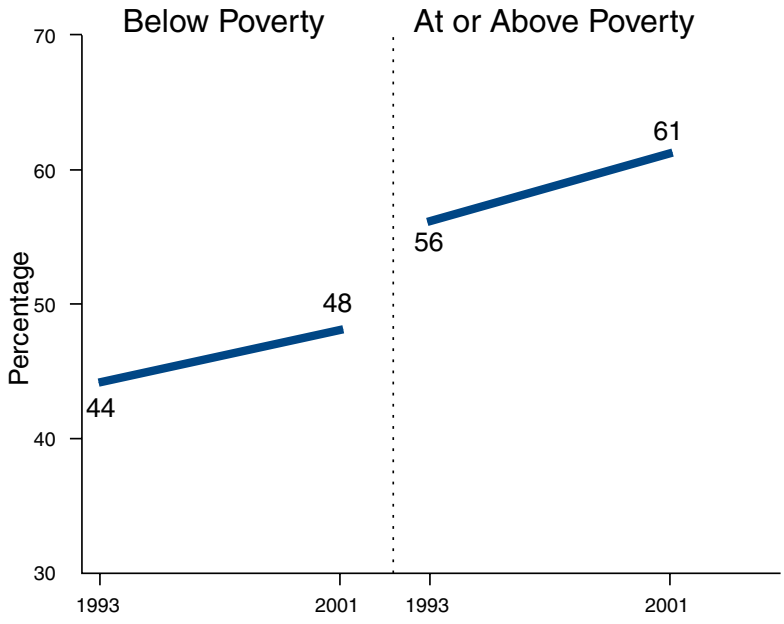
32 Federal Interagency Forum on Child and Family Statistics, *America's Children: Key National Indicators of Well-Being*, 2002. C.B. Wells, "Preschool Literacy-Related Activities and Success in School," in M.P. Olson, D.N. Terrance, and A Hildyard (Eds.), *Literacy, Language and Learning: The Nature and Consequences of Literacy* (pp. 229-255). Cambridge, England: Cambridge University Press, 1985.

33 Child Trends cites Catherine E. Snow, M. Susan Burns, and Peg Griffin (Eds.) *Preventing Reading Difficulties in Young Children*, National Research Council, Washington, D.C., National Academy Press, 1998; A.G. Bus, M.H. von Lizendoorm, and D Pellegrini, "Joint Book Reading Makes for Success in Learning to Read: A Meta-Analysis of Intergenerational Transmission of Literacy," *Review of Educational Research*, 65 (1), 1-21, 1995.

Reading to Young Children

Percentage of Children Ages 3 to 5* Who Were Read to
Every Day in the Last Week, by Race/Ethnicity and Poverty, 1993-2001





*Children who had not yet entered kindergarten.

Source: Federal Interagency Forum on Child and Family Statistics, *America's Children: Key National Indicators of Well-Being, 2002*, Table ED1, p. 104. Original data from the *NCES National Household Education Survey*.

Television Watching

A strong rationale exists for including television watching in the discussion of correlates with achievement, even though solid research evidenced is limited.[34] It just makes good sense, however, to believe that elementary school children watching excessive amounts of TV each day will be adversely affected in their school achievement.

In 1938, E.B. White said, "I believe television is going to be the test of the modern world and that in this new opportunity to see beyond the range of our vision, we shall discover either a new and unbearable disturbance of the general peace or a saving radiance in the sky." We abandon the comfort of scientific proof for the common sense that we were given, and proclaim that watching six hours or more of television each day is no saving radiance for the achievement of fourth graders in school.

The Child Trends Data Bank has this to say about TV watching: "When students are watching television excessively, they are less likely to be spending time doing homework, reading, after-school activities, or other intellectually stimulating activities in which they are active participants . . . Eighth graders who watched more than 5 hours of television per day had the lowest average mathematics scores in all countries participating in the Third International Math and Science Study (TIMSS) in 1995."[35]

The Blue Ribbon Panel on the SAT Score Decline, reporting in 1977, commissioned research on the effects of television watching. The studies that were available in Canada and Japan had contradictory results. As to whether television was a factor in achievement and the score decline, the Panel said, "Yes, we think it is. This cannot be proved, and we don't know how much a factor it is. By 1965, when scores started dropping, there were already television sets in 95 percent of all American homes—there are no non-television watching controls."[36]

As shown on the opposite page, among fourth graders in 2000, 13 percent of White, 42 percent of Black, and 22 percent of Hispanic students were, in fact, watching television six hours or more per day. Children of parents with more education were watching somewhat less television: 27 percent of students of parents with less than a high school education, compared with 17 percent of those whose parents had graduated from college watched six hours or more per day.

In this new technological age, we may find that computer games are substituting for some time devoted to television. Of course, it is also possible that the time spent on such games is over and above the time spent watching television.

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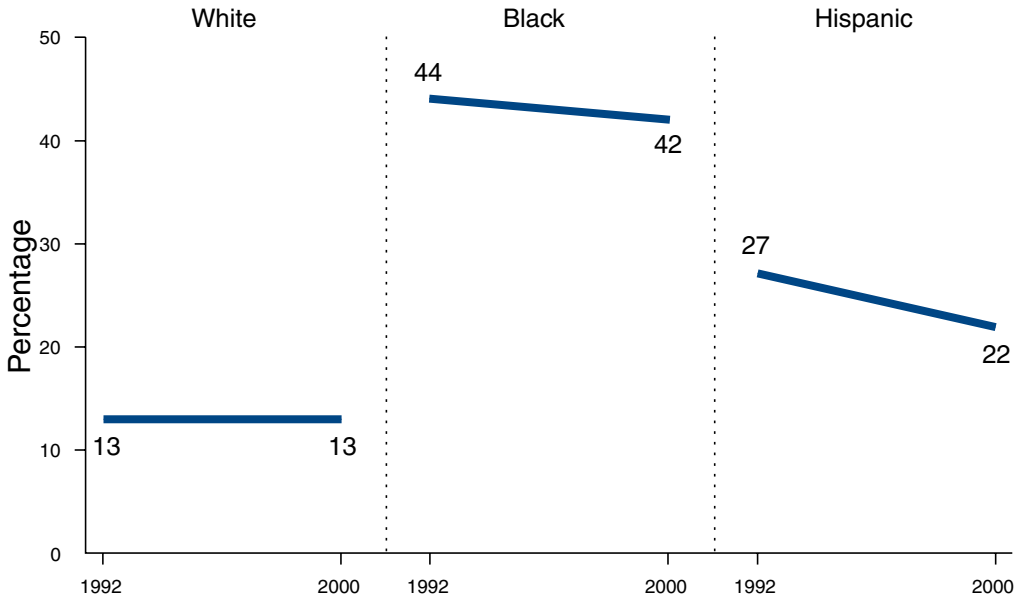
34 While there has been considerable interest, and some effort, the effects of television watching are very hard to identify. For many decades, homes have been saturated with access to television, making it impossible to compare students in homes with and without television.

35 Child Trends Data Bank, http://www.childtrendsdatabank.org/eduskills/behaviors/55watchingtv.htm.

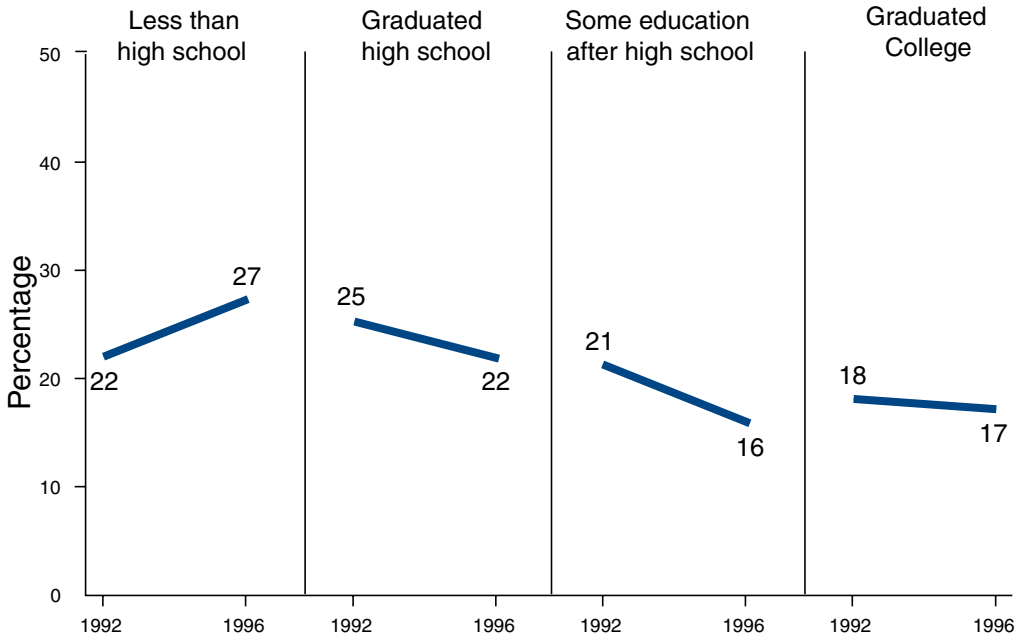
36 *On Further Examination*, Blue Ribbon Panel on the SAT Score Decline, Willard Wirtz, Chairman, College Board, 1977.

Television Watching

Percentage of Fourth Graders Watching Six Hours or More of TV per Day, by Race/Ethnicity (All Schools), 1992-2000



Percentage of Fourth Graders Watching Six Hours or More of TV per Day, by Parents' Highest Level of Education (Public Schools), 1992-1996



Source: National Center for Education Statistics, *Digest of Education Statistics 2001*, Tables 112 and 118. Original source is the National Assessment of Educational Progress.

Parent Availability

It is generally well recognized, in research as well as in the public generally, that parenting plays a critical role in child development and well-being, as well as in performance in school. It seems logical that, if parents are important, having two is better than having just one—at least on the average. An ETS Policy Information Center report entitled *America's Smallest School: The Family* argued this logic and referred to "the parent-pupil ratio."

Research has pointed out that much of the (large) difference in achievement between children from two-parent and one-parent families is due to the effects of the lower incomes of one-parent families, typically headed by a female earning less than males and with only one paycheck. Child Trends concludes that "Single-parent families tend to have much lower incomes than two-parent families; recent research indicates that the income differential accounts for about half of the negative effects of parent absence on the many areas of child and youth well-being, including health, educational attainment and achievement, behavior problems and psychological well-being."[37] This leaves half not accounted for by lower income.

Citing the research of Seh-Ahu Lee,[38] using the 1988 National Educational Longitudinal Survey, the aforementioned ETS report found that lower performance on standardized tests for children in mother-only families still exists after controlling for the greater disadvantages in these families, but the lower performance was much reduced. Of course, lower income and greater disadvantage generally are among the effects of becoming a single-parent family.

As seen on the opposite page, children from minority families are much less likely to have access to two parents in the home, with 75 percent of White children living with two parents, compared with 65 percent of Hispanic children and just 38 percent of Black children. Nine percent of Black children live with neither parent. Twenty-six percent of female heads of households were living in poverty in 2001, compared with 5 percent of married couple families—a rate over five times as high.

The percent of children living with one parent has been rising steadily over the last 30 years, going from 12 percent in 1970 to 27 percent in 2000. While the percent of Black children living with one parent is much higher than for White children (53 percent compared with 22 percent), and has risen from 32 percent in 1970, the rate of growth was higher for one-parent White families. For Hispanic families, it was 30 percent in 1980, with the gap little changed between Hispanic and White families since 1980 (statistics for Hispanics were not available in 1970).[39]

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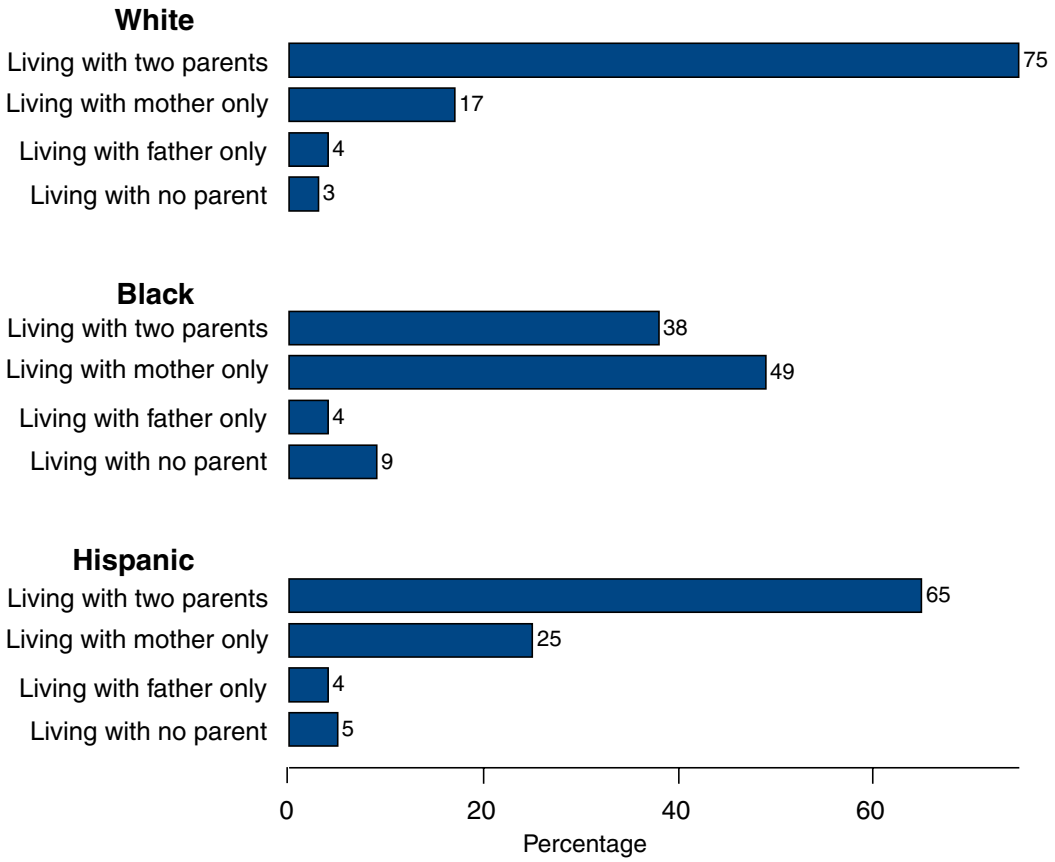
37 Child Trends Data Bank, http://www.childtrendsdatabank.org/family/thefamily/59familystructure.htm. Cited are:
- S. McLanahan, "Parent Absence or Poverty: Which Matters More," in *Consequences of Growing up Poor*, in G. Duncan and J. Brooks-Gunn (Eds.), Russell Sage Foundation, 1997.
- S. McLanahan and G. Sandefur, *Growing Up With a Single Parent: What Hurts, What Helps?* Cambridge, MA, Harvard University Press, 1994.

38 Seh-Ahn Lee, "Family Structure Effects on Student Outcomes," in *Resource and Actions: Parents, Their Children and Schools*, NORC/University of Chicago, August 1991, Chapter 3, p. 1.

39 These statistics are taken from the Child Trends Data Bank (downloaded 10/14/2002) and came originally from the U.S. Census Bureau's Current Population Reports.

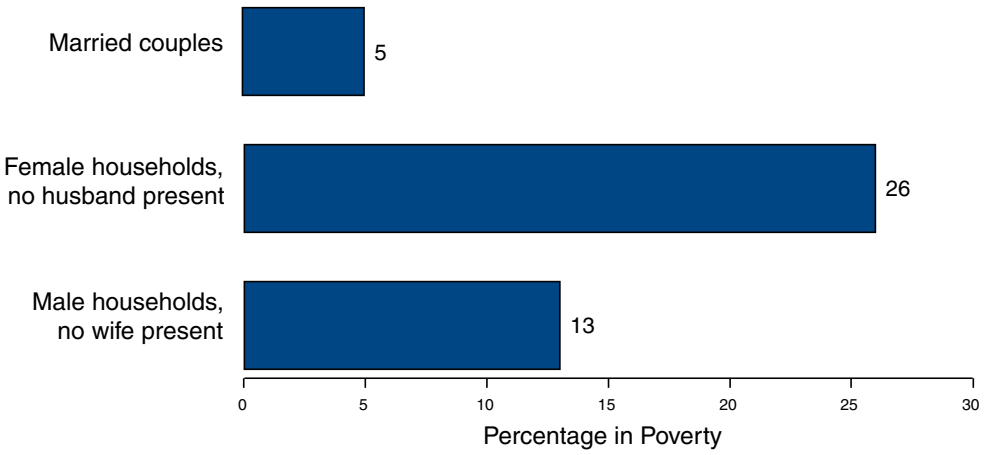
Parent Availability

Parent Availability by Race/Ethnicity, 2000



Source: Child Trends Data Bank, downloaded 10/14/02 (original data from Bureau of the Census, Current Population Reports).

Poverty and Family Structure, 2001



Source: Current Population Survey, Series P60-219, Table 1, People and Families in Poverty by Selected Characteristics, downloaded 10/14/02.

Comments

It is clear that minority students and poor students have disproportionately faced conditions that are hindrances to achieving at levels reached by majority students, from birth to school completion—if, in fact, they complete. At different points along the way they will, on the average, be behind White children in their cognitive development. Gaps in school achievement, as measured, for example, in the eighth grade, have deep roots—deep in out of school experiences and deep in the structures of schools. Inequality is like an unwanted guest who comes early and stays late.

A policy and practice designed to remove wide gaps in achievement would need to be wide ranging to nip such inequality in the bud, to see a full and equal flowering in academic achievement, and to complete school with students showing the kind of equal quality in achievement that shows in a florist's display of flowers.

Gains in student achievement can most likely be realized wherever along the development continuum the effort is made. And, of course, the schooling period is where the concentrated effort to instill knowledge and understanding is applied, through an institution created solely for that purpose.

But this is not at all to say that the education system can succeed in greatly reducing the gaps by going it alone. A learning policy needs to be mindful of what harms learning along the way. And an education policy during the schooling period needs to be mindful of what can be done beyond designing curriculum, setting standards, and establishing accountability. There are inequities in teacher preparation in subject matter, experience and turnover, in class size, and in student classroom behavior. Also, schools can take greater interest in obtaining parent involvement, and student school records can be made to follow students who move from school to school (they often don't).

There are models to learn from in many places of the extension of effort beyond the school doors. One important example is the community schools movement, which has reached out to the community but with the intent to remain rigorous in the demand for high academic standards.

In public policy generally, greater understanding of the roots of inequality in achievement can perhaps contribute to an understanding of the education equality component in things like dealing with environmental hazards such as lead, and assuring adequate nutrition.

Families, of course, are America's smallest schools. They have a large responsibility to regulate use of the TV set, read to young children, see that they get to school, and support efforts to foster discipline and order in the schools.

There are differences in what happens in schools that are associated with differences in student achievement, including high standards with rigorous curriculum, qualified and experienced teachers, and orderly classrooms. Differences in such key components of schooling go along with differences in achievement among different student populations, at least when average achievement is compared.

From time to time there are disagreements about how much importance to assign to one set of factors as compared with another. There is fear that looking outside school will give excuses to the schools. And there is fear that a focus entirely on the schools will cause neglect of matters important to children's well-being and learning, and of expecting more of schools than is within their capability.

Nothing about the impediments to learning that accumulate in a child's environment should be a basis for lowering expectations for what can be done for them by teachers and schools, or for not making teachers and schools accountable for doing those things. And denying the role of these outside happenings—or the impact of a student's home circumstances—will not help to endow teachers and schools with the capacity to reduce achievement gaps. Also, insistence that it can all be done in the school may be taken to provide excuses for public policy, ignoring what is necessary to prevent learning gaps from opening. Schools are where we institutionalize learning; they are also places where we tend to institutionalize blame.

The consequences of enduring these gaps in our democracy and society are widely feared—enough so, perhaps, for those who press for actions to reach children *outside* school, and those who press for high standards *inside* the schools, to march together like Lewis Carroll's unlikely pair, the butcher and the beaver.

But the valley grew narrow and narrower still,
And the evening got darker and colder,
Till (merely from nervousness, not from goodwill)
They marched along shoulder to shoulder. [40]

If there is benefit to linking research-based correlates of school achievement to gaps in access to favorable factors and conditions, it will not likely come from a one-time effort such as this report. What is needed is a set of indicators, at the national and state level—and below, if possible—that can be watched at regular intervals. The baselines in this report could be a point of departure.

Many sets of statistical indicators are now published, and they have been drawn on for this report. But to be applied, they need to be organized and focused in conjunction with research-based findings as to what is correlated with student achievement. Such a marriage could disclose where the statistical indicators need to be supplemented and improved for tracking the gaps. For example, we have no information on the gaps in frequency of school changing since the 1994 data (or at least none that this author discovered).

On the research side, a lot of what is available is the result of happenstance, as described early in this report. A well staffed effort, with sufficient time—say by the National Research Council—could be inclusive, give authority to a synthesis of research on the correlations of student achievement, identify gaps in research, and call for improvements needed in data collection to identify and track the gaps in a systematic way.

Perhaps such a systematic effort could further understanding of where there is the greatest leverage in reducing achievement gaps and where efforts are most cost effective. Certainly there are huge gaps in the knowledge base available to policy makers and practitioners, and to those who advocate action to reduce inequality. From what we do know, however, we can be sure that gaps up and down the line impede achievement in schools and perpetuate gaps in learning outcomes.

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[40] Lewis Carroll, *The Hunting of the Snark: An Agony in Eight Fits.*

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