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ABSTRACT

Noting that students' failure to master the basic skills by third grade places them at high academic and social risk, this report provides a synthesis of the findings from a meeting that drew 30 of the nation's leading experts on early childhood education and school reform to discuss the plight of primary education. The meeting was designed to examine the necessary program and policy strategies most likely to bring about broad-scale improvement in the results of instruction in prekindergarten through third grade, particularly for children at risk. Participants included national leaders in educational research, policy, and practice relevant to the early grades; outstanding district and state superintendents; representatives of key education organizations and task forces; and representatives of several foundations. The report is divided into four areas around which the meeting's discussion centered: (1) instruction, learning, and the school context; (2) standards and assessment; (3) teacher preparation and professional development; and (4) the current context of education. Appended are two additional papers, "Conclusion: A New Pedagogy for Policy?" by David K. Cohen and Carol A. Barnes, which describes the challenges of preparing educators to teach students more rigorous, high-level curriculum content; and "Elementary Students at Risk: A Status Report," by Nettie Legters and Robert E. Slavin, which provides a status report on recent educational research documenting the numbers of elementary students at risk of school failure. (TJQ)

STARTING RIGHT

REFORMING EDUCATION IN THE EARLY GRADES

(Prekindergarten through Grade 3)

By Carol E. Copple

Report based on a meeting held
at Carnegie Corporation of New York
June 1 and 2, 1992

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From time to time Carnegie Corporation holds meetings on issues of importance that may be closely related to its grant programs. Occasionally, reports of these meetings merit public dissemination.

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FOREWORD

In the last two decades, most education reform efforts have centered on changes that need to be made in the middle grades through high school. The early elementary grades have been comparatively neglected. But as this report, *Starting RIGHT: Reforming Education in the Early Grades*, describes, for too many children entering school, "trouble is already brewing." If they fail to master basic skills by the third grade, they are at high risk of developing serious problems later on: becoming pregnant, becoming involved with drugs, dropping out of school. Eight-year-olds who have failed a grade and who also read below grade level are very unlikely to finish high school.

In typical urban settings, many youngsters of normal intelligence who enter school behind their peers in basic skills or who are considered to have behavior problems are taken out of the regular classroom and given remedial instruction or put into a special education track. While the intention may be to give them special attention, these actions can lead them into a spiral of educational failure.

Today, new demands on schools to teach higher levels of skills to all children are challenging all educators to reexamine their practices. In the context of rapidly changing demographics and family structures, this country must find ways to improve dramatically instruction in the primary grades. If efforts to provide education for disadvantaged students succeed in the first three years, important leverage for successful fundamental reform of the entire elementary and secondary school system will be gained.

This report, prepared by Carol E. Copple, a consultant specializing in early childhood issues, provides a synthesis of the findings from a meeting held at Carnegie Corporation on June 1 and 2, 1992. The meeting drew together thirty of the nation's leading experts on early childhood education and school reform to discuss the plight of primary education. David K. Cohen, John A. Hannah Distinguished Professor of

Education and Social Policy at Michigan State University, chaired the meeting. The report draws on brief statements prepared by the participants and on several other resources. Appended are two papers. One, by Cohen and Carol A. Barnes of Michigan State University, describes the challenges of preparing educators to teach students more rigorous, high-level curriculum content. The other, by Nettie Legters and Robert E. Slavin of Johns Hopkins University, provides a status report on recent educational research documenting the numbers of elementary students at risk of school failure.

It is our hope that this report will be stimulating and helpful to those who care about the future of our children.

David A. Hamburg
President
Carnegie Corporation of New York

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INTRODUCTION

Every September between three and four million American children enter kindergarten. They walk up the steps full of pride and excitement about starting school. Yet, only a few years later, many of these children will be receiving Chapter 1 and other compensatory education services because of their low achievement, and a large number will be in special education. A great many will fail one or more grades; in many urban districts the majority of fifth graders have failed at least one grade. Many of the children will be reading so poorly that they will have trouble throughout their school careers. Many will be discouraged, frustrated, angry, or unmotivated.[1]

In the first few years of school, children do not yet display the dramatic problems that show up later, such as school failure, dropout, violence, and teen pregnancy. But trouble is already brewing. While at the start, students' socioeconomic status and performance do not predict high school completion very well, by the third grade they do. By then, poor children who have failed a grade or who read below grade level are very unlikely to graduate.[2] Unfortunately, the more a child experiences failure in school, the harder it is for him or her to turn the tide.

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[1]Legters, N., and R. E. Slavin. *Elementary Students at Risk: A Status Report.* Paper commissioned by Carnegie Corporation of New York as a background paper for the consultation on the early grades, 1992. (See Appendix C.)

[2]Lloyd, D. N. "Prediction of School Failure from Third-Grade Data." *Educational and Psychological Measurement* 38 (1978): 1193–1200.

For these reasons, the early grades can be seen as pivotal years in a child's school career.

Determining how to help students, particularly disadvantaged students, succeed in elementary school was the central purpose of Carnegie Corporation of New York's Consultation on the Early Grades, held June 1-2, 1992, in New York City. The meeting was designed to examine the necessary program and policy strategies most likely to bring about broad-scale improvement in the results of instruction in prekindergarten through third grade, particularly for children at risk. Invited participants included national leaders in educational research, policy, and practice relevant to the early grades; outstanding district and state superintendents; and representatives of key education organizations and task forces. Representatives of six foundations, in addition to Carnegie staff members, participated.

This report is divided into four areas around which discussion in the consultation centered:

- Instruction, Learning, and the School Context
- Standards and Assessment
- Teacher Preparation and Professional Development
- The Current Context of Education

In each of these areas, there is substantial consensus on certain key issues. On other issues, there is much ferment but no firm knowledge base or consensus about the best direction for reform to take.

INSTRUCTION, LEARNING, AND THE SCHOOL CONTEXT

Participants generally agreed that the knowledge base exists to move forward in designing programs to ensure that every student in a large, urban elementary school will attain a reasonably high level of basic and higher-order skills in reading, writing,

mathematics, and science during their early school years, although some key issues have to be debated.

- A great deal is known about ***effective instruction***.
- While a considerable amount is known about what works with the student population as a whole, ***less is known about whether students from different economic and cultural backgrounds are well served by the same strategies.***
- It is known that ***current educational practice diverges sharply from what researchers recommend*** on the basis of available evidence, with the starkest contrast for disadvantaged students.
- Regarding effective instructional practice, ***more is known about teaching the basics than teaching higher-order thinking skills***.
- ***More is known about learning and effective instruction in some subjects*** than others — most in reading, least in science and social studies, an intermediate amount in math.
- ***Far too little is known about what it will take to move teachers and schools*** to function in ways that have been found to be effective. While much is known, it is educational researchers and a few others who have the knowledge; it is not widely possessed by teachers, principals, personnel in local education agencies and state education agencies, and policymakers.

In short, more is known about what constitutes effective practice than about how to achieve it.

What Should Early Elementary Classrooms Look Like?

Perhaps no two experts would describe precisely the same ideal elementary classroom. Indeed, if one looks at "what works" from an international and a historical perspective, it is evident that children can succeed in becoming adept and flexible thinkers through a wide range of pedagogical approaches. There is more than one way for children to learn. Ultimately one should move beyond any particular set of instructional practices to discover the *many* ways of reaching the

same goals.

While acknowledging the limits of any single prescription for best pedagogy, participants agreed that current thinking about best practices in elementary education, taken together, would lead schools to take a very different approach to classroom learning, as summarized in Exhibit 1 (see page 5). Teachers would do more listening than talking; classroom discourse would be more conversational; students would assume more responsibility for their own learning; the focus would be more on the depth than breadth of content; emphasis would be less on producing the "right" answers than on addressing problems that are challenging.

There is some evidence that such approaches are highly productive for children's learning, but educators are only at the most preliminary stages of assessing the outcomes or figuring out how to create strategies. To bring about changes in the classroom environment and pedagogy along these lines clearly would require significant rethinking of the way schools are organized, the way curricula are designed, the way student learning is promoted and assessed, and the way teachers are prepared. Moreover, since real change depends on achieving significant reform in all these areas at the same time, it would be very difficult to accomplish.

"Catch-up" vs. "Leap Frog"

While the last decade's push to improve basic skills met with some success, evidence from the National Assessment of Educational Progress and other sources suggests that students did not gain — and may even have lost ground — on higher-order thinking skills.[3] Fourth-grade students improved in this regard from 1978 to 1990, but the gains were primarily on computation and routine one-step problems; they did not gain significantly in such abilities as analyzing daily life problems and in determining which mathematical procedures to apply.

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[3]Mullis, I., J. Dossey, M. Foertsch, L. Jones, and C. Gentile. *Trends in Academic Progress*. Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 1991.

EXHIBIT 1
What Should Early Grades Classrooms Look Like?[4]

The Teacher and Teaching

The teacher does more questioning than telling, lecturing, or explaining.

The teacher does more listening than talking.

The teacher encourages and values multiple approaches, ways of thinking, and ideas rather than a single approach, way of thinking, or idea.

The teacher focuses on the strengths, knowledge, and understandings that children bring to the classroom from their culture, families, and formal and informal learning rather than on their deficiencies or misunderstandings.

Students and Classroom Discourse

Classroom discourse is more like conversation than lecture-recitation.

Students' knowledge, thinking, and understandings are made "visible" through oral and written discourse rather than remaining invisible or implicit in written answers to worksheets.

The students and the teacher use, discuss, and build on students' ideas rather than only using and discussing the teacher's ideas or those in a textbook.

Students personally commit to, and assume greater responsibility for, their own learning rather than complying with teacher demands or responding to external consequences.

Students collaborate rather than only compete in solving problems, in reasoning, in their involvement in inquiry, and in written and oral discourse.

Content

Complex, meaningful problems are posed and challenging, "worthwhile" tasks are constructed by the teacher and the students.

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[4]Based on a list presented in the consultation by discussant Penelope Peterson to summarize the emerging consensus on what elementary classrooms should look like.

The focus is on depth rather than breadth of content coverage.

Knowledge consists of more than just right answers, facts, or information.

Contexts of Learning

The classroom becomes an authentic learning community rather than assembly line or workplace.

Students' ideas are respected and valued; students are supported for taking risks, offering ideas, and making mistakes; and teachers as well as students revise their thinking and understandings as they learn together.

Children's in-school experiences are related to their out-of-school experiences and culture.

If the list in Exhibit 1 were placed side by side with a list of best practices for teaching basic skills, they would be different. In fact, the two lists would conflict in a number of respects, and a teacher would not be able to implement both sets of practices at once. Focusing primarily on low-level basic skills means forever playing "catch-up," a game that can never be won. On the other hand, by setting one's sights on promoting higher-order skills, students may be able to learn basic skills in the process. In helping students learn to communicate effectively through writing, it may not be necessary to spend hours drilling on spelling or grammar. Teachers can provide feedback and instruction on spelling and grammar, as students work on meaningful writing tasks of increasing complexity. Though there is some research evidence to support this appealing concept, much work remains to be done on how to ensure that basic skills are indeed acquired when classrooms focus on higher-order learning.

"Intellectually Ambitious Instruction" and "Developmentally Appropriate Practice" — Can We Have Both?

Another potential tension in early grades education is between two reform thrusts. The first is aimed at setting higher standards and making education more "intellectually ambitious." The second is concerned with making the classrooms of children from prekindergarten through third grade more "developmentally appropriate."

While there may be no inherent tension between these two concepts, nor between the practices that embody them at their best, the idea of more intellectually ambitious instruction may sound to some early teachers as a threat to what they hold sacred: the need to create a nurturing environment in which children develop physically, emotionally, socially, and cognitively through play, social interaction, and self-interested activity. On the other hand, to those charged with the task of moving all children to higher levels of achievement, developmentally appropriate practice may sound as if it leaves too much to chance.

Yet, many educators see no essential incompatibility. At a general level, the push for higher standards and developmentally appropriate practice may be reconciled as they are in the report of the National Task Force on School Readiness, which states that the national agenda for advancing readiness

> . . . requires that kindergarten and primary grade classrooms exhibit a blend of high expectations, high support, and engaging activities in which students work and learn together in different ways. We base this design on the strong consensus held by early childhood educators and educational researchers on effective approaches to teaching and learning reading, writing, mathematics, science and social studies.[5]

The National Task Force describes a kindergarten and early grades classroom that are organized around a learning center where children can read, work with blocks, explore science, listen to tapes of stories and music, create art, engage in dramatic play, and manipulate mathematics materials. In such classrooms, like those portrayed in Exhibit 1, children do not sit in rows of desks; rather, they move between activities, talking and working in pairs and groups most of the time. Teachers work actively but seldom deliver instruction to the group of children as a whole. Instead, they operate as "*architects* of activities and social arrangements, *monitors* of group behavior and individual progress, *coaches and questioners* to extend learning experiences, and *coordinators* of other human and technical resources."[6]

While there may be no inherent conflict between intellectually ambitious instruction and developmentally appropriate practice, a great gulf currently exists between many practitioners within the school setting and the early childhood tradition. Even among those formulating the reform agenda, proponents essentially

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[5]*Caring Communities: Supporting Young Children and Families*, p. 33. The report of the National Task Force on School Readiness. Sponsored by the National Association of State Boards of Education. N.p. December 1991.

[6]Ibid.

come from two different sets of people, and the two frameworks have remained essentially distinct.

Special Problems for Poor Children in the Early Grades

Many children from low-income families enter school less able than their peers to handle the social and academic requirements of school. They may do reasonably well for a year or two, but their underpreparation becomes increasingly evident, and they do not conform to the behavioral requirements of school. According to Dr. James P. Comer, professor of child psychiatry at Yale University's Child Study Center and one of the participants in the Carnegie Consultation, some schools respond by subjecting these children to *more* controlling tactics, *more* structure, *and more* drill-and-practice than their peers receive. Many fight back. The school then reacts with still more control and lower expectations, further frustrating the children's drive for *autonomy and initiative*, which is so strong at this age. This disastrous cycle exemplifies how a lack of staff knowledge and understanding of key aspects of child development — in this case, the thrust for autonomy and initiative in the early elementary years — contributes to the mounting difficulties that children, particularly poor children, experience in school.

Another development during the early grades is a *maturing cognitive capacity* that allows nonmainstream children to see how different they and their families are from "school people." It is at this time, Dr. Comer believes, that low-income, minority children first "place themselves" as being outside the mainstream and are thus not likely to do well in school. These powerful barriers of attitude and self-concept are often reinforced by parents and other family members.

Comer identifies four major problems that often characterize ineffective schools:

- They have low expectations for children's and teachers' performance.
- They fail to recognize that children's home life and all aspects of their development affect their school performance.

- They lack understanding of children's development and the needs of parents.
- They limit parental involvement in their children's education and do little to overcome parental discomfort and alienation in dealing with school staff.

While each of these barriers to effective schooling has been widely recognized by thoughtful observers of schools, the intimate connections among the problems are not always given sufficient attention. Strategies addressing only one or two of the problems have been found to have only limited impact. It is increasingly clear that the constellation of interrelated problems demands an integrated set of strategies, such as those in the School Development Program or Robert Slavin's Success for All program.[7] Though effective approaches — those in existence and those yet to be developed — will differ in their particulars from the Comer and Slavin programs, each must work to change parental attitudes, the school climate, staff expectations, parental attitudes, and other related aspects of the status quo if children are to succeed.

Though in the past the early elementary grades have not been the focus of a great deal of attention, largely because children are not yet displaying the problems that later become dramatically apparent, the pivotal role of these years in children's long-term school success is widely acknowledged. Moreover, it is increasingly clear that current early grades instruction — and, indeed, the school context as a whole — is failing to meet the educational and developmental needs of many children, especially those living in poverty.

The preceding section delineated major areas of concern with respect to instruction, curriculum, and the school context in the early grades and suggests some promising levers for change. The next section does the same for assessment issues.

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[7]Legters and Slavin, 1992.

STANDARDS AND ASSESSMENT IN THE ELEMENTARY GRADES

The consultation considered this question: Can schools achieve dramatic reforms in early grades curricula and instruction while still relying on the sorts of standardized tests currently in use? The consensus was that they cannot; new assessment strategies must be devised. The current procedures for assessing students were judged inadequate on several counts.

First, multiple-choice tests in which students fill in bubbles on machine-graded answer sheets can only measure certain limited skills. They do not assess the student's ability to perform a complex activity, such as writing a letter or determining what information is needed to solve a problem and how to go about getting it.

Second, taking a standardized multiple-choice test is an activity entirely outside the process of learning and instruction, though it is quite possible to embed assessment as a natural part of instruction.

Third, norm-referenced tests, as opposed to criterion-referenced tests, can only tell us how students are performing relative to each other, that is, whether students in District A are doing better or worse than those in District B, better or worse than last year's students, and so on. Such tests are useless in determining whether students are attaining the levels of knowledge and skills that they should be.

To address these inadequacies of the present assessment system, five principles underlying a reformed *autnentic assessment system* at the elementary level were articulated.

1. ***A broader array of assessment procedures.*** Schools should use a variety of procedures to measure student progress — samples of work, performance-based assessments of students performing complex tasks and applying skills to novel situations, criterion-referenced tests, norm-referenced tests, and assessments of thinking and social skills.

2. ***More emphasis on assessing complex, higher-order skills.*** Much of present assessment focuses on skills that are relatively low in the hierarchy, and it often seeks to measure single skills in isolation. As suggested by the Elementary Grades Task Force report, *It's Elementary!* what is needed is assessments with tasks that are "*complex* (involving the marshaling of many learning behaviors), *open-ended* (with many possible solutions), and intellectually *coherent* (resulting in a single work-product)."[8]

3. ***Assessment that is embedded in the context of instruction and learning rather than always being a separate, disembodied activity.*** Opportunities for authentic, contextualized assessment abound. In the course of the school year, students carry out many tasks that reflect their progress in mastering various skills and knowledge; some of these may be used or adapted for assessment purposes.

4. ***Resonance between assessment for "inside" and "outside" purposes.*** The most important functions of assessment are to inform students of their progress in reaching desired performance levels and to help teachers identify what students know and still need to learn. With respect to these "*inside" purposes*, assessment results provide teachers and schools with information for meeting students' learning needs.

Another legitimate function of assessment is to provide information to those *outside* the school who have a stake in students' learning — parents, taxpayers, school board members, and legislators — and provide a basis for the accountability of schools and teachers. Though assessment procedures for inside and outside purposes should not be the same, they must be compatible. A school that uses state-of-the-art, authentic assessment methods but is still subject to norm-referenced standardized tests for accountability purposes will find that test scores continue to drive the system. Likewise, if authentic assessment methods focusing on thinking skills are established for outside as well as inside purposes, they may be a powerful

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[8]*It's Elementary!* p. 66. Elementary Grades Task Force Report. Sacramento, California: California Department of Education, 1992.

lever in moving the system toward a thinking curriculum. Though participants emphatically agreed on this principle, they were not confident that authentic assessment strategies would have demonstrated viability for accountability use in the immediate future.[9] If norm-referenced tests continue to be used for accountability purposes until viable alternative methods have been developed, their limitations should be clearly recognized.

5. ***Infrequent, low-stakes assessment in the early grades.*** In the early grades, formal assessment, particularly standardized testing, should not be used as the basis for high-stakes decisions, such as school entry, promotion, or placement. While teachers should be using authentic assessment strategies (e.g., gathering work samples and observing each child in a range of learning situations) to determine individual children's progress, some standardized testing to determine group progress also may be appropriate. Such testing, perhaps by third or fourth grade, should be no more frequent than necessary. The burden on students' time might be reduced by testing on different subjects in different grades.

Apart from considering how assessment should be changed to improve early grades education, participants gave some attention to the role of standards in education reform. Some participants advocated national goals and standards as a beacon to states and districts, though not as something imposed by the federal government without regard to local circumstances. They also argued that national standards would send the message that as a nation we reject differential expectations for students of varying ethnic and income groups, which have been quasi-officially

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[9]In the forefront of assessment reform is the New Standards Project, in which seventeen states and school districts in six urban areas are participating as partners. The New Standards system will employ advanced forms of performance assessment, including portfolios, exhibitions, projects, and timed performance examinations, all based on the use of real-life tasks that students are asked to do alone and in groups. Some of these tasks can be completed in minutes; others will take weeks or even months. Work has begun on the tasks that will constitute the core of the examinations. The first valid, reliable, and fair exams will be available for use in math and English language arts by 1993–94, and in science by 1995–96.

accepted in the past. Others participants, while accepting the articulation of standards, that is, benchmarks of what students should know and be able to do, still grappled with sorting out federal, state, and local roles in setting and upholding standards.

Though clear standards and better ways of assessing children's learning may constitute useful levers for change, it would be naive to assume that they can fix what is wrong in U.S. education. It cannot be expected that establishing standards and exchanging our present test-driven system for better assessment strategies will produce the desired outcomes. Teachers, for instance, will not automatically acquire an understanding of the new goals for children's learning nor the instructional skills to achieve them. More realistically, a reformed assessment system would be only one of a systemic set of reforms that also include school restructuring and changes in instruction, curriculum, and staff development, all of which are needed to bring about the changes in schools that are needed. It has been suggested (see Cohen and Barnes paper, Appendix B) that extensively involving teachers in designing and reviewing new assessment tools would provide excellent opportunities for engaging them in new conceptions of learning and instruction.

TEACHER PREPARATION AND PROFESSIONAL DEVELOPMENT

No substantial change will occur in the schools, of course, without a substantial change in the goals, knowledge, and skills of classroom teachers. A recurrent and resounding theme of the consultation was that the reforms being discussed will require radical change in how teachers perceive their jobs, what they understand about children and learning, how thoroughly they know the subject matter areas, and what they know how to do. Accomplishing such an ambitious agenda, not just with a few extraordinary teachers here and there but with all the nation's teachers, will demand staff development efforts of staggering proportions. And they will have to

be quite different in nature from conventional preservice and in-service education.

Preservice teacher education, induction, and ongoing professional development all need considerable rethinking and restructuring. And teachers themselves should be involved in this process. In any reform effort they need to be on board from the beginning, rather than being informed from the top down that they will need to change dramatically.

Nor should teachers be seen merely as "implementers" of reforms worked out by others. As Cohen and Barnes persuasively argue, teachers should be intimately involved in all the tasks of the reform agenda: devising new academic standards, designing new assessments, developing new instructional frameworks, and evolving new curricula. As they work at these tasks, teachers will begin to change their conceptions of learning and instruction. They will need extended opportunities to "practice" in ways that enable them gradually to contrive a very different pedagogy. Thoughtful colleagues should observe teachers' work and make the observations part of a sustained conversation about teaching and learning to teach. Equally important, teachers need opportunities to reflect on these conversations, to try out revisions in their work, and to weigh the results. The point is not to give teachers techniques but to enable them to develop understandings.

With respect to the content of training, participants emphasized that all levels and modes of teacher education need to include more grounding in how children develop and to emphasize developmentally appropriate practice. Teacher education should also promote more understanding of family relationships and methods of dealing with parents as partners in the educative process. In addition, a great many teachers need to have more solid and complete knowledge of each content area in which they provide instruction. Moreover, transforming instruction from conventional to more intellectually ambitious instruction in a given curriculum area requires thoughtful working out of strategies, materials, assessment, and other elements specific to that subject matter area. What has been developed for mathematics will not take teachers far in working out what is needed for reading or science.

Some issues and strategies discussed in the consultation relate more specifically to preservice education, induction, or in-service staff development.

Preservice and In-Service Education

Two major kinds of change were advocated for preservice education:

1. ***Earlier and more extensive exposure to classroom settings with experienced and successful teachers.*** Preservice experiences should include ample amounts of supervised practice with whole classrooms, small groups, and individual students. At the same time, there is a limit to how much on-site training alone can accomplish. Intending teachers and other novices need time and opportunity to reflect on what they see as well as help in sifting out from the bustle of activity the significant aspects of what is happening. Among other things, they need help with learning to listen to children. Videotape and other interactive media are useful tools for giving intending and practicing teachers the opportunity to focus on specific areas of concern. Otherwise, much of what happens in the classroom goes by so fast that the individual does not get the chance to "process" learning sequences and thereby to gain in understanding of children's thinking and learning.

2. ***Increased familiarity with students' community, culture, and learning styles.*** Though mere exposure to students of different backgrounds is not enough and may actually reinforce prejudices, such experience may be effectively coupled with discussion opportunities and other means of extending intending teachers' familiarity with, and openness to, diverse students. Of course, a balance is needed between enabling intending teachers to experience a wide spectrum of settings and students and also to experience, at least in a few settings, a greater degree of involvement and continuity.

As for the professional development of practicing teachers, this must move away from reliance on one-shot training workshops, which are widely recognized to have little effect, to ongoing training that is sequenced and cumulative. Especially useful

is getting feedback from a peer coach or mentor who observes the teacher in action.

Time for teachers to reflect on and debate new ideas and curriculum frameworks and to collaborate in developing instructional strategies and materials is key to educational change. California's Elementary Grades Task Force report asserts, "The most important and enduring kinds of professional development — those that enhance professional judgment and that result in improved student outcomes — must go on for years, not weeks or months, with repeated opportunities for input, discussion, application, and review."[10] This implies a fundamental change in teachers' working conditions and the time devoted to professional development. Since each day added to the teachers' school year is expensive — about $55 million a day in California — schools should consider alternative strategies.[11] Existing staff development days, now usually taken up with one-shot presentations, would be put to better use by giving teachers the opportunity to work together on instructional issues of concern to them. To free up teachers' time so they can participate in professional development, some schools are doubling up on team-taught classes and using categorical funds to hire part-time teachers in areas like art and music.

Another possible strategy is to reduce the present two-to-one ratio of professional staff to classroom teachers. If professional staff spent some time in the classroom — arguably quite a valuable change in itself — and some nonteaching positions were eliminated, the savings could be used to lighten teachers' classroom responsibilities. The "free time" gained for teachers would be allocated to planning, observing other classrooms, collaboration, and other activities to enhance their professional development.

These limited strategies for eking out a little more professional development time fall far short of meeting the need for teachers to engage in a massive unlearning of

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[10]*It's Elementary!* p. 58.

[11]Ibid.

old conceptions and practices, constructing new understandings of how children learn, and developing a new set of skills for a new kind of classroom. To finance professional development and teacher collaboration properly, a larger-scale strategy is needed. For example, all federal programs serving children in the elementary grades — Chapter 1, Individuals with Disabilities Act (IDEA), Head Start, Even Start, Follow Through, and others — could set aside for in-service education a portion of annual funding, at least 5–10 percent.[12]

Financing aside, institutional barriers to reforming teachers' professional development are likely to prove formidable. Clinical engagement of the kind recommended for those training teachers is not currently rewarded or valued highly in schools of education; the incentive structure would have to change substantially. Reform is also stymied by the politics and culture of teacher training institutions, including academic governance, problems of restructuring curriculum and courses, and the powerful turfism that constrains cooperation of schools of education with other departments and colleges, such as arts and sciences. In addition, efforts to improve the training of intending teachers must contend with states' credentializing criteria.

To address these considerations, a systems approach to reforming teacher preparation would include, at a minimum, the following actions:

- Change licensure and teacher certification so that they are based not on courses taken but on assessment of what teachers should know and be able to do.
- Link the state approval process for teacher education programs to the

[12]The Commission on Chapter 1 has proposed that at least 20 percent of Chapter 1 dollars be invested to assist teachers, principals, and other school personnel in developing the overall capacity and focus of the school, reorienting the curriculum, and deepening staff knowledge of both subject matter and instructional practice — a set of activities that subsumes but extends beyond the usual conception of in-service training.

licensure and teacher certification requirements.

- Make a real investment in improving teacher education, probably on an innovative incentive grant basis.
- Incorporate a serious internship model, possibly in a professional development school and starting during student teaching.
- Modify the school structure to provide opportunities for collegial team planning and school improvement. work around new curriculum frameworks and means of assessment.
- Make strategic use of technology in teacher preparation and ongoing professional development.

Few of these actions would be easy to carry out on a massive scale. Serious internship models, for instance, would require funds for release time and a sufficient number of master/mentor teachers who can provide other individuals with a useful internship.

Although both existing preservice and in-service delivery systems can by no means be dismissed, there are those who doubt whether they will ever be sufficient for the kind of reeducation job at hand. In a new paper, Judith Warren Little provides a useful summary of four alternative forms of professional development that were discussed to varying degrees in the course of the consultation:[13]

- ***Teacher collaboratives and other networks.*** Subject-specific collaboratives in mathematics, science, and the humanities have grown in size, visibility, and influence over the last decade. They are based on a vision of teachers' professional development encompassing: "(a) teachers' knowledge of academic content, instruction, and student learning, (b) teachers' access to a broader network of professional

[13]Little, J. W. *Teachers' Professional Development in a Climate of Educational Reform.* Preparation of this paper was supported by the Consortium for Policy Research in Education (CPRE) as part of the project Evaluating Reform: Systemic Reform, with funds from the Office of Educational Research and Improvement (OERI), U.S. Department of Education (No. RR911725005). N.p. 1992.

relationships, and (c) teacher leadership in the reform of systemwide structures."[14]

- ***Subject matter associations.*** Teachers' professional associations such as the National Council of Teachers of English (NCTE), the National Council of Teachers of Mathematics (NCTM), and the National Science Teachers Association (NSTA) have been exerting an increasingly powerful influence in formulating subject curriculum and assessment standards. Little is known about the role these associations play in the professional life of ordinary classroom teachers at the elementary or secondary levels or in shaping teachers' disposition toward particular reforms. But each provides a professional community that extends beyond the school walls, fundamentally independent of the employing organization, but positioned to exert considerable influence on teachers' dispositions towards reform proposals.

- ***Collaborations targeted at school reform.*** While school-university collaborations have had longstanding problems with the asymmetries in status, power, and resources, as partnerships have evolved they are trying to develop ways of moving towards greater parity in obligations, opportunities, and rewards. The Coalition of Essential Schools offers the image of the school "friend," the insider/outsider (generally affiliated with a university) who remains attached to the school to provide support and critique of school progress and to expand access to information and other resources. At Harvard, Michigan State, Stanford (the Stanford/Schools Collaborative), and other university leaders in teacher education, alliances with local schools are experimenting with incorporating cross-institutional roles, such as "Professor in Residence in Schools" opportunities and classroom teachers as lecturers to the teacher education programs.

- ***Special institutes and centers.*** Asked to describe "favorable" professional development experiences, teachers give high marks to special institutes, such as the summer institutes sponsored by the National Science Foundation, where teachers enjoy sustained work with ideas, materials, and colleagues. They praise centers, such as the University of California's Lawrence Hall of Science with its commitment to making math and science more accessible, rich, and engaging for students, parents, and teachers. Such institutes appear to offer substantive depth

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[14]Lord, B. *Subject-Area Collaboratives, Teacher Professionalism, and Staff Development*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, 1991.

and focus; adequate time to grapple with ideas and materials; the sense of doing real work rather than being "talked at"; and an opportunity to consult with colleagues and experts.[15]

As Little states, each of these forms of professional development has the capacity to engage teachers "in the pursuit of genuine questions, problems, and curiosities, over time, in ways that leave a mark on perspectives, policy, and practice. They communicate a view of teachers not only as classroom experts, but also as productive and responsible members of a broader professional community, and as participants in a career that may span thirty or more years."[16]

To this point, our discussion of issues and strategies for reform in early grades education has focused on three extensive and overlapping areas: instruction, learning, and the school context; assessment; and teacher preparation and professional development. Under each of these topics, we have outlined relevant policy implications and strategies that were discussed in the course of the Consultation on the Early Grades. Two major areas of discussion that did not fall into any of these topics, but cut across all of them, are (1) reform of the large categorical programs in order to better serve children in the early grades; and (2) the need for a massive education of the public, policymakers, and the education profession on the reform agenda and the reasons that it is needed.

THE CURRENT CONTEXT OF EDUCATION

Taking place at a time when strenuous efforts to reform American education were already underway, the consultation reflected this context in many ways. Participants indicated that while a great deal of momentum for change has been generated by the

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[15]Little, *Teachers' Professional Development*, p. 10.

[16]Little, *Teachers' Professional Development*, p. 16.

current debate over national goals, higher standards, and more thoughtful measures of classroom performance, no real progress will be sustained if policymakers and the public do not understand the tenacity of the problems which need to be solved.

Reform of Federal Categorical Programs

The consensus in the consultation was that the large categorical programs — Chapter 1, IDEA, and the Bilingual Education Act — are not operating as they should at the school level, a view widely shared by educators and policymakers familiar with the programs. There is too much duplication and too little flexibility in how categorical funds may be used and combined. Since many students qualify for and need two or more categorical funding sources, the programs should be much more closely aligned with one another and with regular education than they are at present.

The incentive structures in the federal categorical programs, notably the accountability systems and funding mechanisms, reward the wrong things. Since schools and districts receive funding on the basis of the number of students classified as requiring special education services, for instance, the incentive is to assign children such classification and keep them in it rather than to use the classification sparingly and work to move students out of special education as soon as possible. Chapter 1 accountability systems, it is widely recognized, reward retention, late intervention, and narrow teaching to standardized tests; improvement is punished by withdrawing Chapter 1 dollars from schools that succeed.

Nor is the Bilingual Education Act well designed for today's needs; it was conceived as a demonstration program with funds typically limited to three years. Moreover, it is a direct federal-to-local program, which precludes state-level coordination with Chapter 1, IDEA, and other federally funded and state administered programs.

To improve the design and use of the federal categorical programs to better serve children in the early grades, participants recommended the following strategies:

- Permit schools and school districts to comingle funds from categorical programs in the service of restructuring school programs and providing integrated services.

- Focus Chapter 1 and Special Education far more on prevention and early intervention than they are at present.

- Reform Chapter 1, Bilingual Education, and other categorical programs so that they use more appropriate assessment methods and an outcome-based approach.

- Invest significant funds from Chapter 1, Bilingual Education, IDEA, and other categorical programs in staff development and in research and development aimed at identifying effective programs and practices.

- Consider incentives and other mechanisms to help encourage funding equity within states. The Independent Commission on Chapter 1, for example, has proposed making federal Chapter 1 money to states conditional on equitably providing low-income students throughout the state education with services comparable to those received by students in more affluent areas, which include preschool programs, well-trained teachers, and reasonable class size.

Educating Policymakers and the Public

Throughout the consultation, participants spoke of the massive task of educating policymakers, educational publishers, and citizens on the reform agenda, particularly the new ways of looking at teaching, learning, and assessment. As Cohen and Barnes point out in their paper, the proposed curriculum and instruction reforms would entail close work among state and federal policymakers, publishers, university faculty, schoolteachers, and administrators, among others. Yet, building and sustaining such connections are constrained by the American system of dividing authority in education among federal, state, and local governments and dividing it within governments by the separation of powers. Moreover, Cohen and Barnes add, "the recent reforms would provoke terrific tensions with inherited knowledge and beliefs, and they would demand extraordinary change and learning from most American grown-ups." Their paper proposes several strategies for tackling this monumental

task.

Participants discussed the challenge of using program evaluation — often a ritualistic exercise — as an instrument for learning more about the content and processes of reform. If evaluation is connected to both theory and classrooms and if it engages a broader range of people, especially practitioners, it can provide useful indicators of the reform trajectory and also promote organizational learning.

CONCLUSION

In each arena of elementary education reform — curriculum, instruction, changing school context and climate, assessment, or professional development — we are only at the beginning. Whatever the gaps in the knowledge base on which reform stands, the consultation participants concluded, we know enough to move forward. On the whole, the direction we need to travel is becoming clear, but the route — or routes, for there are undoubtedly many — and means of getting there are less obvious. This report aims to provoke further reflection not only on the reform agenda itself but on ways and means for moving it forward. Towards this end, Carnegie Corporation of New York seeks in this report to bring to a wider audience of educators, researchers, and policymakers the work of the consultation participants in mapping out the territory that must be traversed to make the reform agenda a reality, warning of the pitfalls and dead ends to be avoided, and reflecting on promising strategies to get us where we want to go.

ENDNOTES

The ***School Development Program*** is based on work that began in 1968 when Dr. James Comer and his colleagues set about to improve two low-performing schools in New Haven, Connecticut. Today, the Comer model has been adopted for use by over 150 schools in 14 school districts around the country.

The School Development Program has four principal components. First, a *governance and management team* representing all adults involved in the school — the principal, teachers, and parents — considers what changes need to be made in the curriculum, social climate, and staff development aspects of the school program and works systematically to ensure that these changes are made. Second, a *mental health team* (e.g., the principal, a social worker, psychologist, special education teacher, and counselor) meets weekly to discuss individual children who are experiencing great difficulties and considers what interventions and services might help. The team also works to prevent problems by fostering a school environment favorable to children's emotional well-being and mental health.

Parent participation is vital and operates at several levels. Through representatives that parents select, they participate in formulating the changes they want to see in the school and plans for achieving them. Some parents also work in the school as classroom assistants, tutors, or aides. In addition, parents attend school events and sponsor, with staff, a variety of projects designed to create a good social climate in the school.

Finally, curriculum and staff development activities are part of the comprehensive school plan developed by the governance and management team. Staff development, recognized as critical, helps teachers and other staff to acquire the knowledge of child development and behavior necessary to understand children's needs more fully and the skills needed to promote personal, social, and academic growth among students.

Another schoolwide restructuring program is ***Success for All***, which was developed by the Center for Research on Effective Schooling for Disadvantaged Children at Johns Hopkins University, under the direction of Dr. Robert Slavin. First implemented in the 1987–88 school year in one inner-city Baltimore elementary school, it is now operating in thirty-one schools — both rural and inner-city — in twelve states, including Alabama, California, Idaho, Illinois, Indiana, Maryland, Pennsylvania, South Carolina, Tennessee, and Texas.

Success for All seeks to ensure that every student in a high-poverty school succeeds in acquiring basic skills in the early grades. Success is defined as performance in reading at or near grade level by third grade, maintenance of this status through the end of elementary grades, and avoidance of retention or special education. The program seeks to accomplish this objective by implementing high-quality preschool and kindergarten programs, one-to-one tutoring in reading to students (particularly first graders) who need it, research-based reading instruction in all grades, frequent assessment of progress in reading, and a family support program.

In some schools, the family support team consists of staff already in the school (e.g., the Chapter 1 parent liaison, counselor, vice principal, and teacher representatives); in high-resource schools, social workers, attendance monitors, and other staff are added to the school's usual staff. The team provides parenting education and works to involve parents in support of their children's success in school. Family support staff are also called upon to provide assistance when students seem to be working at less than full potential because of problems at home. Students who are not getting adequate sleep or nutrition, need glasses, are frequently absent, or exhibit serious behavior problems, receive family support assistance. The family support team is strongly integrated into the academic program of the school, receiving referrals from teachers and tutors regarding children who are not making adequate academic progress. The approach resembles that of Comer's School Development Program.

Another key element of the Success for All model is the use of tutors to promote students' success in reading. One-to-one tutoring, the most effective form of instruction known, is also used in another highly successful program, Reading Recovery. The major difference is that in Success for All tutoring is closely linked to regular classroom reading instruction, while Reading Recovery uses a stand-alone tutorial model.

Appendix A

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AGENDA

Carnegie Corporation of New York
437 Madison Avenue, 26th Floor
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Meeting on the Early Elementary School Grades
June 1 and 2, 1992

Monday, June 1, 1992

8:45 a.m.	Continental Breakfast
9:15 a.m.	Introduction: Purpose of Meeting (Vivien Stewart, Carnegie Corporation)
9:30 a.m.–12:00 p.m.	Teaching and Learning (David Cohen, Michigan State University; Jim Comer, Yale University; Penelope Peterson, Michigan State University)
12:00–1:00 p.m.	Lunch
1:00–3:00 p.m.	Assessment (Lauren Resnick, University of Pittsburgh)
3:00 p.m.	Break
3:15–5:15 p.m.	Teacher Supply and Professional Preparation (Linda Darling-Hammond, Columbia University)
	Adjourn to Omni Berkshire Hotel **21 East 52nd Street at Madison Avenue**
6:00–6:45 p.m.	Reception
6:45–8:00 p.m.	Conversation on Family, Community, and Service Linkages (John Merrow, South Carolina ETV; Tom Payzant, San Diego City School; Heather Weiss, Harvard Graduate School of Education; Anna Hopkins, Grand Street Settlement)
8:00 p.m.	Dinner

Tuesday, June 2, 1992

At Carnegie Corporation of New York Office (26th Floor)

8:30 a.m.	Continental Breakfast
9:00–9:30 a.m.	Synthesis of First Day (David Cohen, Michigan State University)
9:30–12:30 p.m.	Program Scale-Up and Policy Reform (Cindy Brown, Council of Chief State School Officers; Lynn Kagan, Yale University; Susan Traiman, National Governors' Association; Sally Mentor, California Department of Education)
12:30–2:00 p.m.	Lunch Two Superintendents' Perspectives: Tom Payzant, San Diego City School; Tony Alvarado, Community School District 2, New York City
2:00–3:00 p.m.	Opportunities for Foundations
3:00 p.m.	Adjournment

8

Appendix B

Conclusion: A New Pedagogy for Policy?

David K. Cohen
Carol A. Barnes

Educational reformers now press for radical changes in American classrooms. Leaders in politics and business demand "critical thinking" and "teaching for understanding." They insist on "world-class standards" for schools. They argue that students must become independent thinkers and enterprising problem solvers. Educators say that schools must offer intellectually challenging instruction that is deeply rooted in the academic disciplines. These proposals come from many different sources. The California State Department of Education has been urging such ideas on schools since 1985, and several other states are taking similar steps. The National Council of Teachers of Mathematics (NCTM) has launched a campaign to replace rote memorization of facts and procedures with deep understanding of mathematical ideas in all American schools. Researchers and reformers concerned with reading and writing are pressing a parallel approach in schools across the country. Several other professional associations and disciplinary groups are writing new curricula and instructional standards. Publishers have begun to climb on the bandwagon, and new tests and texts are being proposed, designed, and written.

These reform efforts differ from one another in some important ways, but they all differ vastly from most current practice. For many reformers envision an active, constructivist sort of learning and an intellectually adventurous approach to teaching. They believe that instruction should be rooted in a thorough knowledge of academic disciplines and that students should grapple with deep issues in those disciplines as a regular part of their classwork. In contrast, most teaching in U.S. classrooms is rather didactic. Teachers and students spend most of their time with lectures, or formal recitations, or worksheets, or some combination thereof. Intellectual demands generally are relaxed, and a great deal of the work strikes observers as dull. Only a modest fraction of public school teachers have deep knowledge of any academic subject.

What are the prospects for efforts to reform teaching in American schools? The question is as old as public education, though reformers rarely seem aware of it. In the 1840s Horace Mann and other advocates of more thoughtful and humane instruction proposed several of the ideas that enthrall today's reformers and exhorted teachers to embrace them. In the 1890s John Dewey and many allies refined and expanded the ideas and launched a campaign to get teachers to adopt them. Some of the same ideas were revived or discovered anew by reformers in the Sputnik era and sent sailing toward teachers with federal financial and political support. A decade or so later some of the same ideas were again discovered and urged on teachers in the Open Education and Free School movements. Several elements in these reform programs have been broadly adopted, but only at the price of accommodation to many persistently traditional features of prior practice.[1] If John Dewey or Horace Mann were suddenly transported to classrooms today, they would find both startling changes and many sadly familiar practices.

One reason for such mixed and slow progress has been the great difficulty of teaching as many reformers wish—a point that generally has escaped most of those who propose it. Another reason is the great difficulty of learning to teach very differently, which also has escaped most reformers. The progress of reform also has been slowed by Americans' chronic ambivalence about serious intellectual work. One additional reason for slow progress is that

educational policies have only occasionally and weakly promoted the sorts of teaching that reformers now propose. As we argued in Chapter Seven, policymakers have not earned high marks in pedagogy. The policies that are most simplistic intellectually have been most effective pedagogically, while the policies that are most ambitious intellectually have been least effective pedagogically.

New Designs for Policy

Despite this mixed and disappointing record, policymakers now urge much more challenging instruction on schools. In what follows we explore what it might take for them to succeed. We begin with a sketch of the sort of teaching that many current reformers envision, in part to suggest some of the things that most teachers would have to learn. With that in mind we turn to how teachers might learn a new approach to instruction and how policy might promote it. We sketch some proposals for a more educational approach to educational policy, but we note that it would be very different from current arrangements. Hence we also ask whether such a novel approach could reasonably be expected to work, given politics and education as we know them. Our aim in all this is exploratory: we want to probe unfamiliar terrain, not to issue a five-point program.

One thing that is missing in most reform proposals is a sense of what the new teaching might look like and what teachers would have to know and do in order to carry it off.[2] Several of the chapters in this book help in this department, for they sketch a few portraits of new pedagogies.[3] The portraits are unusual; in them teachers try to help students to learn to think and work in something like the ways that historians, mathematicians, and scientists think and work. These teachers treat the terrain of teaching as intellectual practices, that is, as history or mathematics or science. They see instruction in history or biology as a matter of getting students to engage significant problems in these practices, rather than simply transmitting the finished knowledge. Teachers invite students to try out ideas about how to set the problems, to discuss alternative ways to solve them, to test their arguments against evidence, and the like. Rather than acting as though students were empty vessels to be filled, teachers act as though students were active and interesting thinkers. Students must of course learn many finished products of these practices, but they do so while working as apprentice historians, mathematicians, and biologists work, rather than learning the finished products in isolation.

In order to do such work, teachers must find ways to provoke students' performance within the practices they teach. Hence they try to frame classroom tasks that are intellectually authentic yet accessible to apprentices. They try to set these tasks in ways that will stimulate students' interest and evoke lively work. They try to cultivate deep thought and rich discourse by devising appropriate activities, coaching, and conducting rather than didactically "telling knowledge" to students.[4] And teachers try to organize all of this so that members of the class will have access to one another's thinking.

Teaching of this sort defies many inherited ideological categories. It is not conventionally child-centered, for it is rooted in intellectual practices instead of childish activities. Yet it also is rooted in students' performance in those practices, and in their understanding of what makes a good performance. Similarly, though much teaching is done by learners in such classrooms, teaching is much more difficult than in conventional "knowledge telling." Finally, while teachers must be much more knowledgeable and active than their conventional colleagues in order to carry off such teaching, they must do so while finding ways to be much less prominent in the class's work.

When such teaching works, it greatly enriches instruction; but whether it works or not, it greatly complicates instruction. For teachers open up classroom communication to many more voices and much more independent and thoughtful speech. They revise the discourse structure of classrooms so that authority is diffused from teachers and texts to anyone who makes persuasive arguments. Students assume much larger instructional roles and responsibilities. The social organization of classrooms grows much more lively and rich, but teachers' intellectual and managerial responsibilities grow as well.

Learning and teaching as we have sketched them are much more social activities than ordinarily is the case in U.S. classrooms.

Deborah Ball writes that " . . . the GROUP is a focus of attention, even a sort of crucible for learning. Teaching in this way is not just some way to enhance each student's thinking and knowledge. It is also about interaction and community—as both means and goal. I keep thinking of how struck visitors to my class are (especially non-academics) when they see the . . . interactions and sense of community. [One visitor] . . . recently . . . was amazed to find that the girl he was sitting next to had an explicit record of what different issues had come up and what different kids had said during the previous class. She drew on these notes to extend the conversation during the class he was observing (she wrote 'Yesterday, T. said that 3/3 would be equal to 1 and I agree with that, but I also agree with what D. was saying. Let me try something up on the overhead?'). The kids build on one another's work, and they are working TOGETHER . . . playing off one another and . . . mov[ing] . . . collective understandings, assumptions, agreements along."[5]

To work in such ways teachers try to create classroom cultures that support disciplined inquiry. To do so they must respect and understand students' efforts to make sense of material. That is no mean feat, since students' ideas can be as puzzling and oblique as they are inventive and insightful. Their efforts to make sense of things sometimes parallel deep disputes and significant historical developments within fields, but they are expressed in the words and ideas of young beginners rather than experienced professionals. Teachers cannot make much sense of students' efforts to learn unless they understand the fields and know something of their development, as well as understand how children think about particular subjects and how they develop intellectually. Uncommon as such understanding is, it is still not enough, for teachers work with little crowds in classrooms. To create classroom cultures in which disciplined inquiry thrives, teachers also must encourage students to be both tolerant and critical—to respect others' views but also to subject those views to the intellectual discipline of historical or mathematical thought.[6] Teachers must cultivate students' respect for one another's ideas and their capacities for disciplined argument, for probing one another's ideas, and for thoughtful listening. These qualities can be encouraged among young children, but not easily.

No one knows if the sort of teaching and learning that we

have been describing is exactly what most reformers have in mind, for the rhetoric of reform is largely a paper and pencil matter. Few reformers have spent much time in classrooms of any description, and few have written in detail about teaching or referred to specific examples of instruction in their reports, speeches, and proposals.[7] But the pedagogies sketched above do have much in common with recent reform rhetoric. Unlike arguments for reform, though, examples of ambitious pedagogy are quite rare, for most schoolteachers and students see instruction as a matter of giving and getting the right answers. The combination of intellectual tolerance and intellectual discipline that our colleagues have written about in this book is unusual even in college and university classrooms, where most teachers are quite knowledgeable and most students are easy to manage. American education offers few examples that suggest what might be possible, and from which teachers might learn.

But even if teachers had many examples from which to learn, they would find that teaching of this sort is very difficult. Academic work is much more complex and demanding when students try to make sense of biology or literature than when they simply memorize the frog's anatomy or the sentence's structure. Teachers need to know a great deal to understand and appreciate students' ideas, and they must be able to manage complex social interactions about the ideas. Still another reason such teaching is rare is that it is uncertain. Instruction is much less predictable when students discuss and debate their interpretations of a story, or their conception of vertebrate anatomy, than when they memorize facts in isolated silence at their desks and disgorge them in recitation. Teachers must cope with much greater uncertainty when students present ideas that are difficult to understand, when they offer unpredictable insights in discussions, and when they get into complicated disagreements. It is unsettling to confront such uncertainties and difficult to manage them without closing down discussion. Much modern social and psychological research converges on the notion that the mind typically deals with uncertainty by reducing or eliminating it.[8] If so, teaching of the sort that we discuss here cuts across the grain of some deep psychic dispositions or cognitive structures.

Another reason that teaching of this sort is rare is that it is risky. When teachers construct classroom work so that it turns on

extensive student participation, they enhance their dependence on students. Teachers are the professionals in charge, but if students do not do the work, have good ideas, and engage in lively discussions, the class will fall flat and the teacher will have failed publicly. Teachers who try to work in the ways we have sketched must manage greater vulnerability to students than if they taught in a more closed and traditional manner.[9]

The teaching that reformers seem to envision thus would require vast changes in what most teachers know and believe. Teachers would have to revise their conception of learning, to treat it as an active process of constructing ideas rather than a passive process of absorbing information. They would have to rediscover knowledge as something that is constructed and contested rather than handed down by authorities.[10] They would have to see that learning sometimes flourishes better in groups than alone at one's desk with a worksheet. And in order to learn, teachers would have to unlearn much deeply held knowledge and many fond beliefs. Such learning and unlearning would require a revolution in thought, and scholars in several fields have shown that such revolutions are very difficult to foment.[11] Moreover, once teachers' academic knowledge and conceptions of learning changed, they would have to learn how to teach differently.

The reform of teaching therefore would entail an extraordinary agenda for teachers' learning. We wonder if it could be accomplished, and if it could, by what means. Several of our colleagues in this book doubt that teachers would learn a new pedagogy from conventional teacher education, and they suggest some elements of an alternative. One is that teachers would have extended opportunities to "practice" in ways that enabled them to gradually contrive a very different pedagogy, rather than the usual quick-hit "inservice" workshops.[12] Another is that thoughtful colleagues would observe teachers' work, report on it, and make the observations part of a sustained conversation about teaching and learning to teach. Teachers then would have opportunities to see their teaching from other perspectives, perhaps would learn how to adopt such perspectives themselves, and thus would become more reflective about their work. Another element still is that teachers would have

opportunities to reflect on the content of the conversations, to try out revisions in their work, and to weigh the results.

These ideas imply another: as they learned a new pedagogy, teachers would profit from working in protected situations. Protection would be useful in part because teachers would have so much to learn and unlearn. Unlearning is a difficult and little-explored feature of learning that would be especially troublesome in this case, for teachers would have to become novices after many years of thinking they had been accomplished professionals. They would have to cast aside much that they had known and done confidently, yet they would still have to carry on as professionals in their classrooms. Protection also would be useful because teachers would be learning to work in ways that were much more uncertain, and that made them quite vulnerable. Teachers also would profit from protection against the many mistakes they would make as they abandoned old practices and acquired new ones. There is, after all, the possibility that their novice efforts would impede students' learning, or would become unduly painful, or would damage them professionally. Many arrangements could afford some such protection, including special schools, classes, institutes, support groups, and networks for professional development. But one key feature of any such arrangement would be work with more accomplished professionals in relationships that combined trust and critical reflection.[13] Finally, teachers would profit from protection against the typically frantic press for reform-in-a-minute, so that their time to learn would be commensurate with the scale and scope of the learning.[14]

How could policy promote this unusual agenda for teachers' learning? The simplest course of action for policymakers would be to declare the matter an important priority, set goals or standards, and turn operations over to colleges, universities, and other agencies that educate teachers. But those institutions have little capacity to support the sorts of teaching or teacher learning described here. To begin with, inadequate preparation still is no barrier to becoming a teacher. Most colleges and universities grant degrees to intending elementary teachers despite their thin knowledge of the subjects they will teach, and they grant degrees to intending secondary teachers despite their thin knowledge of pedagogy and learning. School systems readily hire those teachers. In a sense the schools

have little choice, for undergraduates who declare an intention to teach elementary school cannot major in an academic subject in most institutions of higher education; they must instead major in teaching, learning, and other aspects of education. In contrast, those who declare an intention to teach secondary school must major in an academic subject, and study learning and pedagogy only quite superficially. But the schools have made few efforts to change things. Many state and local school systems make it exceedingly difficult for applicants to get elementary school teaching jobs if they have majored in an academic subject rather than elementary education, and they offer no incentives for secondary teachers to acquire strong pedagogical preparation. One would think that universities could easily repair the situation by opening academic majors to intending elementary school teachers so they could more adequately study the subjects they will teach and by requiring much deeper study of pedagogy and learning for intending secondary school teachers. But those seemingly simple steps would be very difficult. Efforts to replace the elementary education major with academic fields, or to create joint majors, have been resisted by disciplinarians as well as by educationists, as have efforts to deepen the education of intending secondary school teachers by including more attention to learning and pedagogy.[15]

Even if these problems of curriculum and course offerings were miraculously solved tomorrow, teachers still would find it very difficult to learn the pedagogy that recent reformers propose. One reason is that few college and university professors teach that way. Most intending teachers get most of their undergraduate education in departments of humanities, science, and social sciences. Even those who major in elementary education do two-thirds or three-quarters of their studies in such departments, and instruction there generally is as traditional and didactic as most schoolteaching. Professors know their subjects much more deeply than most schoolteachers, but more sophisticated teaching does not follow necessarily or even frequently from greater academic knowledge.[16] Another reason it would be very difficult for teachers to learn the pedagogy that recent reformers propose is that most teachers are educated at public universities and colleges in which large classes, multiple-choice tests, and little student contact with faculty are the

order of the day. Like most other undergraduates, intending teachers' education often is in the hands of graduate students who are beginners in their subjects, inexperienced at teaching, and unwilling or unable to invest much in learning to teach well. Still another reason it would be very difficult for teachers to learn the pedagogy that recent reformers propose is that most academic departments would neither permit intending elementary school teachers to take the regular sequence of disciplinary courses for majors, nor offer an alternative sequence of intellectually sound courses for those who wished to major but did not intend graduate work in the field. It also would be very difficult for teachers to learn the pedagogy that recent reformers propose, because most education schools and departments could not now offer professionally sound and intellectually defensible studies in pedagogy and learning in academic subjects for teachers at any level. Much of what these schools and departments currently offer is notoriously thin, and little of it is deeply grounded in knowledge of academic subjects.[17] Hence even if colleges and universities did greatly increase intending teachers' opportunities to study academic subjects, learning, and pedagogy, that would be unlikely to produce the teaching that reformers now envision.

To reform schoolteaching by revising college and university instruction would entail much more than revamping undergraduate curricula and course requirements. Great changes in the culture and educational priorities of higher-education institutions also would be required. Few members of the academy exhibit any taste for such work, and signs of inducements that could alter their inclinations are scarce. Recent efforts to reform teacher education have been launched with much fanfare, but they have made only a little progress at best. Moreover, many institutions of higher education have been in a serious revenue squeeze for years, and it is getting worse. The likelihood that colleges and universities will take up major reforms of curriculum and instruction diminishes as money grows shorter, administrative discretion is reduced, and faculty positions are lost. If state and federal policymakers relied on higher education to fundamentally revise instruction in the public schools, they would almost certainly be disappointed.

Reformers could instead turn to continuing professional ed-

ucation, in hope of reeducating teachers while they are at work. But while state and local school systems and universities spend heavily for such education every year, most of it has a dismal reputation. Various professional agencies sponsor a blizzard of workshops, but most are short, simple, and superficial. Universities and colleges also offer much continuing professional education, but most of that is commonly regarded as either irrelevant or thin. Challenging content is almost as rare as the continuing professional contact that can sustain new ideas and practices in classrooms. Some professors and professional development agencies do a better job, but they tend to be few in number and to have modest capacity. Many subsist on external grants from one year to the next, and regularly must change their agendas to accommodate shifting governmental and philanthropic fashions. Few work with teachers for the time or with the intensity that would be required to make and sustain basic change in practice.

Schools also offer extensive continuing education, and policymakers might hope to turn it toward reform. But most of the schools' education for teachers is reported to be a pabulum of brief, superficial, and unconnected workshops. They are rarely inspired by a larger vision of instruction, nor are they tied to deeper issues in curriculum, assessment, or learning. Additionally, few schools offer teachers extended or well-designed opportunities to learn on the job, nor do they create powerful inducements for it.[18] Thoughtful observers argue that schools would become places for teachers to learn only if there were major changes in the institutional culture, in teachers' conceptions of their work, and perhaps in their jobs as well.[19] Such changes would take a great deal of time and energy in any circumstances, but they would be especially demanding when educators were struggling with shrinking budgets and rising social problems, as they do today.

If our analysis is roughly correct, policymakers would not dramatically change pedagogy by simply passing that assignment to the existing agencies of teacher education, for those agencies have neither the capacity to carry most of the educational load themselves nor the disposition to build that capacity. Policymakers and analysts committed to reform, therefore, would have to find other ways to enable teachers to learn. Schools, universities, and professional development agencies would almost surely play an important part in any such effort, but simple delegation is not indicated.

What might policymakers do instead? They could make policy itself much more educational for educators. Educational policy continues to grow: reformers in and out of government are devising more demanding standards, designing more challenging assessments, writing more thoughtful instructional frameworks, and developing more intelligent curricula. Each of these endeavors increases the things that teachers would have to learn if they were to succeed, but few are well enough designed to promote such learning. To make such policies much more educational for educators, the processes in which policy is made and enacted would have to be opened up so that they created many more opportunities to learn. And those opportunities would have to be designed so that they embodied the sorts of teaching and learning that reformers wish to promote for classrooms.[20]

This approach would give an entirely new meaning to the term "educational policy." The idea has a certain appeal; if policymakers want to promote reform, should they not organize policy so that teachers could learn what they needed to know in order to succeed? But Americans have little experience with endeavors of this sort, and we know little about what may be entailed. To probe those entailments, we consider a few examples of how educational policy could become more educational for those who enact it.

Take the case of creating a new instructional framework in any academic subject. Framework design opens up fundamental questions about the nature and purposes of instruction, and thus presents many educational opportunities. Perhaps the most direct way to make framework design more educational for educators would be to create an accompanying design for learning—in effect, a curriculum of framework creation. If such a curriculum were tightly tied to framework development, the very act of constructing new instructional goals and standards would be embedded in an educational scheme. The formation of instructional policy would become a simultaneous venture in adult education. But a curriculum of framework design also could be more loosely tied to actual framework construction. Educators could be engaged in learning activities that simulated or paralleled framework construction, but

on a separate track. In this case the formation of instructional policy would be accompanied at a distance by related educational endeavors. A given venture in framework design could, of course, have some tight and some loose links to a curriculum for learning from the activity.

However these links were set, the aim would be to undertake framework design so that it also presented a rich set of occasions for educators to learn. One key element in any such curriculum would be strategies to help educators think about the scope and structure of instructional frameworks. Such things are largely unknown to Americans, and it would be important to cultivate familiarity with a new approach to instructional purposes and content. Reading and analyzing frameworks from other nations and the few U.S. states that have them would be one fruitful way to begin. In that connection the curriculum also could invite teachers to draft, justify, and criticize their own framework proposals, or to comment on draft proposals for state or national frameworks. An important part of such work would include helping teachers to identify themes for a proposed framework, to consider relations among themes, to analyze the advantages and disadvantages of particular themes, and to cultivate ways to discuss these matters. None of this could be done well without knowledge of the disciplinary fields involved, and given the state of most teachers' knowledge, any such curriculum would have to offer ways for many of them to learn much more. A curriculum could, for example, suggest how teachers could develop the themes that they proposed by identifying and investigating sample topics within one, and planning a few lessons. Such activities would offer a way of learning more about the content of a field and teaching and learning in it, as well as about what remained to be learned.

Another crucial element in any curriculum of framework design would be the identification of materials. Teachers could read books, original sources, experiments, and the like and discuss their suitability. Such work would be an extraordinary opportunity to learn about the intellectual terrain of a field, about the various approaches to mapping it, and about the many different ways in which a single set of instructional goals could be realized in classrooms. A curriculum of this sort also could invite teachers to imag-

ine how they might deal with a particular theme in a series of lessons. Teachers could teach the lessons to colleagues, and, in light of that experience, discuss how they could revise readings, lesson formats, and even framework designs. A proper curriculum would suggest ways to go about such work, including guides to help teachers in scrutinizing the instructional properties of materials, advice about how to weigh their value for teaching and learning, assistance in developing and teaching sample lessons, and guidance in the revision of frameworks in light of discussions and classroom trials.

The same sort of curriculum could be created for the design of new assessments, for, like framework construction, assessment raises fundamental questions: what has been learned? What should be? How is learning best investigated? Here again, the key point would be to frame reform as a set of educational opportunities. One key element in any such curriculum would be guidance in writing blueprints for new assessment, including examples from other school systems, suggested ways to compare blueprints, and exercises that help educators and interested officials or members of the public to learn something of the genre. A curriculum of assessment design could also suggest ways in which teachers might draft blueprints, or comment on drafts already circulating in their state or region. In that connection a curriculum also could suggest ways to use the drafts and comments as a basis for investigating the strengths and weaknesses of proposed blueprints—that is, comparing them to extant assessments and instructional frameworks, exchanging analyses, inviting comments from assessment specialists, and the like.

All of this would in a sense be preliminary to creating assessments. A curriculum of assessment design could offer teachers guidance in the definition of domains, in the composition of questions and other assessment tasks, and in developing rubrics for evaluating answers. It could suggest how teachers might analyze the quality of the questions they wrote and improve on them. Such a curriculum also could organize ways in which teachers could study the topics that they wrote questions about, as they wrote and discussed the questions. That sort of work would both deepen teachers' knowledge of the matters assessed and improve their understanding of the strengths and limitations of assessment within specific subject mat-

ter fields. Finally, with work of this sort en route, a curriculum of assessment design could help to guide teachers' study of the relations among assessment, frameworks, and curricula.

One notion behind these ideas is that the education of educators could flower if it were tied to certain crucial practical tasks that also were intellectually fundamental.[21] The short list of such tasks certainly would include much of the program of the current reform movement: devising new academic standards, designing new assessments, writing new instructional frameworks, and developing new curricula. In that sense the present moment in American education offers unparalleled educational opportunities. While it would be no mean feat to develop curricula for reform that could realize those opportunities, if it were done well, many teachers could gain enormously. Since framework and assessment revision would be continuing tasks in any vital educational system, teachers would be able to contribute to reform and learn from it on a continuing basis. Several states have edged a bit in these directions recently, as they have begun to devise new frameworks and revamp curriculum and testing;[22] but state officials have neither envisioned nor designed such work as a major project in the education of educators. That is not surprising, for the agenda that we have outlined could hardly be done well in the ways that most education agencies now approach continuing professional education—that is, in a few stolen hours after school, on weekends, or in isolated bursts of summer activity.

What would this sort of scheme entail for policy? Most generally, policy would be reconceived as an educational endeavor, and many opportunities to learn would be designed into policymaking processes. Such work would take extraordinary imagination as well as instructional design capacities that now barely exist either in government or in public education. Yet those changes would be for naught if teachers did not capitalize on them, and most teachers already are quite busy, and few have any sense that the sorts of activities that we have sketched should be part of their assignments.[23] Hence teachers' work, or their ideas about their work, also would have to be substantially revised. Additionally, teachers could not do it alone. An educational approach to educational policy also would require learning and teaching on a broader scale, including

specialists in assessment, experts in pedagogy, and subject matter specialists from universities and other agencies. They would have much to contribute as teachers and much to learn as participants in a novel sort of educational policy. None of these things would be likely to occur without other changes: in the way teachers' work was understood and treated by administrators, politicians, and the public, in the mobilization of potent inducements to learn, in the provision of money and other resources to support learning, and hence in the quality of political and educational leadership.

But we are getting ahead of our story. Consider one more example of the approach we have discussed—the development of new curricula for students. Curriculum could be one of the most intimate connections between policymakers and classroom practitioners, for curriculum standards and materials play a large role in the work that teachers and students do together every day. The recent reform movement has produced a small avalanche of proposals to revise that work by fundamentally changing the substance and structure of academic subjects. The projects include those of NCTM, Project 2061, several in the National Academy of Sciences, several others in state governments, as well as others. Like the 1950s curriculum reforms, though, these endeavors often are discussed and carried out as though their authors were unaware of the enormous agenda for educators' learning that they entail.

It is not difficult to envision an alternative: reformers could design new curricula for students so that they were deeply educational for teachers. For example, an innovative unit on fractions for fourth graders could be accompanied by a teachers' fractions curriculum. The teachers' curriculum could offer an array of approaches to teaching and learning fractions and weave discussion of the mathematical ideas into those approaches. The curriculum also could discuss different ways to present each topic and analyze the strengths and limitations of various presentations. Each alternative could include examples of how to frame the mathematics, reports on the sorts of things that students said and did when material was presented to them in that way, and discussion of the mathematical content both of the material presented and students' responses. Such a curriculum also could discuss the ways in which teachers could interpret students' responses and how they could probe students'

ideas to get a better idea of their thinking. In these ways and others, a teachers' fractions curriculum could offer teachers extended discussion of mathematics in the context of considering various ways to teach and learn mathematics. It could be accompanied by additional reading or other supporting material on the mathematical content of fractions, on how students think about this domain of mathematics, and on how accomplished teachers have handled both the material and students' responses to it.

We have not proposed a teacher's guide or classroom scripts. This sort of curriculum would be pointless if it did not influence teaching, but it would be equally pointless if it were mechanically conceived or executed. Our intention is to tie a program for teachers' learning to improved curriculum for students. The teachers' curriculum would be focused on mathematical pedagogy, that is, on the interactions among mathematics, representations of mathematical ideas, teaching, and learning. It could be organized around instructional issues that teachers would face every day as they sought to use the new curriculum with students. Our reasoning in this is straightforward. If recent efforts to reform education do entail the extraordinary learning for teachers that we suggest, new policies could not work unless ways were found to enable that learning. Since most teachers would have to continue to teach even as they learned to teach differently, much of that learning should be situated in or near classrooms. The curricula that teachers and students use every day would be one such situation.[24]

Curricula of this sort would substantially increase teachers' chances to learn the things that recent instructional policies entail, but they would not be easy to create. Curriculum design and publishing would have to be sharply reoriented so that they attended as much to teachers' as to students' learning. Teachers also would need opportunities to learn from the new curricula that were similar to the learning that reformers intend for students, for few American adults have experienced such learning, and teachers could hardly be expected to competently guide students through intricate processes of which they were ignorant. In addition to a new approach to curriculum design for teachers, such curricula also would require that teachers have time to read the new materials, chances to discuss them, helpful and knowledgeable people with whom to discuss

them, opportunities to try out new approaches in their classes or elsewhere, and assistance in such tryouts. Changes of these sorts would add greatly to the time and other resources required to design and enact new curricula. They could not occur without thoughtful action by policymakers, publishers, schools, colleges, and universities, and a variety of professional and disciplinary organizations.[25]

These examples throw a little more light on what it may take to weave a suitable education for educators into educational policy. Policymakers would have to create opportunities for teachers to learn practices such as history or biology by engaging in them, conversing about them, articulating ideas, testing them against evidence, and the like. Rather than acting as though teachers were empty vessels to be filled, policymakers would act as though teachers were active and interesting thinkers and central in policymaking. Teachers would have the sort of opportunities to learn that reformers think students should have. Doing these things would not be easy, since few policymakers and managers ever learned that way in school, let alone taught others. We wonder where policymakers could learn. But assume they did, somewhow. Rather than considering teachers as the "implementers" of policy, they would treat teachers and administrators as though they were intelligent commentators on policy and significant participants in creating and revising it. Policymakers and managers would eschew more familiar and didactic roles in which they "tell knowledge" to educators, and instead would engage them as active, learning collaborators.

Analysts are familiar with several criteria for effective policy, including political feasibility, leadership, appeal to important constituencies, and the like. Our proposal adds another: educational policy should be deeply educational for those who enact it. That criterion would not be easy to satisfy. Simply to design the sorts of opportunities to learn from policy that we have sketched would be difficult, time-consuming, and costly. To actually integrate teachers' learning into policymaking would be vastly more so. Revising extant conceptions of teachers' work and its organization would further add to the costs and complications.

Moreover, thus far we have focused chiefly on what an educational approach to educational policy would entail for teachers. But such curricula as we have sketched also would complicate pol-

icy formation and enactment. Efforts to incorporate pedagogy as well as politics and finance would greatly complicate policymaking. Additionally, if learning from policy became crucial, policymakers would have to attend closely to what teachers and other educators understood. That would greatly complicate what analysts have called implementation; the activity itself might have to be reconceived as reinventing policy.[26] Finally, if they did carefully attend to teachers, policymakers' uncertainty and dependence on teachers would increase. For discourse about policy would open up, much as classroom discourse opens up in adventurous teaching. New voices would be drawn into policymaking, and other voices long silent or ignored would be raised. Teachers' role in producing policy would be more plainly recognized and enhanced, but that could crowd policymakers in unfamiliar and often uncomfortable ways. As in innovative classrooms, such measures could improve understanding, but they would increase debate and division. One expects that results would improve in the long run, but one knows that difficulties would increase in the meantime.

Conclusion

Though we have only sketched the outline of a new pedagogy for policy, it conjures up a cloud of questions. One particularly stands out: could state and national agencies actually devise and enact such "educational policies" as we have discussed?

It is not difficult to imagine a policy agenda—we already have sketched some of it. Policies and programs intended to reform instructional standards and assessment would have to be greatly expanded in order to enhance their educative power. Curriculum reform would have to be redefined and broadened to help teachers learn to teach in unfamiliar and demanding ways. New policies and programs might be required so that higher education institutions could offer teachers extensive help in such learning. Agencies of continuing professional education surely would have to be expanded, reoriented, and strengthened. Schools' organization and professional culture also would have to change to strongly support teachers' learning. That would not be easy, for while policymakers could relatively easily "restructure" schools to offer teachers more

time, autonomy, power, and the like, such things often come to little by themselves. As Sarah McCarthey and Penelope Peterson argue in Chapter Five, when restructuring is unaccompanied by extensive opportunities for teachers to learn, the results are unimpressive.[27] And Joan Talbert and Milbrey McLaughlin point out in Chapter One that professional and institutional cultures are much more potent influences on teaching than most structural arrangements in education.[28] Hence policymakers could find themselves searching for ways to tie change in schools' organization to changes in their culture and educational opportunities for teachers.

One way to make that connection would be to make learning count much more heavily than it now does for teachers. At the moment university course credits count for advanced degrees, and often for salaries as well. But those incentives have not produced many fine courses, nor do they seem to have appreciably advanced teachers' knowledge of pedagogy or academic subjects. As things now stand, serious learning only counts professionally for teachers if they individually choose to make it count. Many teachers are eager to learn, but they are most interested in learning about specific practices that will help them today and tomorrow. They exhibit much less interest either in learning deeply about academic subjects or in learning how to dramatically change their teaching. Yet the current reforms would not take deep root unless teachers were strongly motivated to learn just such things, and to make their teaching much more difficult in the process. Policymakers could decide that they should devise potent incentives for teachers to learn such things and to continue to learn through many difficulties.[29]

Were government to undertake such an agenda, educational policy would greatly expand. State or federal agencies would set dramatically new and higher standards, devise new curricula, create new assessments, build vastly greater capacity for teacher education, and more. As policymaking became more ambitious and complex, government would grow.

Yet the reform agenda that we sketched would not succeed unless educational policymaking also was drastically reduced.[30] A clearer focus on ambitious teaching and learning would require that the accumulated clutter of competing and overlapping programs and policies be cut back and cleaned up. Lacking such ac-

tion, reforms would only add to conflict and ambiguity in instructional guidance.[51] But such cutbacks would require painful merger or discontinuation of many state and federal initiatives, and of the administrative units tied to them. If they focused on a smaller and more coherent agenda of fundamental change, policymakers also would have to alter many of their present habits—for example, embrace much longer time horizons for policy development and enactment, as well as evaluation. They also would have to abandon their continuing intervention in schools and the associated shifts of direction every few years. That would entail new relationships with local schools in which much stronger guidance for content, standards, and results was mixed with much broader support and much less interference in other areas.

This would be a curious combination: dramatic expansion of government in certain respects and equally dramatically contraction in others. The combination would be difficult in any political system, but it would be especially troublesome in the United States. One reason is the power of short-term incentives. Elected officials crave programs or policies that are identified with their name and for which they can claim quick credit with constituents. Would state, local, and federal policymakers willingly renounce the political benefits of short-term tinkering with schools? We cannot imagine why, short of a major crisis or an extraordinarily powerful reform movement. Another source of trouble would be the interest groups that have grown up around existing policies and programs. It would be unprecedented for them to give up concrete and immediate political benefits in favor of more abstract and distant reform schemes.

Efforts to simultaneously shrink and expand education policy also would require extensive coordination among governments within America's fragmented political system. Only a few federal agencies are concerned with schools, and there are fifty state governments—a modest number as U.S. politics goes. But each of those governments is divided into executive and legislative branches, which have deeply different responsibilities for education and whose incumbents regularly differ about educational policy. The work of both branches also is subject to review by state and federal judiciaries, which have been increasingly active in education and

quite willing to overturn the decisions of legislators and governors. There also are more than fifteen thousand autonomous local school governments, and an even larger number of county and municipal governments whose actions bear on local schools through finance and other means. If the reforms sketched above were national or regional in scope, they would require unprecedented coordination among many of these governments. Hundreds or thousands of school agencies at all levels would have to agree on new educational purposes and on new instructional guidance arrangements to achieve those purposes. They also would have to acquiesce in roughly identical reductions of their authority in order to clean up the existing clutter of programs and policies. Yet those same battalions of governments would have to accept an extraordinary expansion in the power both of the state or federal agencies that would guide instruction and of the local schools that would enact a new education. We can imagine such unprecedented intergovernmental coordination, but not without also imagining some extraordinary educational crisis or powerful movement for reform that would compel action.

Political fragmentation would pose one additional problem. A more educational approach to educational policy would require close connections between policy and practice, but the design of American government frustrates such connections. For example, devising and enacting the curricula of framework reform that we sketched earlier would entail close and sustained work among state or federal policymakers, publishers, university faculty, schoolteachers, and administrators, among others. Lacking such collaboration, educators would have few opportunities to learn from new instructional frameworks, and developers and policymakers could not learn from educators' efforts to use the frameworks. Yet making and sustaining such connections would be very difficult, for American government was designed to frustrate such things. Authority in education was divided among state, local, and federal governments in an elaborate federal system, and it was divided within governments by the separation of powers. These divisions were specifically calculated to limit the powers of each branch of government and to inhibit coordinated action across governments. They gained force from the country's great size and diversity. Close rela-

tions between policy and practice are difficult to sustain even in much smaller and more coherent systems, but the vast sprawl of internally divided and jurisdictionally distinct state, federal, and local governments has made them nearly impossible to arrange in America.[32] Great gulfs separate state and national policymaking from classroom practice in the United States,[33] and building the infrastructure to span those gulfs would not be easy.

The reforms that we have been discussing would require a paradoxical mixture of political activism and restraint. Government officials would have to make the sort of extraordinary investments in their spheres that adventurous teaching requires from teachers and students. These would include a great expansion of government action and associated outlays of energy, time, money, and effort, but they also would include much less government action in many areas of education, an entirely different way of relating to those who enact policy, and much longer political and educational time horizons. Those who made and managed policy would work harder, face much greater uncertainty, and take many more risks, in return for many fewer short-term political rewards.

One could therefore conclude that the generally weak pedagogies of policy described in Chapter Seven make sense. The fragmented structure of U.S. government and our old diffidence about intellectually demanding education may mean that policymakers should ignore proposals for intellectually more demanding education and for a more educational approach to educational policy. There is, after all, a relatively good fit between recent emphasis on "basics" and traditional pedagogy. There also is a good fit between basics and what the adult population knows about academic work and believes about school. But there is a great difference between traditional pedagogy and the recent reform proposals. Conversely, there is a great gulf between reformers' conceptions of knowledge and instruction and what most adult Americans know and believe about school. The recent reforms would provoke terrific tensions with inherited knowledge and beliefs, and they would demand extraordinary change and learning from most American grown-ups. There are a few signs of a few of these changes, but only a few.[34] We wonder if American governments are well suited to lead the

struggle for reform, given the great changes that would be required and the political tensions that would have to be endured.

To share this doubt is not to think that reform is lost. One may only conclude that American governments are presently an unsuitable vehicle for fundamental change in teaching and learning. If so, reformers would need to invent ways to improve instruction in state-sponsored schools without requiring state agencies to bear the chief burden of change. For example, reformers could create nongovernmental agencies with broad charters to improve public education by various "systemic" approaches to reform. The National Board for Professional Teaching Standards is one current case in point, though its charter is restricted to teacher certification. Agencies of this sort could develop the linked instructional frameworks, curricula, and examination systems that many reformers now advocate. The New Standards Project presently has something of that sort under way in several states. Such agencies also could devise and implement the sort of curricula for reform that we sketched above, to create opportunities for teachers to learn in and around the development processes, something that no agency appears to be doing on a large scale. The same agencies could organize field trials that would enable systematic learning from the endeavor and consequent revision and redevelopment.

Nongovernmental agencies of this sort would of course have to work closely with some state and local school systems, or with networks dedicated to local school improvement, or with consortia of individual schools. But they would do that work while keeping sponsorship and development of new approaches to instruction at a healthy distance from government. Given the weak pedagogical record of education governments, building the capacities for instructional change might better be undertaken by agencies that stand outside the official policy apparatus. Whatever their enthusiasm today, precedent suggests that policymakers would be likely to corrupt and distract ambitious instructional reforms tomorrow, rather than support and sustain them. If schooling did change, government might adopt the new system, but in the charged atmosphere of U.S. politics even that could be troublesome. The development work also would have to be scheduled so that it made room for the extraordinary learning that successful enactment would en-

tail. Patience and persistence are not virtues of domestic politics in the United States, and they have been especially unfamiliar in education. Keeping the development work largely outside public political management might protect it from the fickleness of American politics well enough for a new system of instruction to mature. But that would require large infusions of private funds and great managerial tact and skill. It also would be unlikely to succeed without at least modest support from state and federal governments and enthusiastic participation by many schools and school systems.

Nongovernmental agencies would not eliminate the problems of public sponsorship. They would only permit reformers to struggle with those problems from a different and possibly improved vantage point. And even if reformers did well on that score, everything else would remain. The stuff of reform itself would have to be developed—new instructional frameworks, curricula, and examination systems and the links among them. It also would remain to revise schools, teaching, and the incentives that surround schooling, so that much more ambitious approaches to instruction made sense for those working in and around schools. And it would remain to create a new pedagogy of reform, so that teachers and others had ample opportunities to learn, in and around the processes of development and change. Whatever their sponsorship, new pedagogies are unlikely to mature in classrooms unless they also ripen in reform itself.

Notes

1. Cohen, 1989; Cohen & Grant, in press; and Cuban, 1984.
2. Elmore & McLaughlin (1988) frame the problem of changing teacher practice as one of teachers' willingness to learn and their opportunities to learn.
3. Chapters Two, Three, and Four of this book.
4. Duffy & Roehler, 1986; Lampert, 1988a; Newmann, 1988; Sizer, 1984; and Scardamalia, Bereiter, & Steinbach, 1984.
5. Deborah Ball, personal communication, March 23, 1992.
6. Lampert, 1986.
7. One additional reason that we are unsure about reformers' ideas is that they are imprecise about the sorts of teaching they

wish to promote. Everyone argues for intellectually demanding teaching, but agreement often ends there. Some advocate a constructivist approach to knowledge, while others seem to hold more traditional conceptions of knowledge. Some reformers point approvingly to innovative teachers who encourage rich discourse in classrooms, while others admire instruction in nonpublic schools, where most teaching seems to be quite traditional and didactic. For relevant discussions of teaching in nonpublic schools see Powell, Farrar, & Cohen (1985) and Bryk & Lee (in press).

8. Braybrooke & Lindblom, 1963; and Simon, 1976.
9. Lampert, 1988b; Duffy & Roehler, 1986; Newmann, 1988; Cuban, 1984; Cohen, 1988; Cohen, unpublished manuscripts, March 1992.
10. For instance, mathematics is a leading area in the current reforms, but most elementary school teachers have a very modest understanding of this subject (Post, Behr, Harel, Lesh, & Taylor, 1988; Thompson, 1984). Teachers would need to learn a great deal more mathematics and they would have to shed the idea that mathematical knowledge is fixed and given, handed down by authorities in books and other sacred locations.
11. Fiske & Taylor, 1984; Guthrie, 1990; Kuhn, 1962; Lakatos & Musgrave, 1970; Markus & Zajonc, 1985; and Nisbett & Ross, 1980. Teachers' difficulties would not stem only from the intellectual problems of changing well-established ideas and practices. Teachers' efforts to become active inquirers often disturbs their personal and professional lives, as several of the earlier chapters note.
12. Chapters Two and Three of this book.
13. Chapters Two, Three, and Four of this book. The combination of support and criticism here parallels the classroom culture that adventurous teachers try to create with their students. The theme is explored in the earlier chapters just cited, where the authors describe the difficulties they encounter in trying to create a context in which students are encouraged to learn but in which they also will risk trying new ideas and com-

menting thoughtfully on each other's ideas. Peter Elbow (1986) writes about this challenge.

14. Teachers additionally would benefit if they were protected from many of the program mandates that pervade state and federal school policy, for they often produce a compliance orientation that runs counter to the approach to instruction that teachers would be trying to learn.
15. There are many reasons for resistance. One is structural: The undergraduate curriculum has steadily grown as new subjects or subfields were created and old ones grew. Undergraduate requirements also have grown apace, and there is less room to add courses. Many undergraduate majors therefor are now precariously close to an undeclared five-year term. Another reason for resistance is governmental: The education curriculum has grown more packed as state governments have added requirements in reading, mathematics, special education, and other areas. Still another reason is simple self-interest: Most arts and sciences departments are unwilling to give up their academic dominion over intending secondary teachers' coursework, and most education departments are unwilling to cede dominion over intending elementary teachers' coursework. Another reason still is attitudinal: Most faculty members and administrators in arts and sciences departments hold educationists in low regard and prefer not to be associated with their endeavors, while most educationists are defensive about their low standing in academia and avoid contact with those resident on the main line. A final reason for resistance is intellectual: Few educationists are deeply knowledgeable about arts and sciences disciplines, and few members of arts and sciences departments are deeply knowledgeable about pedagogy and learning. Hence few members of either group are well situated to thoughtfully discuss the issues that serious curriculum revision would entail.
16. Boyer, 1983; Cohen, 1988; Cuban, 1984; McKeachie, Pintrich, Lin, & Smith, 1986.
17. The academic quality of education schools and departments has greatly improved in the last three decades, but the improvements all have been in imitation of conventional mainline academic values. Education schools and departments have recruited more faculty members who are active researchers and who publish in academic journals. Moreover they have added faculty in the more academically respectable subfields of educational psychology, sociology, politics, and the like and have deemphasized practical work in teaching, teacher supervision, and studies of learning in classrooms. Hence these improvements did not increase, and in many cases actually reduced, the capacity of education schools and departments either to undertake thoughtful research on teaching or to offer intellectually and professionally substantial teacher education.
18. There are some counterexamples of well-designed educational activities. One is teacher work and discussion groups that are organized around deepening knowledge and improving practice in specific areas of the curriculum. The Bay Area Writing Project is one case in point. But we know of few examples in which schools have devised and supported such endeavors.
19. Johnson, 1990; Little, 1982.
20. Elmore & McLaughlin deal very thoughtfully with some of these issues. And Milbrey McLaughlin's studies of change in classroom organization found that change in practice occurred when teachers were actively involved in policy development and implementation—that is, in creating materials, solving problems, and interacting with one another as well as with curriculum specialists and other outside consultants around policy issues (McLaughlin, 1978). From this and other accounts of teacher collaboration in reform she concluded that success in changing practice may require an ongoing process of "mutual adaptation" (p. 340) in which teachers are treated as developers of new practices and allowed, over time, to adapt policy goals to the concrete setting of their classrooms. Here again there are some parallels between uncommon cases of policy enactment and the pedagogy of policy that we discuss.
21. In all of these examples we sketch one possible version of a learning community that embraces a variety of associated activities: collaborative projects, frequent personal exchanges, and connections to other professional communities. Some readers will recognize John Dewey's notion of the continuum.

In such educational activities, he argued, accepted distinctions dissolve, and seemingly distinct elements become part of the same practical process: the subject matter and the method of instruction, the policy and its enactment, knowing and doing. The processes themselves might be considered both as means and important goals of education reform. In these cases the means and ends would continually be reinvented (see Deborah Ball's comment on p. 244 about interaction and sense of community in her classroom as "both means and goal.") For a brief discussion of the education change process viewed as both means and goal see Sarason (1982).

22. Education officials in California, Vermont, and several other states recently did something of this sort as they revised assessments and content standards. For example, California state officials have involved some teachers in redesign of the CAP, and teachers there also have been represented on various bodies that have designed reform policies. But with a few exceptions state officials have involved only a few dozen teachers on statewide oversight committees. None of the committees have developed an extensive instructional agenda for other teachers, nor have they involved many teachers. In contrast, the New Standards Project has proposed an examination system that would incoporate many of the education elements discussed here, though the scale and depth of such education-from-reform remains to be seen.
23. These difficulties recently have impeded assessment and curriculum redesign in Vermont.
24. A curriculum of this sort could be offered in print, but it would be much better in a combination of videotape and text. It would be even more powerful in an interactive computer-video environment, especially if teachers also had the capacity for network consultation with each other and more accomplished colleagues.
25. Our discussion reveals that not only teaching but many practices that bear on schools would have to change. For example, during most of this century politicians and businessmen ignored public schools or supported only minimum programs for most students. And most leaders in education long have been inclined to the view that most students needed basic and practical education, rather than more high-flown and demanding stuff. These tendencies were entirely representative. Though the American people have been enthusiasts for schooling, few have been keen on intellectually ambitious education. This is as true for parents as it is for political and business leaders, which suggests a large task for adult education and political persuasion. Dramatic changes in educational processes and content within schools would require changes in the expectations that parents and politicians have held for schools and students, and in a divided society like that of the United States, in which schools are locally controlled, efforts to make such changes could generate terrific conflict.
26. On that point see the essay by Wildavsky & Majone (1979).
27. For further discussion on the topic of discourse communities, see McCarthy and Peterson (Chapter Five of this book).
28. Chapter Six of this book.
29. There is no plainly best way to rearrange American education so that most teachers and other educators have strong incentives to tackle the difficult sorts of learning sketched above. One possible approach arises from school systems in Europe and Asia. In some of those nations teachers' promotion and other aspects of professional advancement are tied to assessments of their teaching performance by inspectors who conduct extended classroom observations and interviews. The inspectors are themselves experienced teachers who were judged good enough (by other inspectors) to advance to the inspectorate. If some sort of a U.S. inspectorate were established, if successful performance in the classroom were defined as recent reformers have proposed, and if inspectors were both knowledgeable judges and helpful instructors, teachers might have sound professional reasons to want to learn to teach differently. If so, they would have a useful resource in learning—the inspectorate would be a perambulating archive of craft knowledge whose assignment would be to help teachers learn. Under such an arrangement it would be in teachers' professional self-interest to draw on that archive to improve themselves and then to validate the improvement. The link between

good teaching and professional advancement would be one potent incentive to learn, and hence an engine of reform. But one problem with such an approach would be its cost, and another would be the difficulty of establishing a suitable large and expert inspectorate. Still another would be the tendency of such an arrangement to preserve any given pedagogical status quo.

Another approach, more American in flavor, would be to test teachers' knowledge and to tie money rewards and penalties to the results. One version of such tests exists today—the National Teachers Examination, a standardized test published by the Educational Testing Service. One advantage of this approach is its relatively modest cost and ease of operation. But one objection is that such tests would dramatically constrain what could be learned about teachers' knowledge. An alternative would be to condition entry to teaching and advancement within it on teacher performance on complex written and perhaps oral examinations. The difference would be both in the performance criterion—exams versus tests—and in the incentives—professional advancement rather than money. The National Board for Professional Teaching Standards currently is developing the latter approach.

30. One discussion of the rationale for such cutbacks is offered by Smith & O'Day (1991).

31. Cohen & Spillane (1992) report one premise underlying this sort of policy agenda is that guidance for instruction in U.S. education is weak, inconsistent, and diffuse. Many private and public agencies issue advice concerning instructional purposes, content, and methods for teachers and students, but few take account of each other's advice. Hence much of the guidance is unrelated, divergent, or contradictory. Guidance for instruction also has been largely decoupled from government. While public agencies have extensive authority to guide instruction, historically they delegated much of it to private firms or local schools. The influence of U.S. school governments therefore pales when compared to central or provincial agencies elsewhere. The result is paradoxical: public and private agencies here prolifically produce guidance, more than in societies with much more potent advice for instruction, but it does not press instruction in any consistent direction. When guidance is inconsistent and diffuse, no single test, curriculum, policy, or program is likely to have a broad or marked effect. Many teachers and students are aware of different sorts of advice, but few are keenly aware of most of it. Many know that most guidance is either weakly supported or contradicted by other advice, and that much can safely be ignored. The din of diverse, often inconsistent, and generally weak guidance opens considerable latitude to those who work within it.

Another premise for the policy agenda sketched above is that guidance for instruction might have to be greatly strengthened if teaching is to dramatically improve. In this connection, many reformers recently have embraced proposals for "systemic" change—that is, a linked set of reforms in curriculum, teaching, standards, assessment, and teacher education, all aimed at promoting intellectually demanding instruction (see Smith & O'Day, 1991). Some advocates of this approach argue that close alignment among assessment, curriculum frameworks, and texts and other materials would make it clear to teachers and students what they needed to teach and learn. Advocates also contend that such a system would offer many salient opportunities for educators to learn. For instance, grading students' work on systemwide examinations could be an extraordinary educational opportunity for teachers and administrators, if it were properly organized. That would require the selection of useful papers for discussion, finding adequate time to discuss them, and representing a range of useful perspectives in the discussions, including, for example, university subject matter specialists. Such exam grading also could provide many useful opportunities to consider the links between examinations and curricula, and thus to revise exams and curricula.

32. Cohen & Spillane (1992). Teaching is uncertain anywhere and difficult to influence in any system. It also is a rather different sort of work than administration or policymaking, entailing different sorts of knowledge and skills. All this is true in any system. But in some systems inspection and promotion ar-

rangements mean that no one winds up in administrative or ministry posts unless they have been experienced teachers who were judged to be of high quality. That tends to link policy and administration with practice. But in the United States those links are entirely absent. What professionals need to succeed as policymakers or administrators depends not at all on their performance as classroom practitioners. That greatly attenuates connections between the two worlds.

33. Firestone, 1989.
34. Smith, O'Day, & Cohen (1990) report that the American public and many national leaders have changed their attitudes about education considerably in the last twenty years. In 1971 the U.S. Congress asserted, "No provision of any applicable program shall be construed to authorize any department, agency, officer, or employee of the United States to exercise any direction, supervision, or control over the curriculum . . . of any educational institution" (p. 10). This belief in the local control of curriculum and instruction was consistent with the beliefs of most Americans. But by 1989, public opinion about curriculum was shifting toward support of a national curriculum, national standards, and a testing program to measure progress. A Gallup poll conducted that year showed 70 percent of Americans were in favor of national achievement standards and goals, 69 percent were in favor of a standardized national curriculum, and 77 percent were in favor of a national testing program.

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Appendix C

Elementary Students At Risk: A Status Report

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Next September, approximately 3.5 million children will enter our nation's kindergartens. They'll be wearing new clothes, a bright smile, and great confidence that they will succeed in school.

A few years from now, many of these bright, enthusiastic children will be in deep trouble. Many will be in special education. Many will be receiving Chapter 1 services because of their poor achievement, and others will qualify for such services but not receive them. Many will have failed one or more grades; in many urban districts the *majority* of fifth graders have failed at least one grade. Many will be reading so poorly that they will have difficulty learning throughout their school careers. Many will be discouraged, frustrated, angry, or unmotivated.

Students' experiences in the elementary grades have a profound impact on their futures. Early in first grade, information on students' socioeconomic status and performance does not predict ultimate high school completion very well. By third grade, however, this information predicts high school completion with a high degree of accuracy. Disadvantaged children who have failed a grade or are reading below grade level are very unlikely to graduate (Lloyd, 1978). What this tells us is that actual success or failure in elementary school, especially in the early grades, is far more important than socioeconomic factors in predicting ultimate success in the educational system (and therefore in the economic system). There is hope in this observation; we cannot easily change students' family circumstances, but we can help them succeed in school.

The purpose of this paper is to provide a background of information on children in elementary school today and on likely trends in the near future, with a focus on issues relating to students who are at risk for school failure. The paper identifies various risk factors that many students face when they enter school and presents data on developments over time in demographics, student performance, and programs and policies designed to prevent or remediate learning problems in the elementary grades.

There is little in this paper that is new or surprising to those who follow these trends, but we have attempted to pull together in one place data from many sources bearing on the current status and outlook for elementary children in the 1990's.

Risk Factors

Factors that predict undesirable educational outcomes such as low academic achievement and dropping out include childrens' background characteristics as well as features of their schools and communities (Natriello, McDill, & Pallas, 1990). Such characteristics of children and their families as socio-economic status, race/ethnicity, language background, family structure, and parents' education all play a role in determining childrens' relative advantages and disadvantages in achieving success in school. School characteristics such as high enrollments of poverty students, low levels of school resources, and few challenging educational opportunities also predict poor outcomes, as do such features of an individual child's school experience as retention, low achievement, behavior problems, and poor attendance. Finally, there is some evidence that characteristics of the child's home or school community such as low economic status, lack of positive role models, and high levels of violence may also contribute to low achievement or academic failure.

In the actual experience of a child progressing through school, these factors are intertwined in a complex web of forces, events, and relationships which can have the general effect of severely restraining a student's potential to learn. Some of these risk factors, however, are more relevant than others to predicting students' school success at certain ages (Slavin, 1989a, 1989b). As students move beyond the early grades, the best predictors of negative outcomes such as dropping out are indicators of their actual performance in school: grades, attendance, and retentions. For pre-school children and students just entering school, these factors have little relevance given the limited predictive validity of tests at young ages and the obvious fact that young children have too little actual school experience to determine their level of risk based on such factors. For these children, socio-economic characteristics are better predictors of dropout and other school problems.

The observation that different risk factors have better predictive power for children at different stages in their school careers has important practical implications for identifying which students need services to bolster their chances for high levels of achievement and engagement

in school. Characteristics of disadvantaged populations such as poverty and minority race/ethnicity and linguistic status may be the most relevant factors in targeting four-year-old children for extra help and resources, since we know that students with these characteristics tend to perform, on average, at lower levels than their more advantaged, majority peers. Prevention programs, such as preschool, full-day kindergarten, and parent support programs, are therefore most appropriately targeted to children in poor communities rather than to individual children based on individual risk factors.

While these factors do not disappear in later years, by about age nine students' individual performance and behavior in school are better criteria for identifying those in need of services. By this point, the within subgroup variability is more apparent. In a heterogeneous school, for example, there will be students from impoverished families who are performing well and relatively advantaged students who are doing poorly and are at risk of dropping out. At this stage, interventions targeted based on individual risk factors (as contrasted with socioeconomic conditions) become more appropriate.

Data on students' background characteristics and their relationship to achievement outcomes is fairly widely available, largely because such information is collected through the decennial U.S. Census and through nationwide standardized achievement assessments. There are, however, some difficulties in achieving fair and accurate interpretations based on these data. Measures of poverty, for example, tend to assess an individual child's poverty level at a single point in time. Research shows, however, that the amount of time a child spends in poverty and the proportion of poverty students attending the child's school are much stronger predictors of that child's academic achievement than is family income at any one point in time (Kennedy, Jung, & Orland, 1986). Overall, we know less about the impact of school and community characteristics on student learning than we do about students' individual background characteristics.

Estimating the size of the at-risk student population is a difficult task that largely depends on whether one is looking at educational failure, graduating without basic skills,

dropout, or any other of the several available criterion. Natriello, McDill and Pallas (1990) estimate that 40% of the school-age population under 18 is at risk of failure in school on the basis of at least one of the following five indicators: race/ethnicity, poverty status, family structure, mother's education, and limited English proficiency.

The number of at-risk students might also be approximated by national dropout rates. In 1989, 12.6% of all 16 to 24 year olds were classified as high school dropouts (not enrolled and not high school graduates), with 12.4% white, 13.8% black and 33% of Hispanic origin. While some of these students may return to obtain either a high school diploma or GED, the numbers probably underestimate the number of students who are not succeeding in school and who are at risk of dropping out. While we do not put forth any numerical estimate of the number of students who fall into category of substantial risk, the following demographic and achievement profiles help us get a handle on the nature and magnitude of the problem.

Demographic Profile

The demographic profile below tells us several things about school-age children (where possible we have included data specifically for elementary grade students). First, population and enrollment data show that the number of students has increased, marking a trend that is expected to continue through the turn of the century. Second, these data support the popular perception that the school-age population is becoming increasingly racially, ethnically and linguistically diverse. Finally, an increasing number of students are living in poverty or in single-parent, female-headed households which are more likely to be characterized by low economic status than homes where both parents are present.

Population and Enrollment

School-age Youth Under 18: In the period between 1988 and 2020, the total number of children under 18 is expected to increase by about 4%, rising from 63.6 million in 1988 to 66.4 million in 2020. Figure 1 displays the projected racial/ethnic composition of the U.S.

population under 18 according to census data presented by Natriello, McDill and Pallas (1990). [1] According to this analysis, while the number of white children is expected to decrease substantially during this period, this decline will be offset by a near three-fold increase in the Hispanic population by 2020. The total proportion of whites in the school age population is projected to decrease from 7 in 10 in 1988 to 1 in 2 by 2020 whereas the total proportion of Hispanics will increase from 1 in 9 to 1 in 4 in 2020. The number of blacks in this age group is expected to increase somewhat during this period, from 15% to 16%. The total percentage of other groups (mostly Asian) is projected to nearly double, from 4% to 7% of the total population of school-age youth.

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Figure 1 Here

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Elementary School-Age Children: While the period between 1977 and 1985 saw a decline in the elementary school-age population (ages 5-13 yrs.), the number of annual births has increased since 1977, creating a phenomenon known as the "baby echo." The result is a current and projected increase in the number of elementary school-age children through the year 2000 with a downturn occurring in the first decade of the century. As indicated in Table 1, from 1985 to 1990 the number of 5-13 year olds increased by 7.9% from 30.1 million to 32.5 million. By 1995, this number is expected to increase by 6.7% to 34.7 million. By 2002 this population is expected to increase at a lesser rate to 36.3 million. While the total elementary school-age population is then expected to drop to 31.9 million by 2010 (as indicated by a different source in Table 2), the total remains above the 1985 level.

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[1] Natriello, McDill and Pallas, 1990. use the high series of projections for migration, fertility, and mortality in estimating the Hispanic population while using the high series for migration and medium projections for fertility and mortality in estimating white and black populations.

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Table 1 Here

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Breaking down the elementary school-age population along racial and ethnic lines tells a slightly different story (Table 2). From 1985 to 1990, the number of white children in this age group increased by 6.1%. The level of increase is expected to drop from 1990-1995 to 4.6% and from 1995 through 2010, the number of white 5-13 year olds is expected to decrease from 23.7 million to 20.3 million, a total of decline of over 14%. In contrast, the number of Hispanic 5-13 year olds increased by 15.8% from 1985 to 1990 and is expected to steadily increase through 2010, with the greatest rate of increase expected in the first half of the 1990's (16.6%). Overall, the number of Hispanic elementary school-age children is expected to grow from 3.5 million in 1990 to 4.8 million in 2010. The picture for African American 5-13 year olds is somewhat similar. The number of children in this age group increased by 14.6% from 1985 to 1990. From 1990 through 1995 this number is expected in increase by another 12.1%, from 5.1 to 5.7 million, with the rate of increase slowing in the latter part of the 1990's. Unlike the Hispanic population, however, the number of 5-13 year olds is expected to decrease slightly by 2.2% to 5.6 million from 2000 to 2010. The total number of American Indians, Native Alaskans, Asian and Pacific Islanders, is expected to steadily increase from 1.1 million to 1.4 million in the period from 1990 to 2010.

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Table 2 Here

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Reflecting the overall increase in the number of 5-13 year olds, public and private elementary school enrollment also is projected to rise. The total number of elementary school students was 28.5 million in 1985 and is expected to grow to 32.8 by 2002. Table 3 shows

steadily increasing enrollments in public elementary schools while private elementary school enrollment dropped slightly from 1986 to 1990. Projections for 1991 through 1996 show total enrollments increasing by an average of nearly 350,000 per year with the rates of increase tapering off through the latter half of the decade. Overall, public elementary school enrollment in kindergarten through grade 8 is expected to grow on average about 1% per year from 1990 through 2002. Elementary enrollment is expected to increase the most in the Northeast (17%) and the least in the Midwest (5%). The West and the South are expected to see increases of 14% and 13% respectively (Gerald & Hussar, 1991 p. 96).

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Table 3 Here

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Family Structure

Table 4 and Figure 2 show a steady and dramatic increase in the number of children under 18 living in single parent families over the past several decades. For all races the percentage of children under 18 living with a single parent tripled, rising from 7.1% to 21.9% between 1950 and 1989. The rate of white children living in single parent homes is consistently lower than the average for all races, growing from 8.1% in 1970 to 16.8% by 1989. The rate for blacks, however, far exceeds the average level, growing from 33.6% in 1970 to 54.2% in 1989. The rate for Hispanics also exceeds the average level, growing from 21.3% in 1980 to 28.4% in 1989. While most single-parent families are headed by women, the number headed by men has been rising (see Table 8). The total number of children not living with both parents is projected to rise (Figure 3). Between 1987 and 2020, the number of these children is expected to increase by approximately 18%, from 16.9 in 1987 to 19.9 million in 2020 (Natriello, McDill, & Pallas, 1990).

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Table 4 and Figures 2-3 Here

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Poverty and Income

The proportion of all children under 18 living in poverty declined during the 1960s but then rose during the 1970's and '80's. In 1989, approximately 19% of all children lived in poverty (Table 5). By age group, the highest proportion of children living in poverty are under six years old, and this figure has increased between 1979 and 1989 (Figure 4). Moreover, while 31% of all children under six in 1989 were non-white minorities, 59% of poor children under six were minorities (National Center for Children in Poverty, 1991).

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Table 5 and Figure 4 Here

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The number of children under 18 living in poverty is projected to increase as shown in Figure 5 (Natriello, McDill, & Pallas, 1990). Between 1987 and 2020, the number of children in poverty is expected to rise by 33% from 12.4 million to 16.5 million, representing a proportional increase of poverty children to all children from 20% to 26%. While this proportional increase may not appear very dramatic, Natriello, McDill and Pallas are right to point out that what matters here is that our schools will need to serve over 4 million more children in poverty by 2020 than they did in 1987.

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Figure 5 Here

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Far more disturbing than the number of children living in single parent homes is the high correlation between single parent homes (specifically female-headed households with no husband present) and low economic status (Table 5). Once again, rates for black and Hispanic children far exceed the average for all children, with 43.2% of black children and 35.5% of Hispanic children living in poverty in 1989 in contrast to 14.1% of white children. These rates rise across the board when looking at female-headed households. In 1989, the poverty rate of children in female-headed families was 51.1%, with 42.8% for whites, 62.9% for blacks, and 65.0% for Hispanics. Moreover, the proportion of all poverty children living in female-headed households has seen a nearly steady increase for all groups through 1988 with some decline in 1989--rising dramatically from 24% in 1960 to 57% for all children, 29% to 76% for black children and from 21% to 46% for white children.

Female-headed households also show a much higher percentage of children who live in families with relatively low income levels. Table 6 shows that, in 1987, the highest proportion of children of children living in female-headed households live in families with an annual income under $10,000 (nearly 54%), with the second highest proportion (25%) living in families with an income ranging from $10,000 to $19,999. Children living in married couple families are more evenly distributed, with the highest percentages found in the $20,000-$39,999 range. A related change in family structure has occurred for these children, however, as the number of married couple families with both parents participating in the labor force has increased significantly during the 1970's and '80's (Table 7). The percentage of families with children under 18 with both parents working rose from 37.1% in 1975 to 58% in 1986, replacing households with only the father employed as the predominant pattern. Another notable statistic here is the high rate of labor force participation among single fathers with children under 18 in contrast to the lower participation rates of single mothers.

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Table 6-7 Here

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Home Language

The U.S. Education Department has examined school-age children on the basis of the number of children scoring at or below the 20th percentile on a national English proficiency test and of 11 indicators of dependency on their native language such as whether the child speaks a non-English language at home and whether English is the primary or secondary household language (Natriello, McDill, & Pallas, 1990). Depending upon the number of indicators, the number of children who display limited English proficiency (LEP) ranges from 1.2 million (6 indicators) to 2.6 million (at least 1 indicator). An alternative assessment conducted by the U.S. General Accounting Office estimates this population at about 1.5 million (U.S. GAO, 1987 in Natriello, McDill, & Pallas, 1990). As shown in Figure 6, the number of children under 18 speaking a primary language other than English (PLOTE) is projected to increase from 2.3 million in 1986 to 5.5 million by 2020, raising the proportion of PLOTE children from under 4% to nearly 8%.

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Figure 6 Here

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Academic Profile

At the national level, student academic performance in most elementary schools is assessed primarily through standardized achievement tests such as the CAT, MAT and CTBS. In addition to these tests, the National Assessment of Educational Progress (NAEP) has regularly assessed academic achievement among 9, 13 and 17-year-olds in reading, mathematics, science, writing, history, geography, civics and other fields since its inception in 1969. In this section we highlight significant achievement trends based on the NAEP data, focusing on students' race/ethnicity, school SES, and parents' education (a proxy for student SES). We also take a brief look at language minority student achievement and at aggregate teacher characteristics to provide a sense of who is teaching elementary-school-age students.

As Kennedy, Birman and Demaline (1986, pp. D13-14) point out, care should be taken in interpreting trends in NAEP test score data, as there has been no formal equating of scores from one assessment to the next. Moreover, these researchers report that while NAEP's sample design itself is strong, resulting in fairly representative samples, several subgroups are excluded, including handicapped students, students with limited English proficiency, and students who have dropped out of school. These groups are important to any study of at-risk students. Despite these limitations, NAEP's instruments are carefully designed and there is consensus in the research community that the achievement data collected are of fairly high quality.

National Trends of Aggregate Student Performance

Figure 7 shows national trends in average achievement for science, math, reading, and writing. Science proficiency for 9-year-olds declined in the 1970's and rose in the 1980's. However, performance levels in this area in 1990 remain only slightly above what they were in 1970. Proficiency in math improved steadily for 9-year-olds between 1973 and 1990. While the overall increase during this period is not dramatic, the fact that the increase has occurred primarily since 1982 may indicate a continuing upward trend. In reading achievement, 9-year-olds made gains in the 1970's. These gains appear to have eroded during the 1980's, however, bringing 1990 levels back down to previous 1971 levels. Students in the fourth grade displayed improvements in writing from the 1984 to 1988 assessments, but this upward trend was not sustained in 1990. Below we consider trends in student performance in each of these subject areas for various student subgroups. All data cited are for 9-year-olds or 4th graders unless otherwise specified.

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Figure 7 here

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Reading

Figure 8 and Table 8 show that, in 1990, black and Hispanic students scored lower on average than white students at each measured grade level, with Hispanics scoring slightly above blacks. Average scores for students in other racial/ethnic subgroups (Native American, Native Alaskan, Asian/Pacific Islander) show performance levels below whites and above both blacks and Hispanics. Though there is variation within groups, African American and Hispanic 12th grade students on average performed far closer to the level of 8th grade white students than to their 17-year-old white peers (Figure 7). However, blacks and Hispanics on average show more improvement than whites in reading achievement across grade levels. While this improvement lessens between ages 13 to 17, performance gaps between whites and the other two subgroups appear to narrow slightly as children progress through school.

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Figure 8 and Table 8 here

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Between 1971 and 1990, reading scores for white 9-year-olds remain relatively constant. African American 9-year-olds, however, made significant progress in reading performance throughout the 1970's, though these gains have leveled off in the 1980's and have actually seen a slight downturn in 1990, bringing average reading scores for black students close to the 1975 level. Hence, the gap between black and white 9-year-olds decreased during the 1970's, but remained stable in the 1980's and increased slightly by 1990. Since first measurement in 1975, Hispanic students' reading performance has also improved and remained between that of black and white students (albeit with scores much closer to those of black students). They have made comparatively smaller gains, however, than black students.

Table 8 shows a clear linkage between the social-economic status of the school's community and average levels of reading proficiency. In 1990, 9-year-old students attending schools in disadvantaged urban areas scored significantly lower than their peers in advantaged

urban schools and somewhat lower than their rural counterparts. Students in rural communities achieved significantly higher average reading levels in 1980 than in 1971, and students in disadvantaged urban areas attained significantly higher average scores in 1984 than in 1971.

Not surprisingly, 9-year-old students with college educated parents show consistently higher scores than students with less educated parents, and students whose parents graduated from high school perform better than those whose parents did not complete high school. Students whose parents had a post-high-school education, however, have seen a decline in 1990 reading achievement from the 1980 level.

Figure 9 describes the five levels of reading proficiency corresponding to the NAEP scale. Tables 8.1-8.5 show percentages of 9-year-old students and student subgroups with reading proficiencies at each of these levels. While the vast majority of 9-year-olds assessed have been able to carry out simple, discrete reading tasks (level 150) in each assessment, the trend data shows a decline in the number of students performing at this level after 1980. A similar trend is seen at the next reading level (200), with the proportion of 9-year-olds performing at this reading level rising from 59% in 1971 to 68% in 1980 but then dropping back to 59% in 1990. This downturn in the 1980's suggests an area of concern.

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Figure 9 and Tables 8.1-8.5 Here

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Racial/ethnic breakdowns for reading levels show that at the 200 level, the gap between blacks and Hispanics and whites has been reduced substantially since 1971. In 1971, six in ten white 9-year-olds were performing at the 200 level compared to two out of every ten black students. By 1988, the number of black students performing at this level nearly doubled while there was little change in the number of white students. In 1975, three in ten of Hispanics performed at this level compared with nearly seven in ten whites. By 1988, nearly half of the

Hispanics students were performing at this level. Performance for black and Hispanic students decreased slightly in the 1990 assessment. The percentage of students in the "other" subgroup performing at this level steadily increased and exceeded the percentage of white students in the 1984 and 1988 assessments. In the 1990 assessment, however, their numbers at this level declined by a dramatic 20.3%, dipping below the number of white students. Trend estimates are unreliable for this student group, however, due to small sample size.

Writing

In their 1984, 1988 and 1990 assessments of students' writing proficiency, NAEP examined students' ability to produce three types of writing: informative, persuasive and imaginative. Student writing is evaluated on whether it meets the specific purpose of each writing task (primary trait evaluation), students' relative writing fluency, and students' mastery of spelling, punctuation and grammar. A composite score based on the first mode of evaluation (primary trait) provides estimates of students' average performance across all three types of writing.

Table 9 shows average scores and trends in writing proficiency among 4th graders. Trends for white, black and Hispanic students are displayed in Figure 10. Performance for these three groups has remained relatively stable across time. There was some slight improvement for white and Hispanic 4th graders from the 1988 to 1990 assessment, but no change for black students at this age. White students and the Asian/Pacific Islander and Native American Indian group consistently scored 35-40 points above black 4th graders. Hispanic students' average scores remained in the middle, somewhat closer to those of black students.

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Table 9 and Figure 10 Here

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Fourth grade students attending school in advantaged urban areas had the highest scores on all three assessments. Students in rural areas had the lowest average scores in 1984. The scores of 4th graders in disadvantaged urban areas declined, however, from 1984 to 1988, while students in rural areas rose. Hence we find students in disadvantaged urban communities with the lowest average scores in 1990. A larger gap exists between these students and students in the other groups (rural, advantaged urban and "other") which are now more closely clustered together.

The writing performance of 4th graders was higher for students whose parents had completed high school and, in general, higher still for students whose parents had some post-high school education or were college graduates. These results varied little over the three assessments.

Alternative Writing Assessment: The method NAEP has used on their traditional writing assessments has the problem of measuring only "how well students can write on an assigned topic under timed conditions. They are not designed to capture the range and depth of the writing processes in which students engage during process writing instruction programs (Gentile, 1992, p. 2)." The student products being assessed by this method are essentially rough drafts written in 15 minutes which give little information about how well a student implements editing and revising strategies crucial to good writing.

In 1990, NAEP began to explore alternative ways of evaluating student writing by conducting a pilot portfolio assessment alongside their standard assessment. The main purposes of the pilot study were "1) to explore procedures for collecting classroom-based writing from students around the country; 2) to develop methods for describing and classifying the variety of writing submitted; and 3) to create general scoring guides that could be applied across papers written in response to a variety of prompts of activities (ibid, p. 5)." While the results of this particular study are not useful in assessing students' writing abilities given their non-representative sample (consisting of students who tended to be older, higher achieving, and more advantaged than those assessed in the standard 1990 study), NAEP will apply the

lessons learned from the pilot to their 1992 Portfolio Study. On the whole, the endeavor appears to be a promising step forward in national writing assessment practice.

Mathematics

Table 10 and Figure 11 shows the results of NAEP's assessments of 9-year-olds' proficiency in mathematics between 1978 and 1990. Statistically significant improvements have been found for blacks, whites, and Hispanic 9-year-olds over this time period. This improvement is accompanied, however, by persistent and relatively stable discrepancies between the achievement of white students and their black and Hispanic peers. While the gap between white and black 9-year-olds narrowed between 1973 and 1986, it saw less of a decrease in the 1980's and increased again slightly in 1990. The gap between Hispanic and white students was smaller than that between whites and blacks, but showed no signs of improvement over this time period.

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Table 10 and Figure 11 Here

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While there has been improvement between 1978 and 1990 in math performance among 9-year-old students living in disadvantaged urban areas, their scores remain consistently below those of students in advantaged urban areas. Students living in rural areas and in areas classified as "other" also showed significant gains, with proficiency levels falling between those of the advantaged and disadvantaged urban populations. Broken down by parents' education, 9-year-olds showed progress across all levels of parental education between 1978 and 1990, except for those in the "some post-high school education" category.

Figure 12 describes levels of mathematics proficiency corresponding to five points on the NAEP scale. Tables 10.1-10.5 show the percentages of various student subgroups at age 9 performing at or above these levels. The picture is most interesting when looking at level 200

where there is the greatest amount of variation among student subgroups. In 1978, less than half (42%) of black students and slightly over half (54%) of Hispanic students performed at this level, compared to 80% of Asian/Pacific Islander and American Indian students and 76% of white students. By 1990, this gap had reduced somewhat, with 60% of black students and 68% of Hispanic students performing at this level, compared to 87% of both white students and other students. Similar gaps are present at the 250 level.

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Figure 12 and Tables 10.1-10.5 Here

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In 1991, the National Assessment Governing Board applied new standards for reporting the results of NAEP data which enable data to be reported in terms of what students should be able to do at particular grade levels (National Education Goals Panel, 1991). Table 12 shows the results of student performance in grade 4 broken down by student race/ethnicity and by achievement level. Achievement levels are 1) basic-which denotes partial mastery of knowledge and skills for proficient math work in grade 4, e.g. routine one-step problem solving, 2) proficient-which represents solid academic math performance and an understanding of numbers and their application to daily life problem solving, and 3) advanced-which indicates superior performance, e.g., greater ability to analyze more complex problems and to generalize knowledge to different situations. Students have been further designated as "competent" if they display advanced or proficient levels of performance, while students at or below the basic level of performance are categorized as "not competent" (Figures 13 and 14). The validity and reliability of this latter categorization, however, remains to be determined.

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Table 11 and Figures 13-14 Here

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According to this analysis, in 1990, the largest proportion of black and Hispanic 4th grade students scored at the below basic level, 70% and 58% respectively. The majority of white and American Indian/Alaskan Native students and a near majority of Asian/Pacific Islander students scored at the basic level. Only Asian/Pacific Islander students (27%) and white students (18%) are substantially represented at the proficie' t level. Figure 12 shows that the majority of students in all racial/ethnic subgroups can be classified as "not competent" in math, with the greatest percentage being black students (98%) and the lowest percentage being Asian/Pacific Islander students (71%).

Science

Table 12 and Figure 15 shows the results of NAEP's assessment of 9-year-old students' proficiency in science broken down for various subgroups. Race and ethnic breakdowns show that African American students have achieved the greatest increase in this area since the early 1970's, hence narrowing the gap between themselves and white students. The lessening of this gap, however, did not continue past 1982, and black students' average scores remain below those of white, Hispanic, and "other" students. The gap between Hispanic and white students also decreased somewhat, though not significantly. Though student performance in advantaged urban communities remains consistently and substantially higher than that in other areas, the gap between students in these areas and their disadvantaged urban counterparts has narrowed significantly since 1977.

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Table 12 and Figure 15 Here

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As with reading and math, NAEP also provides a breakdown of the scale into levels of science proficiency, as described in Figure 16. Tables 12.1-12.5 show the percentages of students by various types of subgroups performing at each successive level. In 1990, 97% of

all 9-year-olds demonstrated knowledge of everyday scientific facts (level 150), 76% demonstrated an understanding of simple scientific principles (level 200), and 31% were able to adequately apply general scientific information (level 250). Progress on levels 200 and 250 show significant gains over 1977 and 1982 assessments.

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Figure 16 and Tables 12.1-12.5 Here

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At the 200 level, black students have made the most gains among the racial/ethnic subgroups, raising their number from approximately three in ten in 1977 to nearly five in ten in 1990. This increase has waned in the latter half of the 1980's, however, and the gap in 1990 between the number of black students (46%) and their white peers (84%) performing at this level remains quite large. Hispanic students also have made significant gains at this level, but, similarly, the gap compared to whites is substantial.

The number of students proficient at this level in disadvantaged urban areas rose from 34% in 1977 to 57% in 1990. The number in advantaged communities rose less than half that much, from 73% in 1977 to 82% in 1990. Communities classified as other resembled rural areas in percentages and level of improvement, while advantaged urban areas remained relatively stable. While there is not much difference in representation among students whose parents have had some post-high school education or are college graduates at this level, more of the students in each of these groups attain this level than students with less educated parents.

Achievement of Language Minority Students

Rising levels of immigration from Latin American and Asian countries has resulted in larger numbers of language minority students entering the U.S. school system in recent decades. These groups are culturally and socio-economically heterogeneous and represent a wide-range of English speaking ability. Students are generally identified as language minority (LM) if a language other

than English is spoken at home. While the definition of a sub category of LM, limited English proficient (LEP), is a subject of debate, students classified as LEP can be thought of as those who have enough difficulty with English that they do not benefit from classes taught entirely in English (Bradby, 1992). This puts them at a great disadvantage in traditional classrooms and creates significant challenges for the schools they attend and the teachers who teach them.

As mentioned above, NAEP assessments do not include LEP students. In 1988, NAEP did publish a special study assessing reading and math performance of language minority students. While this study did confirm the importance of English language competence to academic achievement, it has been criticized for not including LEP students. In a recent report, Bradby (1992) builds on this research through her analysis of a nationally representative sample of eighth graders using data from the National Education Longitudinal Study of 1988 (NELS: 88) which includes LEP students.

General achievement results from this study show few surprises (Table 13). More low SES students in both groups failed to achieve basic reading and math performance levels than their higher SES peers. Somewhat surprisingly, there was little overall difference in the proportion of non-language minority and language minority students failing to achieve basic reading and math levels for both groups. However, in reading achievement for both groups, the language minority students with the lowest level of English proficiency were much more likely to fail than those LM students with higher proficiency. This also held true in math for Hispanics, though not for Asians. This study will be expanded through analyses of 1990 and 1992 follow-up surveys.

Teachers

At the time of writing this report, we had no data on teacher characteristics specifically in urban elementary schools, so we report only national aggregate data. Much of the general data available on teachers is found in the Schools and Staffing Survey of 1987-88. Table 14 shows the number of teachers by various characteristics taken from this survey. Teachers are relatively evenly distributed among public elementary and secondary schools. The vast majority of public school teachers (86%) are white, with only 8% black, approximately 3%

Hispanic, and the rema_ ing 3% made up of Asian American/Pacific Islander, American Indian, or Alaskan Natives. Approximately seven in ten public school teachers are female, a number that has remained fairly consistent since the early 1960's (Table 15). The majority of teachers (67%) are in their 30's and 40's, while 13% are younger than 30 and 18% are over 50. There are more teachers with 10 to 20 years of full-time teaching experience (44.5%) than in any other range.

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Table 14 Here

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The majority of teachers (52.2%) hold Bachelor's degrees and many hold Master's degrees (40%). While more white than African American teachers hold Bachelor degrees, slightly more African Americans than whites hold Masters degrees. More elementary school teachers hold Bachelors than Masters degrees while the distribution of highest degree held is more even for secondary school teachers. The number of teachers earning Master's or specialist degrees has more than doubled since 1961 (Table 15).

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Table 15 Here

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Programs for Students at Risk

The total amount and proportion of federal dollars supporting programs designed to improve education and provide extra services at the preschool, elementary, secondary, and post-high school levels has increased by 13% (in constant dollars) since 1989 (Table 16; from National Goals Panel, 1991). Funding for preschool programs has seen by far the greatest increase during this period, with funding levels rising from nearly $9.2 million in 1989 to $14.2 million in 1991, a total increase of 41%. In spite of the large increase in funding, preschool programs represented the

lowest proportion of the total funding for education/service programs at 24% in 1991, compared to school year programs which received 32% and post-high school programs which received 42% (with 2% of the total funding going to a residual category of programs; Figure 17). A variety of federally funded programs are directed toward prevention or remediation of the learning problems of at-risk students (Tables 17 and 18). The current status of the most important of these is summarized below.

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Tables 16-18 and Figure 17 Here

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Chapter 1/Title 1

Compensatory education refers primarily to federal programs targeted toward low achieving, disadvantaged students. The largest compensatory program by far is Chapter 1 (formerly Title 1). In the 1991-92 school year, Chapter 1 provided more than six billion dollars to programs serving over 90% of all public school districts and approximately five million children nationwide (LeTendre, 1991; Anderson, 1992); one in every nine students received Chapter 1 services (LeTendre, 1991). In 1988-89, 43% of Chapter 1 students were white, 27% were black, 25% were Hispanic, 3% were Asian or Pacific Islander, and 2% were American Indian or Alaskan Native. From 1980 to 1989, the percentage of Chapter 1 participants who are Hispanic increased from 15% to 25%, while the percentage of white participants has declined from over 50% in 1980 (Sinclair and Gutmann, 1991). The majority of students served by Chapter 1 are in elementary schools, with 72% of Chapter 1 participants in grades 1-6 in 1988-89 (Figure 18). While the overall participation in Chapter 1 programs has increased substantially during the 1980's (from just under 4.5 million in 1982), the distribution of participants by grade level has remained virtually unchanged (Figure 18).

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Figure 18 Here

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Though funding for Chapter 1 was cut back slightly in 1981 and 1982, and later in 1986, support for the program has doubled since 1980. Most Chapter 1 funds provide instructional services to students in reading, mathematics, and /or language, as is illustrated by Figure 19. Chapter 1 funds are given to schools on the basis of the number of low-income students they serve, but within schools they are used to serve students according to their educational needs, not their poverty level. Because of this, and because non-poor students so outnumber poor ones, the majority (58%) of students receiving Chapter 1 services are not themselves from families in poverty (Figure 20). However, poor students are disproportionate recipients of Chapter 1 services, as are black and Hispanic students. For the first time, in 1988-89, the U.S. Dept. of Education collected data on the number of students classified as handicapped or limited English proficient (LEP) receiving Chapter 1 services. With 23 states and the District of Columbia reporting (California is a notable exception), 4% of Chapter 1 participants were classified as handicapped and 8% were classified as LEP (Sinclair and Gutmann, 1991).

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Figure 19 and 20 Here

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Models of Chapter 1 Service Delivery. Two guiding principles of delivery of Chapter 1 services are that only eligible low-achieving students may benefit from these services, and that the services must supplement, not supplant, local educational efforts. The first of these, which typically limits use of Chapter 1 funds to students who score below a certain cut off score on standardized tests (e.g., below the 40th percentile), keeps most schools from using Chapter 1 funds to improve the school overall, for example by reducing class size or implementing more effective practices in the school as a whole (the exception is schoolwide projects, described

below). The "supplement, not supplant" requirement generally keeps schools from using Chapter 1 funds to provide services that non-Chapter 1 students receive out of local funds. For example, a district could not provide preschool or summer school programs for low-achieving or disadvantaged students out of Chapter 1 funds if it also provided similar programs for non-Chapter 1 students out of local funds. A small army of state regulators audit Chapter 1 programs to make sure that funds are spent only on eligible students and that they supplement local efforts.

There are five principal models of service delivery used under Chapter 1 funding: pullout, inclass, add-on, replacement, and schoolwide. In pullout, students are taken out of their homeroom classes for 30-40 minute periods, during which time they receive remedial instruction in a subject with which they are having difficulty, usually from a certified Chapter 1 teacher and usually in a class of eight or fewer pupils. In inclass models, the teacher (or, more commonly, an instructional aide) works with eligible students within the classroom. Add-on programs provide services outside of the regular classroom, as in summer school or after school programs; an increasingly popular option, using Chapter 1 funds to provide pre-kindergarten programs or to extend kindergarten to a full day might also be considered an add-on model. Replacement models involve placing Chapter 1 students in self-contained classes in which they receive most or all their instruction. These programs require school districts to provide additional local resources to supplement Chapter 1 funds. Schoolwide projects are those in which all students in a high-poverty school can benefit from Chapter 1 funds. Until recently, schoolwide projects have been rare, as they could only be used in schools in which at least 75% of students were in poverty and in which the district was willing to provide matching funds to supplement the Chapter 1 allocations. The 1988 Hawkins-Stafford Amendment removed the matching fund requirement, so schoolwide projects are now becoming more common among high-poverty schools. While state reporting on the number of schoolwide projects was incomplete for 1988-89, 27 states reported a total of 589 schools with schoolwide projects. The number of projects in a state ranged from 1 in several states to 378 in California (Sinclair & Gutmann, 1991).

While use of inclass, add-on, and replacement models is increasing in recent years. Chapter 1 funds still overwhelmingly utilize pullout programs. Figure 21 shows that in elementary schools, pullout designs were used in 84 percent of all Chapter 1 reading programs and 76 percent of math programs, more than all other models combined, in the early 1980's. While pullout has continued to decline, it is still by far the predominant Chapter 1 model in the 1990's. Part of the reason for this is that pullout models most clearly fulfill the "supplement, not supplant" requirements of Chapter 1 regulations; in inclass models in particular, there is always concern about the possibility that teachers or aides present in the regular classroom will be helping ineligible as well as eligible students.

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Figure 21 Here

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The best national assessment of the effects of Title 1 is the now rather dated Sustaining Effects Study (Carter, 1984), which compared achievement gains made by Title 1 students in 1976-77 to matched "needy" students and to a representative sample of non-needy students. Figure 22 shows that Title 1 students did generally make greater gains in reading and math than other needy students, but these gains were not adequate to close the gap between Title 1 and non-needy students. Table 19 summarizes the same data in standard deviation units. Note that in comparing Title 1 and matched needy students, only in first grade did differences exceed 15% of a standard deviation. Chapter 1 effects diminished each year, and were no longer detectable in reading after third grade (although small effects were found in math through grade 6). This may be due to the fact that earlier participation in Chapter 1 increased the baseline for one-year gains, but it also may indicate that early intervention is simply more effective than remediation late in the elementary years.

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Table 19 and Figure 22 Here

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More recent evaluations of the effectiveness of Chapter 1 services have aggregated the results of routine district evaluations, and show gains in normal curve equivalent scores each year. However, such assessments without control groups are flawed by problems of missing data, retention, effects of entry and exit to the program, statistical regression, and other difficulties. Prospects, the congressionally mandated longitudinal study of Chapter 1, will provide an updated national evaluation of the program, with the first one-year impact assessment due to appear in 1993.

Head Start

Head Start is a federal compensatory program for students from age three to school entry. Since 1965, Head Start has served a total of 12.5 million children and in 1991 received nearly 2 billion dollars to operate approximately 1,350 projects serving over one half million children nationwide (U.S. Dept. of Health and Human Services, 1992). Head Start programs typically provide a half-day preschool setting for children from low income families with activities designed to enhance their socio-emotional and cognitive growth. Most programs also provide health, nutrition, and/or family support services (see Zigler & Valentine, 1979; McKey et al., 1985).

Enrollment in Head Start grew from just over one half million in 1965 to close to 700,000 in 1968, at which point it began to decline to a low of 333,000 in 1977. Since 1977, however, enrollments have risen (with some yearly fluctuations) by a quarter of a million children, in part reflecting growth in the population of preschool-age children. The number of children served by Head Start is projected to increase to 622,000 in 1992. In 1965, Head Start received a congressional appropriation of $96.4 million. This figure rose to $475 million by 1977 and has increased fairly steadily since then. Appropriations for 1990 and 1991 show

especially large jumps in Head Start funding over previous years, with a total increase from 1989 to 1991 of $597 million or 44% (in constant dollars). In 1992, Head Start is expected to receive over $2.2 billion in program funds.

In 1985, CSR, Inc. conducted a review/meta-analysis which synthesized over 200 separate evaluations of Head Start programs. They concluded that Head Start does show some statistically significant effects on students' cognitive and socioemotional development. However, the study reported a frequent "fade-out" effect whereby students' cognitive and affective gains disappeared by the end of the first year of regular school (McKey et al., 1985). The national Head Start office reports that a comprehensive assessment of the Head Start program is planned for 1992.

Special Education

Special education services have long been provided to students who have identified handicaps. Since the passage of Public Law 94-142 in 1975, school districts have provided a continuum of services for handicapped students ranging from special schools to special classes within regular schools to various part-time placements. In these programs, students typically receive instruction in very small groups from teachers with certification in special education. Eligibility for special education depends on assessments of individual students' levels of functioning, and a variety of procedural and legal safeguards provided for in PL 94-142 are intended to ensure that students receive appropriate services in the "least restrictive environment."

As shown in Figure 23, the number of students receiving special education services (under the Individual with Disabilities Act--IDEA and under Chapter 1) has increased steadily since 1976. In 1989-90, 4.7 million children and youth received such services, constituting 6.9% of the nation's resident population of 3-21 year olds (for IDEA) and birth-21 year olds (for Chapter 1). The proportional increase between 1976-77 and 1989-90 is 30.4%. Funding for special education (combined IDEA and Chapter 1) also has increased steadily from $373 million in 1977 to nearly $1.7 billion in 1990.

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Figure 23 and Table 20 Here

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One of the most important trends in recent years relating to the subject of this paper is a substantial increase in the number of students with mild academic handicaps who are receiving special education services. Table 20 shows that while the percentage of students categorized as physically disabled and mentally retarded has stayed at about the same level over the period 1976-1989, the number of students categorized as learning disabled increased by more than 250%. Almost 90% of this increase represents the entry into the special education system of low achievers who would not have been served in special education in the 1970's. In other words, special education has assumed a substantial burden in trying to meet the needs of students at risk of school failure. Yet research comparing students with mild academic handicaps in special education to similar students left in regular classrooms finds few benefits for this very expensive service (see Leinhardt & Pallay, 1982; Madden & Slavin, 1983).

Trends in the Education of Students at Risk

This is a time of rapid change in education generally and education of at-risk students specifically. Nationally, the most important changes involve *curriculum* and *assessment*. In recent years elementary schools have been trying to move away from the teaching of isolated skills and drill toward more integration of content across disciplines, more problem solving and higher-order thinking skills, and more wholistic approaches to instruction. In reading, schools have rushed to embrace "whole language" approaches, which vary widely in details but tend to de-emphasize basals, phonics, and workbooks and to emphasize instead use of novels, integration of reading and writing, and relatively unstructured, exploratory approaches. Language arts instruction has changed dramatically, to focus more on creative writing rather than language mechanics. Use of writing process models, in which students plan, draft, revise, and ultimately "publish" compositions, has increased substantially. In mathematics, standards promulgated by the National

Council of Teachers of Mathematics have had enormous influence in moving teachers toward more use of discovery, problem solving, group work, and other strategies (NCTM, 1989).

Schools serving disadvantaged students have generally been the last to adopt these curricular innovations, partly because of a lack of resources for staff development and partly because of severe accountability pressures in Chapter 1 schools and urban districts generally which focus teachers on norm-referenced standardized test scores.

In the area of assessment, two important developments are taking place. One is a strong political movement toward the establishment of national standards, with tests at selected grade levels keyed to these standards. The second is the movement toward "authentic" testing, use of tests that include actual performances (e.g., setting up experiments), integrate content across disciplines, use open-ended rather than multiple-choice formats, and in some cases evaluate "portfolios" of student work over time. The movement in this area has been primarily in state assessment procedures, where such states as Connecticut, Vermont, Maryland, and California are piloting assessment programs radically different from traditional norm-referenced and criterion-referenced measures. The new state assessment systems put Chapter 1 schools in a quandary, as Chapter 1 continues to require norm-referenced tests; schools serving poor children are increasingly being asked to teach to two quite different sets of standards, with accountability sanctions attached to each.

Another important national trend is a move away from ability grouping. Districts throughout the country are at least discussing and often implementing untracking plans. At the elementary level, between-class ability grouping has not been predominant (McPartland, Coldiron, & Braddock, 1987), so much of the change in this area is a move away from the use of formal reading groups, often tied to a movement toward whole language techniques. At the same time, there is increasing use of nongraded primary plans that allow for flexible grouping of students according to needs. This movement is connected to a reaction against retention. As many districts (especially those serving disadvantaged students) implemented grade-to-grade promotion standards and insisted on age-appropriate curriculum at every grade in the early 1980's, retention rates often

soared. This trend is now reversing as research indicating the harmful effects of retention (e.g., Shepard & Smith, 1989) has become more widely known.

Important changes in school governance are taking place. There is increasing emphasis on site-based management, allowing individual schools more autonomy and decision-making authority and encouraging the participation of teachers (and often parents) in school governance.

Many of the trends having the greatest impact on disadvantaged students are changes taking place in Chapter 1. Among these, mentioned earlier, are the increased total funding of Chapter 1, the rapid increase in schoolwide projects, and the continuing gradual movement away from pullout. Another important movement in Chapter 1 is an increased emphasis on program quality rather restrictive regulations. This movement has been aided by the 1988 Hawkins-Stafford Amendment's program improvement guidelines, which have focused attention on student outcomes. One element of program quality that has come to the fore is integration between Chapter 1 and regular classroom instruction. In addition, there has been a continuing trend to concentrate Chapter 1 funds in the poorest schools and the lowest grades. Chapter 1 dollars are increasingly being used to fund preschool, full day kindergarten, and first-grade interventions such as Reading Recovery, to prevent learning problems from developing.

It is important to state once again that major changes in Chapter 1 programs are happening in only a small number of schools; the great majority still use traditional pullout programs much like those of the 1970's. Yet the percentage of schools using schoolwide projects, early intervention, and other interventions is increasing, and these changes are significantly altering the discussions of effective practice in Chapter 1 even if they do not yet affect a majority of Chapter 1 schools. As Chapter 1 approaches its 1993 reauthorization, these discussions could have major consequences for changes in Chapter 1 regulations and funding patterns.

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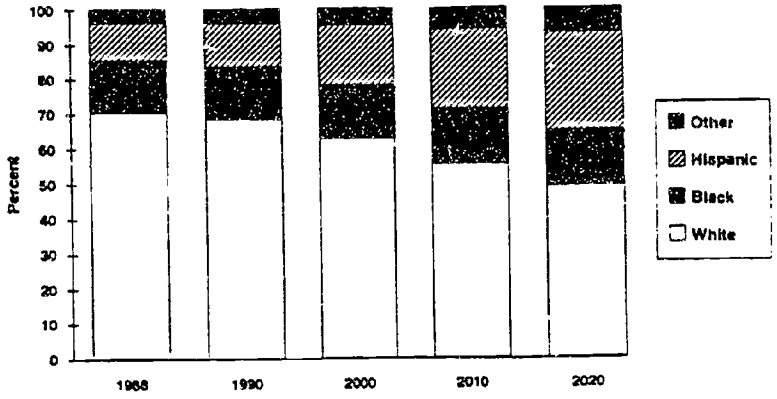
Figure 1



Projected Racial/Ethnic Composition of the U.S. Population Under Age 18, 1988-2020.

Table 1
School-age populations (U.S. Census projections, Series 18), ages 5, 6, 5-13, and 14-17 years: 50 States and D.C., 1977 to 2002

(In thousands)

Year (July 1)	5 years old	6 years old	5–13 years old	14–17 years old
1977	3,334	3,644	32,855	17,045
1978	3,156	3,343	32,094	16,946
1979	3,092	3,164	31,431	16,611
1980	3,181	3,112	31,095	16,142
1981	3,135	3,192	30,754	15,599
1982	3,285	3,144	30,614	15,041
1983	3,313	3,293	30,410	14,720
1984	3,421	3,321	30,238	14,704
1985	3,548	3,428	30,110	14,865
1986	3,605	3,555	30,351	14,797
1987	3,651	3,612	30,824	14,468
1988	3,671	3,660	31,406	13,983
1989	3,605	3,678	31,835	13,496
1990*	3,752	3,626	32,527	13,290
		Projected		
1991	3,740	3,762	33,000	13,402
1992	3,782	3,750	33,402	13,710
1993	3,857	3,792	33,934	13,873
1994	3,920	3,867	34,310	14,305
1995	3,960	3,931	34,673	14,647
1996	3,977	3,969	34,994	15,005
1997	3,972	3,987	35,290	15,272
1998	3,962	3,982	35,642	15,346
1999	3,951	3,972	35,844	15,497
2000	3,942	3,960	36,044	15,585
2001	3,936	3,949	36,200	15,790
2002	3,935	3,945	36,283	15,935

*Projected.

SOURCE: U.S. Department of Commerce, Bureau of the Census. "United States Population Estimates, by Age, Sex, Race, and Hispanic Origin: 1980 to 1988." *Current Population Reports*, Series P-25, No. 1045, January 1990, and "Projections of the Population of the United States, by Age, Sex, and Race: 1988 to 2080." *Current Population Reports*, Series P-25, No. 1018, January 1989.

From Gerald and Hussar, 1991, p. 186.

Table 2
Projections of the population, birth to age 24, by race/ethnicity and age: 1990 to 2010

Race/ethnicity and age	Population, in millions				Percent change			
	1990	1995	2000	2010	1985 to 1990	1990 to 1995	1995 to 2000	2000 to 2010
Total, all ages	249.7	259.6	268.0	283.2	4.6	4.0	3.2	5.7
All races	90.1	90.8	92.0	92.5	-1.6	0.8	1.3	0.6
Under 5	19.2	18.6	17.6	18.0	4.0	-3.0	-5.3	2.0
5 to 13	32.2	34.4	34.4	31.9	8.5	7.0	-0.2	-7.3
14 to 17	13.0	14.1	15.4	15.0	-12.1	8.7	9.2	-2.6
18 to 24	25.8	23.7	24.6	27.7	-10.2	-8.1	3.8	12.4
White, non-Hispanic	64.1	63.1	62.5	59.9	-4.1	-1.6	-1.0	-4.1
Under 5	13.2	12.5	11.5	11.2	2.4	-5.4	-8.2	-2.7
5 to 13	22.7	23.8	23.2	20.3	6.1	4.6	-2.2	-12.6
14 to 17	9.3	10.0	10.6	9.9	-15.3	7.5	6.4	-6.9
18 to 24	18.9	16.9	17.2	18.6	-12.4	-10.7	1.8	8.0
Hispanic	9.5	10.5	11.5	13.3	10.0	10.4	9.5	16.0
Under 5	2.3	2.4	2.5	2.9	14.2	5.7	3.5	14.3
5 to 13	3.5	4.0	4.4	4.8	15.8	16.6	8.3	9.0
14 to 17	1.4	1.5	1.8	2.1	5.5	11.5	21.0	13.5
18 to 24	2.4	2.5	2.8	3.6	1.6	5.2	10.2	30.1
Black*	14.1	14.6	15.2	16.1	1.9	3.7	4.1	6.1
Under 5	3.2	3.2	3.1	3.3	5.2	-1.6	-2.7	7.2
5 to 13	5.1	5.7	5.8	5.6	14.6	12.1	1.1	-2.2
14 to 17	1.9	2.2	2.5	2.5	-9.5	11.0	17.9	-0.0
18 to 24	3.8	3.5	3.8	4.6	-8.2	-6.7	6.5	21.9
Other*	3.0	3.3	3.5	4.0	7.6	8.6	7.7	13.7
Under 5	0.6	0.7	0.7	0.8	1.7	10.1	7.8	14.5
5 to 13	1.1	1.2	1.3	1.4	13.2	4.4	7.7	15.6
14 to 17	0.5	0.5	0.5	0.6	7.0	18.0	-3.5	20.0
18 to 24	0.8	0.9	1.0	1.1	5.4	8.0	14.6	7.5

* Includes small numbers of Hispanics.

NOTE: Details may not add to totals because of rounding. Percentages are computed on unrounded data.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-25, *Projections of the Hispanic Population: 1983 to 2080.*

From U.S. Dept. of Education, 1991, p. 12.

Table 3

Enrollment in elementary and secondary schools, by organizational level and control of institution, with projections: 50 States and D.C., fall 1977 to fall 2002

(In thousands)

Year	Total			Public			Private		
	K-12[1]	Elementary	Secondary	K-12[1]	Elementary	Secondary	K-12[1]	Elementary	Secondary
1977	48.717	28.788	19.929	43.577	24.991	18.586	5.140	3.797	1.343
1978	47.636	28.749	18.887	42.550	25.017	17.534	5.086	3.732	1.353
1979	46.645	28.591	18.054	41.645	24.891	16.754	[2]5.000	3.700	1.300
1980	46.249	28.212	18.037	40.918	24.220	16.698	5.331	3.992	1.339
1981	45.522	28.174	17.348	40.022	24.074	15.948	[2]5.500	4.100	1.400
1982	45.166	28.023	17.142	39.566	23.823	15.742	[2]5.600	4.200	1.400
1983	44.967	28.264	16.703	39.252	23.949	15.303	5.715	4.315	1.400
1984	44.908	28.395	16.513	39.208	24.095	15.113	[2]5.700	4.300	1.400
1985	44.979	28.470	16.509	39.422	24.275	15.147	5.557	4.195	1.362
1986	45.205	28.266	16.939	39.753	24.150	15.603	[2]5.452	4.116	1.336
1987	45.487	28.537	16.950	40.008	24.305	15.703	[2]5.479	4.232	1.247
1988	45.430	28.451	16.980	40.189	24.415	15.774	[2]5.241	4.036	1.206
1989	45.881	28.782	17.099	40.526	24.620	15.906	[2]5.355	4.162	1.193
1990[3]	46.221	29.680	16.541	41.026	25.614	15.412	5.195	4.066	1.129
				Projected					
1991	46.841	30.070	16.772	41.575	25.943	15.632	5.266	4.127	1.140
1992	47.601	30.442	17.159	42.250	26.250	16.000	5.351	4.192	1.159
1993	48.410	30.800	17.610	42.971	26.550	16.421	5.439	4.250	1.189
1994	49.279	31.130	18.149	43.749	26.830	16.919	5.530	4.300	1.230
1995	50.054	31.460	18.594	44.442	27.115	17.327	5.612	4.345	1.267
1996	50.759	31.817	18.942	45.074	27.433	17.641	5.685	4.384	1.301
1997	51.331	32.081	19.251	45.585	27.659	17.926	5.746	4.422	1.325
1998	51.750	32.364	19.386	45.955	27.899	18.056	5.795	4.465	1.330
1999	52.110	32.551	19.559	46.276	28.061	18.215	5.834	4.490	1.344
2000	52.406	32.691	19.715	46.539	28.175	18.364	5.867	4.516	1.351
2001	52.679	32.764	19.915	46.782	28.229	18.553	5.897	4.535	1.362
2002	52.996	32.783	20.213	47.068	28.238	18.830	5.928	4.545	1.383

[1] Includes most kindergarten and some nursery school enrollment.
[2] Estimated by NCES.
[3] Estimate.

NOTE. Some data have been revised from previously published figures. Projections are based on data through 1989. Because of rounding, details may not add to totals.

SOURCE. U.S. Department of Education, National Center for Education Statistics. *Statistics of Public Elementary and Secondary Schools*. Common Core of Data surveys. "Selected Public and Private Elementary and Secondary Education Statistics," *NCES Bulletin*, October 23, 1979; "Private Elementary and Secondary Education, 1983. Enrollment, Teachers, and Schools," *NCES Bulletin*, December 1984. 1985 Private School Survey. "Key Statistics for Private Elementary and Secondary Education, School Year 1988–89," *Early Estimates*. "Key Statistics for Private Elementary and Secondary Education: School Year 1989–90," *Early Estimates*; and "Key Statistics for Public and Private Elementary and Secondary Education, School Year 1990–91," *Early Estimates* (This table was prepared April 1991.)

From Gerald and Hussar, 1991, p. 10.

Table 4

Number and percentage of own children under 18 years old in married-couple and single-parent families, by race of family householder: 1950 to 1989

[Numbers in thousands]

Year	Number of own [1] children under 18	Number and percent of own children under 18			
		Married-couple families		Single-parent families	
		Number	Percent	Number	Percent
		All races			
1950	42,253	39,252	92.9	3,002	7.1
1955	54,712	48,655	88.9	6,057	11.1
1960	64,519	—	—	—	—
1965	66,014	59,557	90.2	6,457	9.8
1970	66,714	59,143	88.7	7,571	11.3
1975	62,733	52,611	83.9	10,122	16.1
1980	57,700	46,810	81.1	10,890	18.9
1985	57,658	45,556	79.0	12,102	21.0
1988	57,824	45,342	78.4	12,482	21.6
1989	58,876	45,959	78.1	12,918	21.9
		White [2]			
1970	57,446	52,791	91.9	4,655	8.1
1975	53,608	47,086	87.8	6,522	12.2
1980	48,739	41,903	86.0	6,836	14.0
1985	47,975	40,218	83.8	7,757	16.2
1988	48,000	39,915	83.2	8,085	16.8
1989	48,380	40,229	83.2	8,151	16.8
		Black [2]			
1970	8,462	5,619	66.4	2,843	33.6
1975	8,095	4,598	56.8	3,497	43.2
1980	7,724	3,845	49.8	3,879	50.2
1985	7,741	3,689	47.7	4,052	52.3
1988	7,780	3,744	48.1	4,035	51.9
1989	8,022	3,676	45.8	4,347	54.2
		Hispanic [3]			
1980	4,631	3,643	78.7	988	21.3
1985	5,663	4,171	73.7	1,492	26.3
1988	6,254	4,516	72.2	1,737	27.8
1989	6,355	4,552	71.6	1,804	28.4

—Data not available.

[1] "Own" children in a family are sons and daughters, including stepchildren and adopted children, of the householder. Excludes householders under 18 years, subfamily reference persons, and their spouses.

[2] Includes Hispanics.

[3] Hispanics may be of any race.

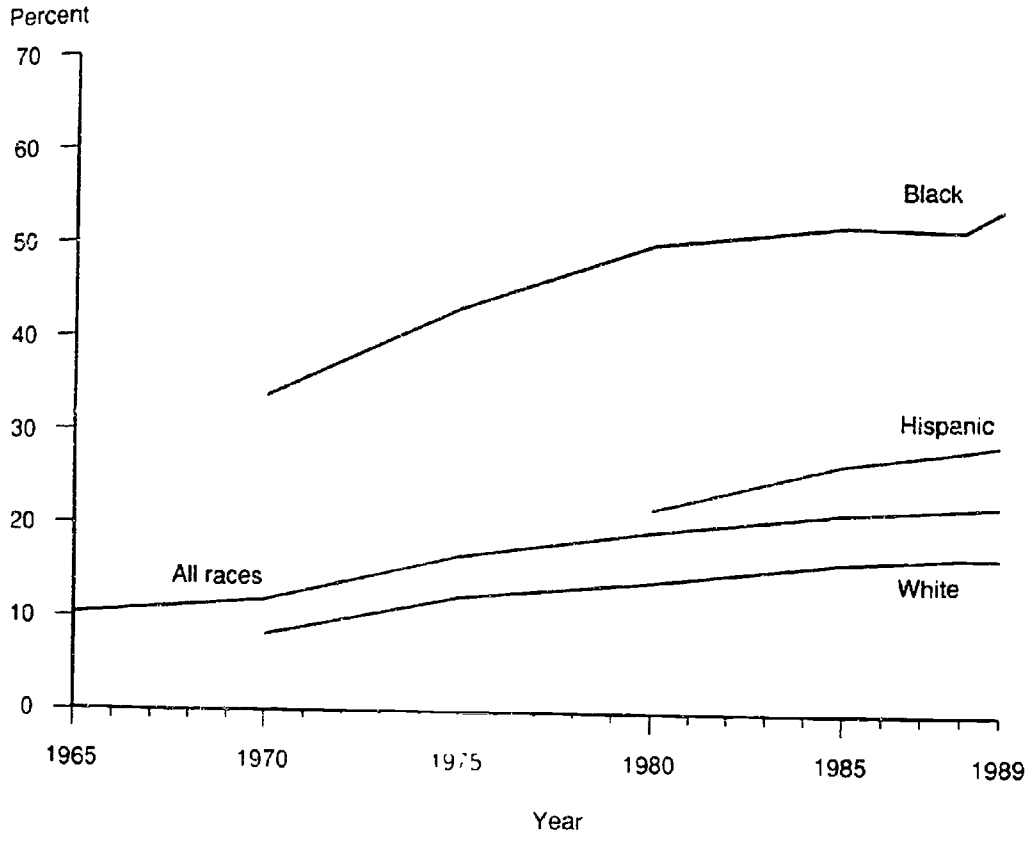
NOTE: Because of rounding, details may not add to totals.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, *Household and Family Characteristics*, various years, and *Marital Status and Living Arrangements: March 1988 and 1989*, nos. 433 and 445.

From U. S. Dept. of Education, 1991, p. 28.

Figure 2

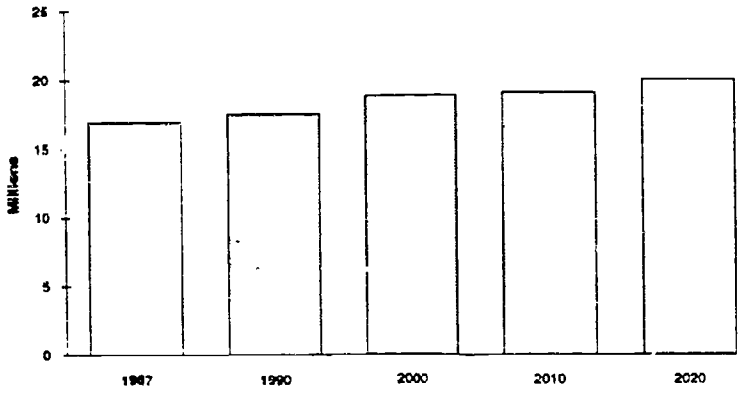
Percentage of own children living in single-parent families, by race of family householder: 1965 to 1989



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, *Household and Family Characteristics*, various years; and *Marital Status and Living Arrangements: March 1988 and 1989*, nos. 443 and 445.

From U. S. Dept. of Education, 1991, p. 29.

Figure 3



Projected Number of U.S. Children Not Living with Both Parents, 1987-2020 (in millions).

Table 5

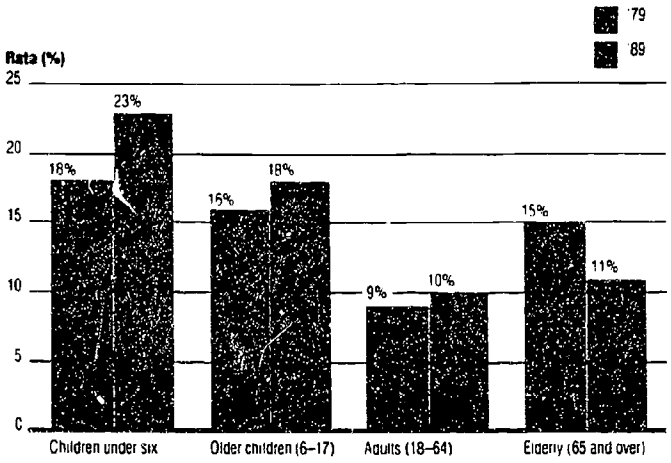
Number and percentage of children under 18 years old living in poverty, by family status and race/ethnicity of family householder: 1960 to 1989

Year	All families		Families with female householder,[1] no husband present		Percent of all poverty children in families with female householder, no husband present
	Number of children under 18 in poverty, in thousands	Percent of children under 18 in poverty	Number of children under 18 in poverty, in thousands	Percent of children under 18 in poverty	
			All races		
1960	17,288	26.5	4,095	68.4	23.7
1965	14,388	20.7	4,562	64.2	31.7
1970	10,235	14.9	4,689	53.0	45.8
1975	10,882	16.8	5,597	52.7	51.4
1980	11,114	17.9	5,866	50.8	52.8
1985	12,483	20.1	6,716	53.6	53.8
1987	12,275	19.7	7,074	54.7	57.6
1988	11,935	19.0	7,082	53.2	59.3
1989	12,001	19.0	6,808	51.1	56.7
			White[2]		
1960	11,229	20.0	2,357	59.9	21.0
1965	8,595	14.4	2,321	52.9	27.0
1970	6,138	10.5	2,247	43.1	36.6
1975	6,748	12.5	2,813	44.2	41.7
1980	6,817	13.4	2,813	41.6	41.3
1985	7,838	15.6	3,372	45.2	43.0
1987	7,398	14.7	3,474	45.8	47.0
1988	7,095	14.0	3,550	45.1	50.0
1989	7,164	14.1	3,320	42.8	46.3
			Black[2]		
1959	5,022	65.5	1,475	81.6	29.4
1967	4,558	47.4	2,265	72.4	49.7
1970	3,922	41.5	2,383	67.7	60.8
1975	3,884	41.4	2,724	66.0	70.1
1980	3,906	42.1	2,944	64.8	75.4
1985	4,057	43.1	3,181	66.9	78.4
1987	4,234	44.4	3,394	68.3	80.2
1988	4,148	42.8	3,301	65.2	79.6
1989	4,257	43.2	3,256	62.9	76.5
			Hispanic[3]		
1973	1,364	27.8	606	68.7	44.4
1975	1,619	33.1	694	68.4	42.9
1980	1,718	33.0	809	65.0	47.1
1985	2,512	39.6	1,247	72.4	49.6
1987	2,606	38.9	1,241	70.1	47.6
1988	2,576	37.3	1,265	68.6	49.1
1989	2,496	35.5	1,163	65.0	46.6

[1] The householder is the person in whose name the housing unit is owned or rented.
[2] Includes Hispanics.
[3] Hispanics may be of any race.
SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-20, *Characteristics of the Populations Below the Poverty Level*, various years; and Series P-60, *Money Income and Poverty Status of Families and Persons in the United States*, various years.

From U. S. Dept. of Education. 1991. p. 38.

Figure 4



From National Center for Children in Poverty, 1991, p. 2.

Figure 5

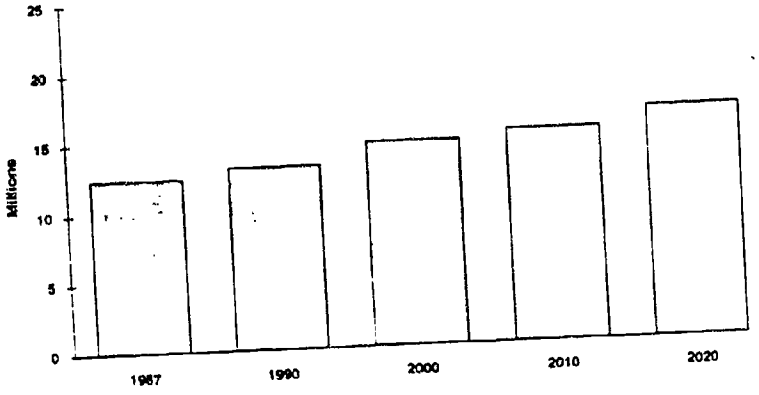


Table 6

Number and percentage of own children, by type of family and family income: 1987

[Numbers in thousands]

Total family income	Families with own children under 18 years old						Average number of own[3] children per family with own children under 18
	Total[1]		Married-couple families		Female-headed households,[2] no husband present		
	Number of children	Percent of children	Number of children	Percent of children	Number of children	Percent of children	
All families	57,824	100.0	45,342	100.0	10,906	100.0	1.81
Under $10,000	8,929	15.4	2,730	6.0	5,838	53.5	1.98
$10,000 to $19,999	9,641	16.7	6,486	14.3	2,757	25.3	1.82
$20,000 to $29,999	9,997	17.3	8,332	18.4	1,373	12.6	1.80
$30,000 to $39,999	9,928	17.2	9,135	20.1	553	5.1	1.81
$40,000 to $49,999	7,396	12.8	7,042	15.5	215	2.0	1.82
$50,000 to $74,999	8,240	14.3	8,018	17.7	116	1.1	1.72
$75,000 and over	3,693	6.4	3,598	7.9	55	0.5	1.65

[1] Includes data for male-headed households not shown separately.
[2] The income reported for these women includes child support payments received.
[3] "Own" children in a family are sons and daughters, including stepchildren and adopted children, of the householder.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, *Money Income of Households, Families, and Persons in the United States, 1987.*

From U.S. Dept. of Education, 1991, p. 36.

Table 7

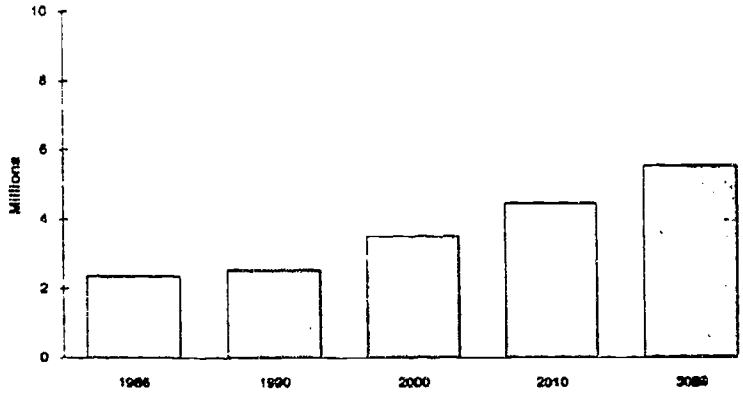
Employment status of parents with own children under 18 years old, by type of family: 1975 to 1988

Type of family	1975	1980	1985	1988
	Number, in thousands			
Total families	55,698	59,910	63,232	65,670
Total families with own children under 18	30,060	31,325	31,496	32,347
Husband-wife families (with own children under 18)	25,236	24,974	24,225	24,611
Both parents employed	9,358	11,925	12,844	14,271
Only father employed	13,441	10,975	9,227	8,365
Only mother employed	895	852	960	1,005
Neither parent employed	1,543	1,222	1,194	968
Female-headed families (single mothers with own children under 18)	4,400	5,718	6,345	6,666
Mother in labor force	2,635	3,833	4,302	4,481
Mother not employed	329	421	561	462
Male-headed families (single fathers with own children under 18)	424	633	926	1,070
Father in labor force	369	561	834	965
Father not employed	42	47	84	95
	Percentage distribution			
Total families	100.0	100.0	100.0	100.0
Total families with own children under 18	54.0	52.3	49.8	49.3
Husband-wife families (with own children under 18)	100.0	100.0	100.0	100.0
Both parents employed	37.1	47.7	53.0	58.0
Only father employed	53.3	43.9	38.1	34.0
Only mother employed	3.5	3.4	4.0	4.1
Neither parent employed	6.1	4.9	4.9	3.9
Female-headed families (single mothers with own children under 18)	100.0	100.0	100.0	100.0
Mother in labor force	59.9	67.0	67.8	67.2
Mother not employed	7.5	7.4	8.8	6.9
Male-headed families (single fathers with own children under 18)	100.0	100.0	100.0	100.0
Father in labor force	87.0	88.6	90.1	90.2
Father not employed	9.9	7.4	9.1	8.9

NOTE: Includes parents working both full-time and part-time. "Own children" in a family are sons and daughters, including stepchildren and adopted children, of the householder.

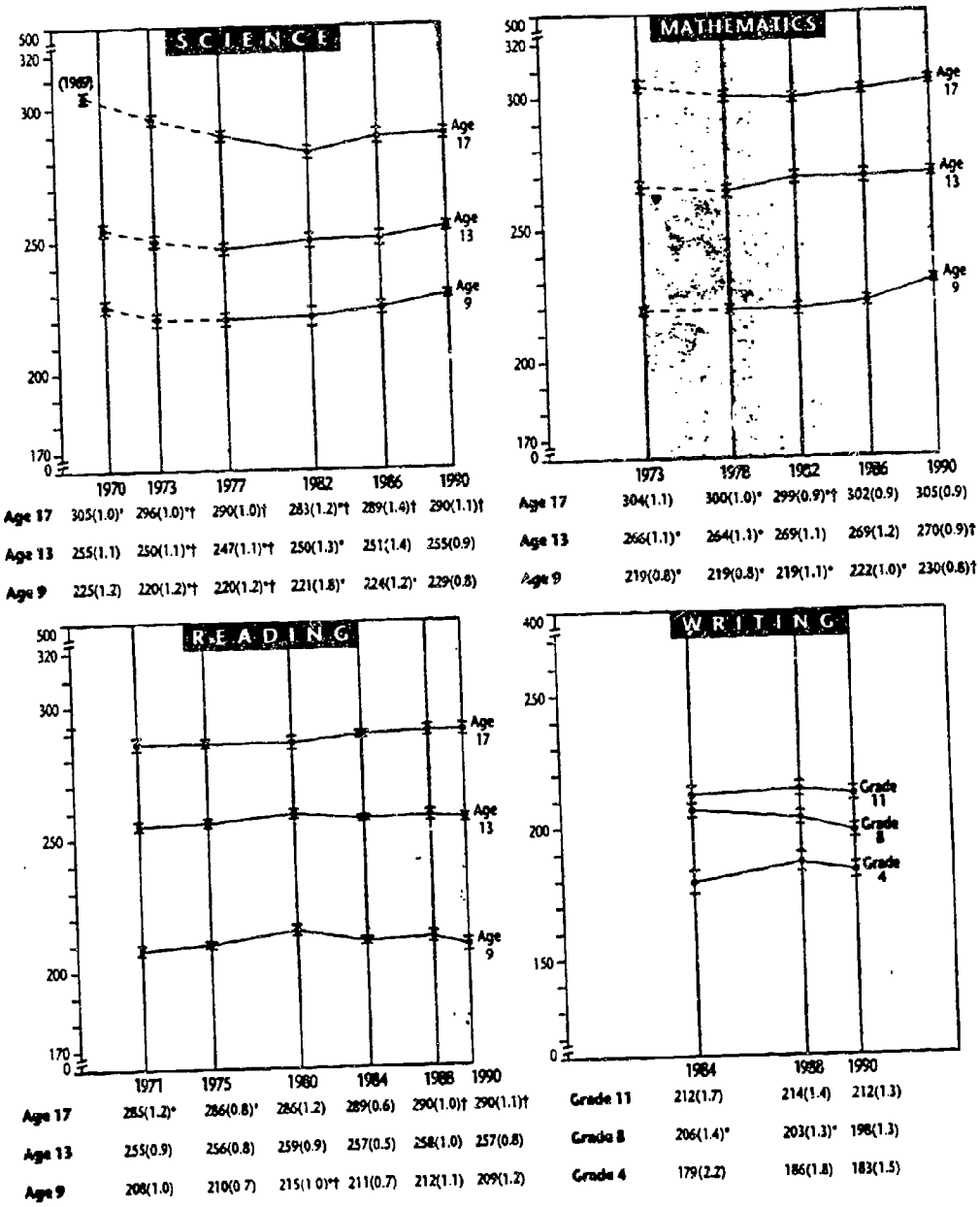
From U.S. Dept. of Education, 1991, p. 44.

Figure 6



Projected Number of U.S. Children with a Primary Language Other Than English, 1986-2020 (in millions).

Figure 7
National Trends in Average Achievement in Science, Mathematics, Reading, and Writing



	1970	1973	1977	1982	1986	1990
Age 17	305(1.0)*	296(1.0)*†	290(1.0)†	283(1.2)*†	289(1.4)†	290(1.1)†
Age 13	255(1.1)	250(1.1)*†	247(1.1)*†	250(1.3)*	251(1.4)	255(0.9)
Age 9	225(1.2)	220(1.2)*†	220(1.2)*†	221(1.8)*	224(1.2)*	229(0.8)

	1973	1978	1982	1986	1990
Age 17	304(1.1)	300(1.0)*	299(0.9)*†	302(0.9)	305(0.9)
Age 13	266(1.1)*	264(1.1)*	269(1.1)	269(1.2)	270(0.9)†
Age 9	219(0.8)*	219(0.8)*	219(1.1)*	222(1.0)*	230(0.8)†

	1971	1975	1980	1984	1988	1990
Age 17	285(1.2)*	286(0.8)*	286(1.2)	289(0.6)	290(1.0)†	290(1.1)†
Age 13	255(0.9)	256(0.8)	259(0.9)	257(0.5)	258(1.0)	257(0.8)
Age 9	208(1.0)	210(0.7)	215(1.0)*†	211(0.7)	212(1.1)	209(1.2)

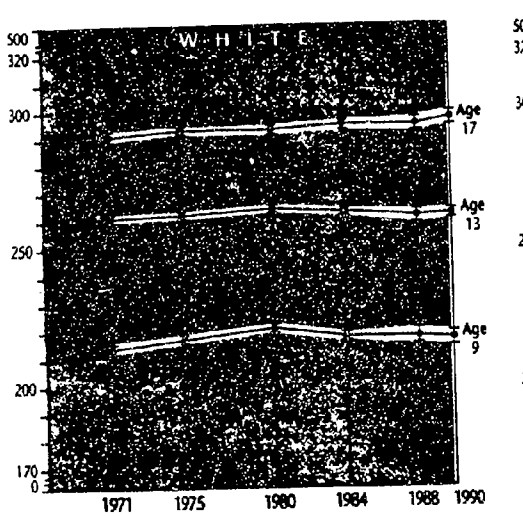
	1984	1988	1990
Grade 11	212(1.7)	214(1.4)	212(1.3)
Grade 8	206(1.4)*	203(1.3)*	198(1.3)
Grade 4	179(2.2)	186(1.8)	183(1.5)

I 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

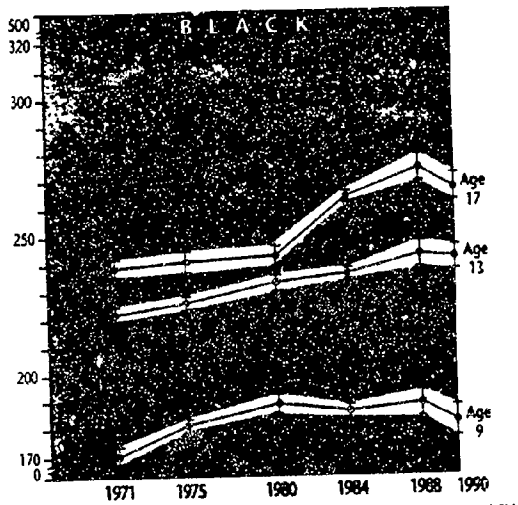
* Statistically significant difference from 1990 and † statistically significant difference from 1969–70 for science, 1973 for mathematics, and 1971 for reading, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample.

From Mullis et al., 1991, p. 2.

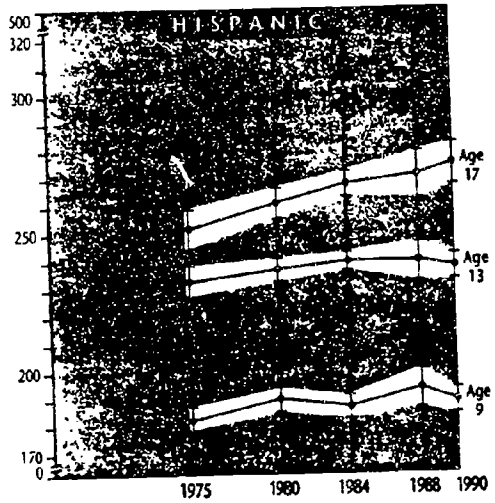
Figure 8
Trends in Average Reading Proficiency by Race/Ethnicity, 1971 to 1990



	1971	1975	1980	1984	1988	1990
Age 17	291(1.0)*	293(0.6)	293(0.9)	295(0.7)†	295(1.2)	297(1.2)†
	87(1.3)*	84(1.0)*	83(1.6)*	77(0.6)*†	77(0.6)*†	74(0.5)†
Age 13	261(0.7)	262(0.7)	264(0.7)†	263(0.6)	261(1.1)	262(0.9)
	84(1.4)*	81(1.2)*	80(1.8)*	77(0.6)*†	76(0.7)†	74(0.8)†
Age 9	214(0.9)	217(0.7)	221(0.8)†	218(0.8)†	218(1.4)	217(1.3)
	84(1.4)*	80(1.2)*	79(1.3)*	75(1.2)†	75(1.0)†	74(1.0)†



	1971	1975	1980	1984	1988	1990
Age 17	239(1.7)*	241(2.0)*	243(1.8)*	264(1.0)†	274(2.4)†	267(2.3)*†
	11(1.2)*	11(0.8)*	12(1.4)*	14(0.2)*	15(0.3)†	16(0.3)†
Age 13	222(1.2)*	226(1.2)*	233(1.5)*†	236(1.0)†	243(2.4)†	242(2.2)†
	15(1.4)	13(0.9)*	14(1.3)	14(0.2)*	15(0.3)	15(0.2)
Age 9	170(1.7)*	181(1.2)†	189(1.8)†	186(1.1)†	189(2.4)†	182(2.9)†
	14(1.3)	13(0.8)	14(1.0)	16(0.5)	16(0.7)	16(0.6)



	1975	1980	1984	1988	1990
Age 17	252(3.6)*	261(2.7)*	268(2.2)†	271(4.3)†	275(3.6)†
	3(0.6)	4(0.6)	7(0.7)	6(0.5)	7(0.4)
Age 13	233(3.0)	237(2.0)	240(1.7)	240(3.5)	238(2.3)
	5(0.8)*	6(1.0)	7(0.7)	6(0.6)	8(0.5)†
Age 9	183(2.2)	190(2.3)	187(2.1)	194(3.5)	189(2.3)
	5(0.8)	6(0.8)	7(1.4)	6(1.0)	6(0.6)

Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup.

± 95 percent confidence interval

* Statistically significant difference from 1990 and † statistically significant difference from 1971 (for White and Black students) or 1975 (for Hispanic students), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0.) The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian Pacific Islander students and American Indian students, the sample sizes were insufficient to permit robust trend estimates.

From Mullis et al., 1991, p. 112.

Table 8
NAEP 1990 Reading Trend Assessment-Age 9
Average Reading Proficiency Across Assessment Years

	1971	1975	1980	1984	1988	1990
-- TOTAL --	207.6(1.0)	210.0(0.7)	215.0(1.0)	210.9(0.7)	211.8(1.1)	209.2(1.2)
SEX						
MALE	201.2(1.1)	204.3(0.8)	210.0(1.1)	207.5(0.8)	207.5(1.4)	204.0(1.7)
FEMALE	213.9(1.0)	215.8(0.8)	220.1(1.1)	214.2(0.8)	216.3(1.3)	214.5(1.2)
RACE/ETHNICITY						
WHITE	214.0(0.9)	216.6(0.7)	221.3(0.8)	218.2(0.8)	217.7(1.4)	217.0(1.3)
BLACK	170.1(1.7)	181.2(1.2)	189.3(1.8)	185.7(1.1)	188.5(2.4)	181.8(2.9)
HISPANIC	*****(0.0)	182.7(2.2)	190.2(2.3)	187.2(2.1)	193.7(3.5)	189.4(2.3)
OTHER	193.5(3.8)	207.8(4.1)	218.5(3.8)	223.8(2.5)	228.4(5.4)	205.5(4.4)
REGION						
NORTHEAST	213.0(1.7)	214.6(1.3)	221.1(2.1)	215.7(1.7)	215.2(2.6)	217.4(2.2)
SOUTHEAST	193.9(2.9)	201.1(1.2)	210.3(2.3)	204.3(1.6)	207.2(2.1)	197.4(3.2)
CENTRAL	214.9(1.2)	215.5(1.2)	216.7(1.4)	215.3(1.5)	218.2(2.2)	212.7(2.0)
WEST	205.0(2.0)	207.0(2.0)	212.8(1.8)	207.8(1.5)	207.9(2.8)	209.6(2.8)
TYPE OF COMMUNITY						
EXTREME RURAL	200.2(3.3)	204.2(2.5)	211.8(1.7)	201.2(3.4)	213.7(4.2)	209.4(4.5)
DISADVANTAGED URBAN	179.2(2.7)	184.2(2.5)	187.6(2.1)	191.5(1.6)	192.0(5.5)	186.1(4.7)
ADVANTAGED URBAN	229.8(1.3)	227.3(1.5)	232.5(1.4)	230.8(1.7)	222.4(2.7)	227.1(3.3)
OTHER	207.8(1.1)	210.9(0.8)	214.5(1.1)	211.3(0.8)	211.3(1.4)	209.8(1.5)
PARENTS' EDUCATION LEVEL						
NOT GRADUATED H.S.	188.6(1.5)	189.9(1.3)	194.3(1.6)	195.1(1.4)	192.5(4.9)	192.6(3.2)
GRADUATED H.S.	207.8(1.2)	211.3(0.9)	213.0(1.3)	208.9(1.0)	210.8(2.2)	209.1(1.8)
POST H.S.	223.9(1.1)	221.5(0.9)	226.0(1.1)	222.9(0.9)	220.0(1.7)	217.7(2.0)
DO NOT KNOW	197.4(1.0)	203.1(0.8)	206.1(1.0)	204.4(0.7)	204.4(1.5)	201.4(1.5)
TYPE OF SCHOOL						
PUBLIC	*****(0.0)	*****(0.0)	213.5(1.1)	209.4(0.8)	210.2(1.2)	207.5(1.4)
PRIVATE	*****(0.0)	*****(0.0)	227.0(1.8)	222.8(1.6)	223.4(3.0)	228.3(3.3)
QUARTILES						
UPPER	252.6(0.5)	251.3(0.7)	255.0(0.8)	257.9(0.4)	259.1(1.6)	261.3(1.1)
MIDDLE TWO	210.6(0.4)	213.1(0.3)	218.0(0.3)	211.8(0.3)	212.8(0.7)	209.4(0.6)
LOWER	156.6(0.7)	162.8(0.5)	169.3(1.0)	161.6(0.6)	162.7(1.8)	156.5(1.5)

From Mullis et al., 1991, p. 313.

Figure 9
Levels of Reading Proficiency

LEVEL 350 LEARN FROM SPECIALIZED READING MATERIALS

Readers at this level can extend and restructure the ideas presented in specialized and complex texts. Examples include scientific materials, literary essays, and historical documents. Readers are also able to understand the links between ideas, even when those links are not explicitly stated, and to make appropriate generalizations. Performance at this level suggests the ability to synthesize and learn from specialized reading materials.

LEVEL 300 UNDERSTAND COMPLICATED INFORMATION

Readers at this level can understand complicated literary and informational passages, including material about topics they study at school. They can also analyze and integrate less familiar material and provide reactions to and explanations of the text as a whole. Performance at this level suggests the ability to find, understand, summarize, and explain relatively complicated information.

LEVEL 250 INTERRELATE IDEAS AND MAKE GENERALIZATIONS

Readers at this level use intermediate skills and strategies to search for, locate, and organize the information they find in relatively lengthy passages and can recognize paraphrases of what they have read. They can also make inferences and reach generalizations about main ideas and author's purpose from passages dealing with literature, science, and social studies. Performance at this level suggests the ability to search for specific information, interrelate ideas, and make generalizations.

LEVEL 200 PARTIAL SKILLS AND UNDERSTANDING

Readers at this level can locate and identify facts from simple informational paragraphs, stories, and news articles. In addition, they can combine ideas and make inferences based on short, uncomplicated passages. Performance at this level suggests the ability to understand specific or sequentially related information.

LEVEL 150 SIMPLE, DISCRETE READING TASKS

Readers at this level can follow brief written directions. They can also select words, phrases, or sentences to describe a simple picture and can interpret simple written clues to identify a common object. Performance at this level suggests the ability to carry out simple, discrete reading tasks.

From Mullis et al., 1991, p. 123.

Table 8.1
NAEP 1990 Reading Trend Assessment-Age 9
Percentage of Students with Reading Proficiency
At or Above Anchor Level 150

	1971	1975	1980	1984	1988	1990
--TOTAL --	90.6(0.5)	93.1(0.4)	94.6(0.4)	92.3(0.3)	92.7(0.7)	90.1(0.9)
SEX						
MALE	87.9(0.7)	91.0(0.5)	92.9(0.5)	90.4(0.5)	90.4(0.9)	87.9(1.4)
FEMALE	93.2(0.5)	95.3(0.3)	96.4(0.4)	94.2(0.4)	94.9(1.0)	92.4(1.1)
RACE/ETHNICITY						
WHITE	94.0(0.4)	96.0(0.3)	97.1(0.2)	95.4(0.3)	95.1(0.7)	93.5(0.9)
BLACK	69.7(1.7)	80.7(1.1)	84.9(1.4)	81.3(1.0)	83.2(2.4)	76.8(2.7)
HISPANIC	****(0.0)	80.8(2.5)	84.5(1.8)	82.0(2.1)	85.6(3.5)	83.7(1.8)
OTHER	86.0(1.9)	92.4(1.9)	96.1(1.2)	95.4(1.1)	96.9(1.8)	89.3(3.1)
REGION						
NORTHEAST	93.4(0.9)	94.1(0.5)	96.4(0.7)	94.2(0.6)	92.8(1.3)	92.6(1.6)
SOUTHEAST	82.7(1.9)	89.8(0.8)	93.0(0.9)	89.7(0.8)	91.3(1.7)	84.5(2.4)
CENTRAL	93.6(0.5)	95.6(0.5)	95.6(0.7)	94.3(0.6)	95.4(0.7)	92.7(1.4)
WEST	91.0(1.1)	92.4(1.0)	93.6(0.8)	90.9(0.9)	91.5(1.6)	90.6(1.3)
TYPE OF COMMUNITY						
EXTREME RURAL	86.5(1.9)	90.2(1.5)	94.4(1.1)	87.5(2.1)	92.9(3.4)	89.3(2.6)
DISADVANTAGED URBAN	75.8(2.4)	81.4(1.7)	83.4(2.1)	84.0(1.3)	84.0(4.0)	76.9(3.2)
ADVANTAGED URBAN	97.8(0.4)	98.2(0.4)	98.9(0.3)	98.1(0.4)	97.2(1.0)	97.0(1.1)
OTHER	91.4(0.6)	94.0(0.4)	94.8(0.5)	93.2(0.4)	92.5(1.0)	90.8(1.1)
PARENTS' EDUCATION LEVEL						
NOT GRADUATED H.S.	82.3(1.4)	84.4(1.2)	85.6(1.5)	86.2(1.3)	84.4(4.4)	83.0(3.8)
GRADUATED H.S.	92.1(0.7)	94.2(0.5)	94.9(0.6)	92.8(0.7)	92.5(2.1)	91.2(1.3)
POST H.S.	96.1(0.4)	96.5(0.4)	97.3(0.4)	95.4(0.4)	95.1(0.8)	92.8(1.2)
DO NOT KNOW	86.7(0.7)	91.5(0.5)	92.7(0.9)	91.0(0.4)	90.9(1.2)	87.5(1.4)
TYPE OF SCHOOL						
PUBLIC	*****(0.0)	*****(0.0)	94.2(0.4)	91.7(0.4)	92.1(0.8)	89.8(1.0)
PRIVATE	*****(0.0)	*****(0.0)	98.1(0.4)	96.8(0.5)	96.7(1.3)	95.2(1.7)
QUARTILES						
UPPER	100.0(0.0)	100.0(0.0)	100.0(0.0)	100.0(0.0)	100.0(0.0)	100.0(0.0)
MIDDLE TWO	99.6(0.1)	100.0(0.0)	99.9(0.1)	99.9(0.1)	99.7(0.2)	99.1(0.5)
LOWER	63.1(1.1)	72.6(1.0)	78.7(1.2)	69.7(0.9)	71.3(2.3)	62.2(3.0)

From Mullis et al., 1991, p. 316.

Table 8.2
NAEP 1990 Reading Trend Assessment-Age 9
Percentage of Students with Reading Proficiency
At or Above Anchor Level 200

	1971	1975	1980	1984	1986	1990
-- TOTAL --	56.7(1.0)	62.1(0.8)	67.7(1.0)	61.5(0.7)	62.6(1.3)	58.9(1.3)
SEX						
MALE	52.7(1.2)	56.2(1.0)	62.7(1.1)	58.0(0.9)	58.4(1.8)	53.8(1.9)
FEMALE	64.5(1.1)	68.1(0.8)	72.7(1.0)	65.2(0.8)	66.9(1.4)	64.2(1.2)
RACE/ETHNICITY						
WHITE	65.0(1.0)	69.0(0.8)	74.2(0.7)	68.6(0.8)	68.4(1.8)	66.9(1.4)
BLACK	22.0(1.5)	31.6(1.5)	41.3(1.9)	36.8(1.5)	39.4(2.9)	33.9(3.4)
HISPANIC	****(0.0)	34.6(3.0)	41.6(2.6)	38.6(2.2)	45.9(3.3)	40.9(2.7)
OTHER	42.0(5.2)	58.8(5.3)	72.9(3.7)	72.7(2.9)	77.2(4.8)	56.8(4.5)
REGION						
NORTHEAST	64.1(1.6)	66.8(1.5)	73.5(1.1)	66.5(1.5)	65.7(2.5)	65.4(2.8)
SOUTHEAST	45.9(2.8)	53.1(1.2)	62.6(2.4)	54.8(1.6)	58.0(2.8)	48.2(3.3)
CENTRAL	65.7(1.4)	67.4(1.3)	69.4(1.2)	66.0(1.6)	66.4(1.7)	62.8(2.0)
WEST	55.8(1.8)	59.5(2.1)	65.8(1.5)	58.8(1.5)	59.5(3.5)	59.6(2.9)
TYPE OF COMMUNITY						
EXTREME RURAL	51.2(3.2)	56.3(2.7)	64.4(2.0)	59.2(3.0)	64.5(4.1)	59.1(4.4)
DISADVANTAGED URBAN	30.9(2.6)	34.6(2.8)	39.7(2.0)	42.5(1.8)	43.3(5.7)	37.5(6.3)
ADVANTAGED URBAN	79.0(1.4)	79.5(1.6)	84.0(1.2)	80.3(1.7)	72.9(3.2)	74.4(3.4)
OTHER	59.2(1.1)	63.1(0.9)	67.4(1.0)	62.2(0.8)	62.1(1.8)	59.6(1.4)
PARENTS' EDUCATION LEVEL						
NOT GRADUATED H.S.	39.4(1.7)	41.8(1.4)	47.5(1.6)	47.4(2.1)	44.0(7.1)	42.8(4.1)
GRADUATED H.S.	59.8(1.3)	64.1(1.0)	66.5(1.3)	60.0(1.3)	62.7(3.4)	59.4(2.8)
POST H.S.	73.7(1.1)	73.3(1.0)	77.8(1.1)	71.9(0.9)	69.7(1.3)	65.8(2.0)
DO NOT KNOW	48.3(1.2)	55.1(1.0)	59.0(1.1)	55.9(1.0)	56.1(1.9)	52.7(1.8)
TYPE OF SCHOOL						
PUBLIC	****(0.0)	*****(0.0)	66.2(1.0)	60.0(0.8)	61.1(1.5)	57.5(1.5)
PRIVATE	****(0.0)	*****(0.0)	79.3(1.6)	73.9(1.7)	73.5(2.5)	74.8(3.0)
QUARTILES						
UPPER	96.7(0.3)	99.2(0.2)	99.6(0.2)	99.8(0.1)	99.7(0.3)	99.7(0.3)
MIDDLE TWO	66.4(1.0)	72.8(0.5)	80.6(0.6)	70.2(0.6)	72.4(1.1)	65.8(1.3)
LOWER	3.0(0.5)	3.8(0.4)	9.9(0.9)	5.0(0.4)	6.0(1.2)	4.3(1.1)

From Mullis et al., 1991, p. 317.

Table 8.3
NAEP 1990 Reading Trend Assessment-Age 9
Percentage of Students with Reading Proficiency
At or Above Anchor Level 250

	1971	1975	1980	1984	1988	1990
-- TOTAL --	15.6(0.6)	14.6(0.6)	17.7(0.8)	17.2(0.6)	17.3(1.1)	18.4(1.0)
SEX						
MALE	12.0(0.6)	11.5(0.6)	14.6(0.9)	15.9(0.7)	15.8(1.4)	16.1(1.2)
FEMALE	19.2(0.8)	17.7(0.8)	20.7(1.0)	18.4(0.7)	19.1(1.2)	20.8(1.2)
RACE/ETHNICITY						
WHITE	18.0(0.7)	17.4(0.7)	21.0(0.9)	20.9(0.7)	20.3(1.5)	22.6(1.2)
BLACK	1.6(0.5)	2.0(0.3)	4.1(0.6)	4.5(0.5)	5.6(1.2)	5.2(1.5)
HISPANIC	****(0.0)	2.6(0.5)	5.0(1.4)	4.3(0.5)	8.6(2.3)	5.8(2.0)
OTHER	8.7(2.1)	14.5(3.5)	18.7(4.3)	24.7(2.6)	29.8(6.9)	13.1(3.9)
REGION						
NORTHEAST	17.9(0.9)	17.7(1.0)	21.6(2.2)	19.8(1.3)	20.8(1.9)	23.9(1.9)
SOUTHEAST	10.2(1.1)	9.9(0.8)	15.3(1.5)	13.8(0.9)	14.7(1.4)	12.8(2.7)
CENTRAL	19.7(0.9)	17.2(1.2)	17.9(1.1)	19.2(1.3)	20.7(3.2)	19.3(2.0)
WEST	13.0(1.4)	12.7(1.2)	16.4(1.5)	15.9(1.0)	14.5(1.1)	18.1(2.1)
TYPE OF COMMUNITY						
EXTREME RURAL	12.4(1.6)	12.0(1.6)	14.8(1.5)	11.3(1.5)	18.9(4.8)	19.6(3.7)
DISADVANTAGED URBAN	3.7(0.7)	3.7(0.8)	4.2(0.7)	8.1(0.9)	7.9(2.2)	6.7(2.0)
ADVANTAGED URBAN	30.3(1.3)	25.7(1.5)	31.1(2.3)	30.9(1.8)	22.0(3.0)	29.0(3.5)
OTHER	14.9(0.7)	14.4(0.7)	16.6(0.7)	16.5(0.6)	17.2(1.1)	18.3(1.1)
PARENTS' EDUCATION LEVEL						
NOT GRADUATED H.S.	6.1(0.8)	5.2(0.7)	6.7(1.0)	6.6(0.7)	6.3(2.1)	9.1(2.2)
GRADUATED H.S.	13.7(0.8)	14.0(0.9)	15.0(1.1)	14.3(0.9)	16.8(2.0)	17.2(1.4)
POST H.S.	26.1(1.1)	22.3(0.9)	25.9(1.1)	26.3(0.8)	22.8(1.6)	24.3(1.7)
DO NOT KNOW	9.6(0.5)	9.7(0.6)	11.0(0.8)	11.8(0.6)	12.3(1.3)	13.2(1.5)
TYPE OF SCHOOL						
PUBLIC	****(0.0)	*****(0.0)	16.7(0.9)	16.3(0.6)	16.6(0.9)	17.2(1.0)
PRIVATE	****(0.0)	*****(0.0)	25.6(1.7)	23.6(1.7)	23.6(3.5)	32.4(4.3)
QUARTILES						
UPPER	52.6(0.9)	50.5(1.6)	58.1(1.7)	61.0(1.0)	63.1(3.2)	66.0(1.9)
MIDDLE TWO	5.0(0.3)	3.9(0.3)	6.3(0.4)	3.6(0.3)	3.3(0.6)	3.8(0.5)
LOWER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.2)	0.0(0.0)

From Mullis et al., 1991, p. 318.

Table 8.4
NAEP 1990 Reading Trend Assessment-Age 9
Percentage of Students with Reading Proficiency
At or Above Anchor Level 300

	1971	1975	1980	1984	1988	1990
-- TOTAL --	0.9(0.1)	0.6(0.1)	0.6(0.1)	1.0(0.1)	1.4(0.3)	1.7(0.3)
SEX						
MALE	0.6(0.2)	0.3(0.1)	0.4(0.1)	0.8(0.2)	1.1(0.4)	1.4(0.3)
FEMALE	1.3(0.2)	0.9(0.2)	0.8(0.1)	1.1(0.1)	1.6(0.4)	2.0(0.5)
RACE/ETHNICITY						
WHITE	1.1(0.2)	0.7(0.1)	0.8(0.1)	1.2(0.2)	1.6(0.3)	2.2(0.4)
BLACK	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.1)	0.2(0.2)	0.3(0.2)
HISPANIC	***(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.0)	0.4(0.0)	0.2(0.3)
OTHER	0.5(0.5)	0.9(0.9)	0.3(0.0)	1.9(0.6)	4.0(2.7)	0.7(0.8)
REGION						
NORTHEAST	1.1(0.3)	0.9(0.3)	0.8(0.2)	1.4(0.3)	1.7(0.4)	2.7(0.7)
SOUTHEAST	0.4(0.2)	0.3(0.2)	0.6(0.3)	0.6(0.2)	0.8(0.4)	1.0(0.5)
CENTRAL	1.3(0.3)	0.7(0.2)	0.6(0.2)	1.1(0.2)	1.9(1.1)	1.6(0.5)
WEST	0.7(0.2)	0.4(0.2)	0.5(0.2)	0.8(0.2)	1.1(0.4)	1.6(0.4)
TYPE OF COMMUNITY						
EXTREME RURAL	0.8(0.2)	0.4(0.2)	0.4(0.2)	0.5(0.3)	1.6(1.2)	1.5(0.8)
DISADVANTAGED URBAN	0.1(0.1)	0.1(0.0)	0.1(0.1)	0.3(0.2)	0.4(0.0)	0.7(0.5)
ADVANTAGED URBAN	2.7(0.7)	1.5(0.4)	1.7(0.4)	2.6(0.6)	2.0(0.9)	3.8(0.8)
OTHER	0.7(0.1)	0.5(0.1)	0.5(0.1)	0.8(0.1)	1.3(0.3)	1.5(0.4)
PARENTS' EDUCATION LEVEL						
NOT GRADUATED H.S.	0.2(0.1)	0.1(0.1)	0.1(0.1)	0.2(0.6)	0.0(0.0)	0.5(0.7)
GRADUATED H.S.	0.6(0.2)	0.5(0.2)	0.4(0.1)	0.6(0.2)	0.9(0.8)	1.3(0.7)
POST H.S.	2.0(0.3)	1.2(0.2)	1.1(0.2)	2.0(0.3)	2.2(0.7)	2.7(0.8)
DO NOT KNOW	0.4(0.1)	0.2(0.1)	0.3(0.1)	0.4(0.1)	0.6(0.3)	0.8(0.4)
TYPE OF SCHOOL						
PUBLIC	***(0.0)	***(0.0)	0.6(0.1)	0.9(0.1)	1.2(0.3)	1.6(0.3)
PRIVATE	***(0.0)	***(0.0)	1.1(0.5)	1.4(0.4)	2.4(1.1)	2.6(1.1)
QUARTILES						
UPPER	3.7(0.5)	2.4(0.3)	2.5(0.4)	3.9(0.5)	5.4(1.3)	6.7(1.2)
MIDDLE TWO	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
LOWER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)

From Mullis et al., 1991, p. 319.

Table 8.5
NAEP 1990 Reading Trend Assessment-Age 9
Percentage of Students with Reading Proficiency
At or Above Anchor Level 350

	1971	1975	1980	1984	1988	1990
-- TOTAL --	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)
SEX						
MALE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
FEMALE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)	0.1(0.1)
RACE/ETHNICITY						
WHITE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)
BLACK	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
HISPANIC	****(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
OTHER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.0)	0.0(0.0)	0.0(0.0)
REGION						
NORTHEAST	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)
SOUTHEAST	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)	0.0(0.1)
CENTRAL	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
WEST	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)
TYPE OF COMMUNITY						
EXTREME RURAL	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.0)	0.0(0.0)
DISADVANTAGED URBAN	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
ADVANTAGED URBAN	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.2)	0.0(0.2)
OTHER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)
PARENTS' EDUCATION LEVEL						
NOT GRADUATED H.S.	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
GRADUATED H.S.	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.0)	0.0(0.0)
POST H.S.	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)	0.1(0.1)
DO NOT KNOW	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)
TYPE OF SCHOOL						
PUBLIC	****(0.0)	*****(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.1)
PRIVATE	****(0.0)	*****(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
QUARTILES						
UPPER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.1)	0.1(0.2)
MIDDLE TWO	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
LOWER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)

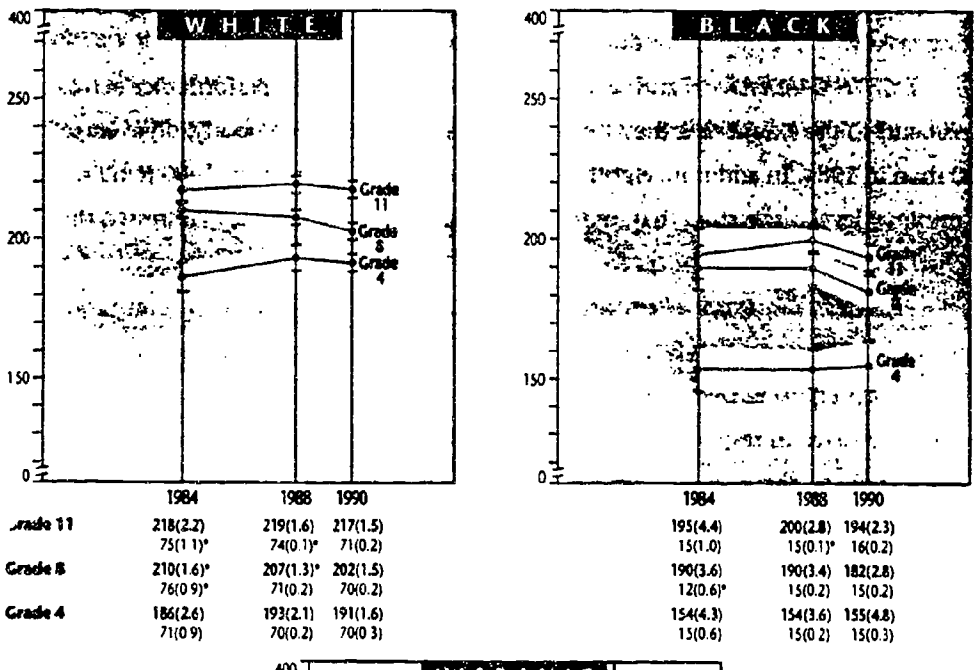
From Mullis et al., 1991, p. 320.

Table 9
NAEP 1990 National Writing Trend Assessment-Grade 4
Average Writing Achievement Across Assessment Years

	1984	1988	1990
-- TOTAL --	179.4(2.2)	185.5(1.6)	183.3(1.5)
SEX			
MALE	175.6(3.0)	175.9(2.8)	173.8(1.6)
FEMALE	183.6(2.6)	194.9(1.6)	192.5(2.2)
RACE/ETHNICITY			
WHITE	186.4(2.6)	193.2(2.1)	190.9(1.6)
BLACK	154.3(4.3)	154.3(3.6)	155.0(4.8)
HISPANIC	162.6(3.5)	169.1(4.4)	167.8(3.4)
OTHER	183.4(6.4)	189.1(9.2)	188.7(4.7)
REGION			
NORTHEAST	186.0(5.3)	187.3(5.2)	191.4(3.2)
SOUTHEAST	179.4(4.0)	180.7(3.5)	175.5(4.7)
CENTRAL	175.8(3.8)	189.9(2.3)	184.5(2.4)
WEST	177.3(3.3)	184.7(3.7)	182.6(3.0)
TYPE OF COMMUNITY			
EXTREME RURAL	154.0(10.9)	165.2(4.8)	186.2(4.8)
DISADVANTAGED URBAN	167.0(4.1)	158.0(4.8)	158.6(6.6)
ADVANTAGED URBAN	197.1(3.8)	199.2(6.1)	195.3(4.8)
OTHER	180.1(2.8)	186.1(2.4)	184.4(1.9)
PARENTS' EDUCATION LEVEL			
NOT GRADUATED H.S.	156.9(6.0)	157.6(6.4)	169.1(4.9)
GRADUATED H.S.	171.2(4.6)	183.3(3.2)	183.0(2.8)
POST H.S.	186.5(5.5)	178.6(6.6)	194.5(5.9)
GRADUATED COLLEGE	192.6(2.2)	194.9(2.2)	191.3(1.5)
DO NOT KNOW	175.9(3.3)	178.7(3.2)	174.4(2.2)
TYPE OF SCHOOL			
PUBLIC	177.5(2.4)	184.3(1.7)	181.9(1.7)
PRIVATE	190.7(4.7)	193.6(6.3)	198.6(3.6)

From Mullis et al., 1991, p. 357.

Figure 10
Trends in Average Writing Achievement by Race/Ethnicity, 1984 to 1990



	1984	1988	1990
Grade 11	218(2.2)	219(1.6)	217(1.5)
	75(1.1)*	74(0.1)*	71(0.2)
Grade 8	210(1.6)*	207(1.3)*	202(1.5)
	76(0.9)*	71(0.2)	70(0.2)
Grade 4	186(2.6)	193(2.1)	191(1.6)
	71(0.9)	70(0.2)	70(0.3)

	1984	1988	1990
Grade 11	195(4.4)	200(2.8)	194(2.3)
	15(1.0)	15(0.1)*	16(0.2)
Grade 8	190(3.6)	190(3.4)	182(2.8)
	12(0.6)*	15(0.2)	15(0.2)
Grade 4	154(4.3)	154(3.6)	155(4.8)
	15(0.6)	15(0.2)	15(0.3)

	1984	1988	1990
Grade 11	188(3.9)	199(4.2)	198(3.9)
	8(0.6)	8(0.1)*	9(0.1)
Grade 8	191(5.7)	188(3.8)	189(3.0)
	8(0.7)*	10(0.1)	10(0.2)
Grade 4	163(3.5)	169(4.4)	168(3.4)
	11(0.7)	11(0.1)	11(0.2)

Note: Averages are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup.

± 95 percent confidence interval.

* Statistically significant difference from 1990, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of 2 comparisons (each year compared to 1990). The standard errors of the estimated averages and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian/Pacific Islander students and American Indian students, the sample sizes were insufficient to permit robust trend estimates.

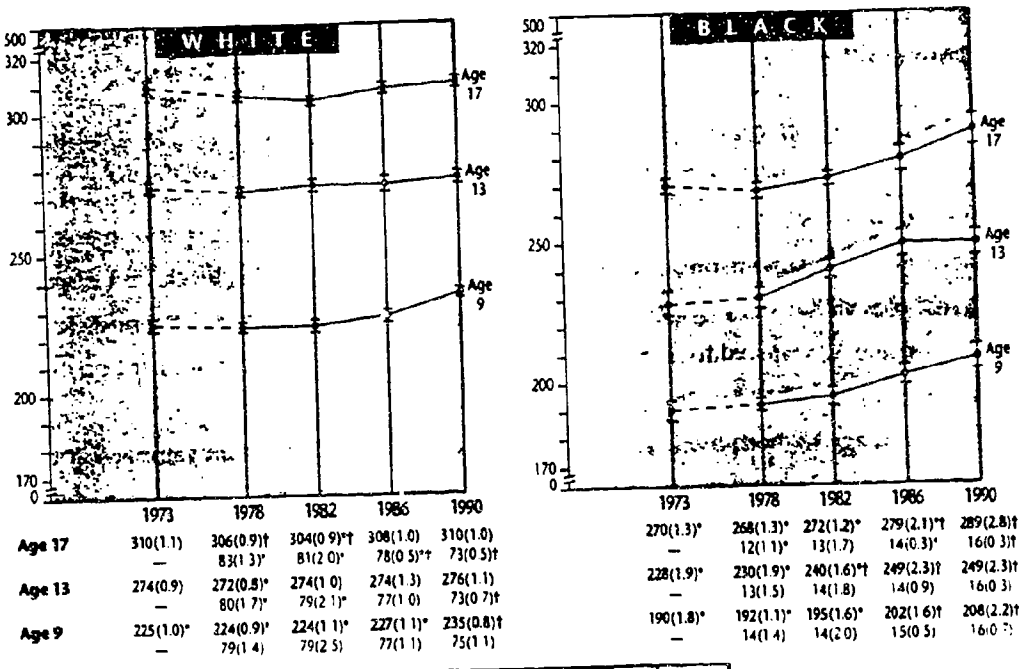
From Mullis et al., 1991, p. 152.

Table 10
NAEP 1990 Mathematics Trend Assessment-Age 9
Average Mathematics Proficiency Across Assessment Years

	1977-78	1981-82	1985-86	1989-90	DIFFERENCE 1978-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	218.6(0.8)	219.3(1.1)	221.7(1.0)	229.6(0.8)	11.0(1.2)	10.7(1.4)	7.9(1.3)
SEX							
MALE	217.4(0.7)	217.1(1.2)	221.7(1.1)	229.1(0.9)	11.7(1.2)	12.0(1.5)	7.4(1.4)
FEMALE	219.9(1.0)	220.8(1.2)	221.7(1.2)	230.2(1.1)	10.2(1.5)	9.4(1.6)	8.4(1.6)
RACE/ETHNICITY							
WHITE	224.1(0.9)	224.0(1.1)	226.9(1.1)	235.2(0.8)	11.1(1.2)	11.2(1.4)	8.3(1.4)
BLACK	192.4(1.1)	194.9(1.6)	201.6(1.6)	208.4(2.2)	15.9(2.5)	13.4(2.8)	6.8(2.8)
HISPANIC	202.9(2.2)	204.0(1.3)	205.4(2.1)	213.8(2.1)	10.8(3.1)	9.7(2.5)	8.3(2.9)
OTHER	227.2(3.4)	238.5(3.4)	221.8(7.5)	235.2(3.2)	8.0(4.7)	-3.3(4.7)	13.4(8.2)
REGION							
NORTHEAST	226.9(1.9)	225.7(1.8)	226.0(2.7)	235.8(2.1)	8.9(2.8)	10.2(2.7)	9.9(3.4)
SOUTHEAST	208.9(1.2)	210.4(2.5)	217.8(2.5)	223.9(2.4)	15.1(2.7)	13.6(3.5)	6.1(3.5)
CENTRAL	224.0(1.5)	221.1(2.7)	226.0(2.3)	230.7(1.3)	6.7(2.0)	9.6(3.0)	4.7(2.6)
WEST	213.5(1.3)	219.3(1.8)	217.2(2.4)	228.5(1.8)	15.0(2.2)	9.2(2.5)	11.3(3.0)
TYPE OF COMMUNITY							
EXTREME RURAL	212.3(2.9)	210.9(2.6)	218.8(7.0)	230.5(3.2)	18.2(4.3)	19.5(4.1)	11.6(7.7)
DISADVANTAGED URBAN	196.7(2.9)	198.8(2.2)	204.2(1.9)	214.4(4.8)	15.7(5.5)	15.6(5.2)	10.2(5.0)
ADVANTAGED URBAN	237.3(1.8)	238.9(2.2)	238.5(2.7)	244.1(1.8)	6.7(2.6)	5.2(2.9)	5.6(3.3)
OTHER	218.4(0.7)	219.3(0.9)	219.4(1.3)	229.0(0.9)	10.7(1.2)	9.7(1.3)	9.6(1.6)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	200.3(1.5)	199.0(1.7)	200.6(2.5)	210.4(2.3)	10.0(2.8)	11.4(2.9)	9.7(3.4)
GRADUATED H.S.	219.2(1.1)	218.3(1.1)	218.4(1.6)	226.2(1.2)	7.0(1.6)	7.8(1.6)	7.8(2.0)
SOME EDUC AFTER H.S.	230.1(1.7)	225.2(2.1)	228.6(2.1)	235.6(2.0)	5.8(2.7)	10.7(3.0)	7.3(2.9)
GRADUATED COLLEGE	231.3(1.1)	228.8(1.5)	231.3(1.1)	237.6(1.3)	6.2(1.7)	8.8(2.0)	6.2(1.7)
UNKNOWN	211.4(1.1)	212.6(1.5)	214.3(1.4)	223.0(1.0)	11.6(1.5)	10.4(1.8)	8.7(1.7)
TYPE OF SCHOOL							
PUBLIC	217.2(0.8)	217.0(1.1)	220.1(1.2)	228.6(0.9)	11.4(1.2)	11.6(1.4)	8.5(1.5)
PRIVATE	230.5(1.7)	231.8(2.1)	230.0(2.5)	238.1(2.3)	7.6(2.9)	6.3(3.1)	8.1(3.4)
QUARTILES							
UPPER	256.0(0.8)	256.0(0.6)	259.3(0.7)	265.6(0.8)	9.6(1.1)	9.6(1.0)	6.3(1.1)
MIDDLE TWO	220.5(0.5)	220.7(0.5)	223.3(0.5)	231.3(0.4)	10.8(0.6)	10.6(0.6)	8.0(0.7)
LOWER	177.6(0.6)	178.5(0.8)	180.9(0.7)	190.3(1.0)	12.7(1.2)	11.8(1.3)	9.4(1.3)

From Mullis et al., 1991, p. 267.

Figure 11
Trends in Average Mathematics Proficiency by Race/Ethnicity, 1973 to 1990



	1973	1978	1982	1986	1990
WHITE					
Age 17	310(1.1)	306(0.9)*†	304(0.9)*†	308(1.0)	310(1.0)
	—	83(1.3)*	81(2.0)*	78(0.5)*†	73(0.5)†
Age 13	274(0.9)	272(0.8)*	274(1.0)	274(1.3)	276(1.1)
	—	80(1.7)*	79(2.1)*	77(1.0)	73(0.7)†
Age 9	225(1.0)*	224(0.9)*	224(1.1)*	227(1.1)*	235(0.8)†
	—	79(1.4)	79(2.5)	77(1.1)	75(1.1)
BLACK					
Age 17	270(1.3)*	268(1.3)*	272(1.2)*	279(2.1)*†	289(2.8)†
	—	12(1.1)*	13(1.7)	14(0.3)*	16(0.3)†
Age 13	228(1.9)*	230(1.9)*	240(1.6)*†	249(2.3)†	249(2.3)†
	—	13(1.5)	14(1.8)	14(0.9)	16(0.3)
Age 9	190(1.8)*	192(1.1)*	195(1.6)*	202(1.6)†	208(2.2)†
	—	14(1.4)	14(2.0)	15(0.5)	16(0.7)
HISPANIC					
Age 17	277(2.2)	276(2.3)	277(1.8)	283(2.9)	284(2.9)
	—	4(0.5)	5(1.0)	6(0.3)	7(0.4)
Age 13	239(2.2)*	235(2.0)*	252(1.7)†	254(2.9)†	255(1.8)†
	—	6(0.9)	5(1.2)	7(1.1)	7(0.5)
Age 9	202(2.4)*	203(2.2)*	204(1.3)*	205(2.1)	214(2.1)†
	—	5(0.7)	5(1.1)	6(1.1)	6(0.6)

Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

± 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

* Statistically significant difference from 1990 and † statistically significant difference from 1973 (for proficiencies) or 1978 (for percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0.) The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian/Pacific Islander students and American Indian students, the sample sizes were insufficient to permit robust trend estimates.

From Mullis et al., 1991, p. 64.

Figure 12
Levels of Mathematics Proficiency

	1976-77	1981-82	1985-86	1989-90	DIFFERENCE 1977-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	93.5(0.6)	95.2(0.7)	96.2(0.3)	97.0(0.3)	3.4(0.7)	1.7(0.8)	0.8(0.5)
SEX							
MALE	94.3(0.5)	95.0(1.0)	96.8(0.5)	96.8(0.5)	2.5(0.7)	1.8(1.1)	0.0(0.7)
FEMALE	92.8(0.7)	95.5(1.2)	95.6(0.6)	97.1(0.4)	4.4(0.8)	1.6(1.2)	1.5(0.7)
RACE/ETHNICITY							
WHITE	97.7(0.3)	98.3(0.4)	98.2(0.3)	98.2(0.2)	1.5(0.4)	0.9(0.5)	1.0(0.4)
BLACK	72.4(1.8)	82.1(3.0)	88.6(1.4)	88.0(1.3)	15.6(2.2)	5.8(3.3)	-0.6(2.0)
HISPANIC	84.6(1.8)	85.1(3.1)	89.6(2.4)	93.6(1.5)	9.0(2.4)	8.6(3.5)	4.0(2.8)
OTHER	94.9(2.4)	95.7(3.2)	95.9(1.8)	96.3(2.6)	1.4(3.6)	0.6(4.1)	0.4(3.2)
REGION							
NORTHEAST	94.6(0.7)	94.5(1.4)	96.7(0.9)	97.1(0.6)	2.5(0.9)	2.6(1.5)	0.4(1.0)
SOUTHEAST	87.8(1.8)	92.7(1.8)	95.0(1.2)	94.6(0.9)	6.8(2.0)	1.9(1.8)	-0.4(1.5)
CENTRAL	95.5(0.8)	97.5(1.1)	97.1(0.6)	98.4(0.7)	2.9(1.0)	0.9(1.3)	1.3(0.9)
WEST	94.9(1.1)	95.4(1.3)	95.9(0.7)	97.7(0.7)	2.8(1.3)	2.3(1.5)	1.8(1.0)
TYPE OF COMMUNITY							
EXTREME RURAL	96.6(0.9)	94.3(2.6)	97.0(1.8)	97.6(1.8)	1.0(2.0)	3.3(3.1)	0.6(2.5)
DISADVANTAGED URBAN	74.9(2.4)	85.2(4.3)	86.3(2.0)	92.2(2.3)	17.3(3.3)	7.0(4.9)	6.0(3.1)
ADVANTAGED URBAN	98.9(0.4)	99.7(0.4)	99.3(0.4)	99.6(0.3)	0.7(0.5)	-0.2(0.5)	0.3(0.5)
OTHER	94.3(0.6)	95.6(0.7)	96.3(0.5)	97.0(0.4)	2.7(0.7)	1.4(0.8)	0.8(0.6)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	86.0(1.7)	85.5(3.5)	90.1(3.4)	93.3(2.3)	7.2(2.8)	7.8(4.2)	3.2(4.1)
GRADUATED H.S.	95.0(0.5)	96.1(1.0)	95.6(0.6)	96.9(0.8)	1.9(1.0)	0.7(1.3)	1.3(1.0)
SOME EDUC AFTER H.S.	97.1(0.9)	96.6(1.8)	98.0(1.1)	97.6(1.2)	0.5(1.5)	1.0(2.1)	-0.3(1.6)
GRADUATED COLLEGE	96.8(0.6)	97.2(0.7)	98.0(0.4)	98.1(0.4)	1.3(0.7)	0.9(0.8)	0.0(0.5)
UNKNOWN	91.4(0.8)	93.8(1.9)	95.0(0.6)	96.0(0.6)	4.6(1.0)	2.2(2.0)	1.0(0.9)
TYPE OF SCHOOL							
PUBLIC	93.0(0.7)	94.9(0.8)	95.8(0.4)	96.7(0.4)	3.8(0.8)	1.9(0.9)	0.9(0.5)
PRIVATE	98.1(0.6)	98.9(1.4)	98.2(0.7)	98.7(0.9)	0.5(1.1)	-0.2(1.6)	0.5(1.1)
QUARTILES							
UPPER	100.0(0.0)	100.0(0.0)	100.0(0.0)	100.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
MIDDLE TWO	99.5(0.1)	100.0(0.1)	99.8(0.1)	100.0(0.0)	0.5(0.2)	0.0(0.1)	0.1(0.1)
LOWER	75.2(1.4)	81.0(2.5)	85.2(1.1)	87.9(1.2)	12.6(1.8)	6.9(2.7)	2.7(1.6)

From Mullis et al., 1991, p. 76.

Table 10.1
Percentage of Students with Mathematics Proficiency At or Above Anchor Level 150

	1977-78	1981-82	1985-86	1989-90	DIFFERENCE 1978-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	96.7(0.3)	97.1(0.3)	97.9(0.3)	98.1(0.2)	2.4(0.3)	2.0(0.4)	1.2(0.4)
SEX							
MALE	96.2(0.5)	96.5(0.5)	98.0(0.5)	99.0(0.3)	2.9(0.5)	2.5(0.6)	1.0(0.6)
FEMALE	97.2(0.3)	97.6(0.3)	97.8(0.4)	99.1(0.3)	1.9(0.4)	1.5(0.4)	1.4(0.5)
RACE/ETHNICITY							
WHITE	98.3(0.2)	98.5(0.3)	98.8(0.2)	99.6(0.2)	1.3(0.2)	1.1(0.3)	0.8(0.3)
BLACK	88.4(1.0)	90.2(1.0)	93.9(1.4)	95.9(0.9)	8.4(1.3)	6.7(1.3)	3.0(1.6)
HISPANIC	83.0(1.2)	84.3(1.2)	96.4(1.3)	98.0(0.8)	4.9(1.4)	3.6(1.6)	1.6(1.5)
OTHER	98.1(1.6)	99.2(0.5)	97.4(2.2)	99.2(0.8)	1.2(1.8)	0.0(1.0)	1.9(2.3)
REGION							
NORTHEAST	97.9(0.4)	98.3(0.4)	98.4(0.5)	99.3(0.3)	1.5(0.5)	1.0(0.5)	1.0(0.6)
SOUTHEAST	94.0(0.6)	94.8(0.8)	97.1(0.7)	98.2(0.7)	4.2(0.9)	3.6(1.1)	1.1(1.0)
CENTRAL	98.2(0.3)	97.9(0.5)	98.5(0.5)	99.4(0.3)	1.2(0.4)	1.5(0.6)	0.9(0.6)
WEST	96.2(0.6)	97.5(0.6)	97.5(0.8)	99.3(0.3)	3.1(0.6)	1.8(0.6)	1.8(0.8)
TYPE OF COMMUNITY							
EXTREME RURAL	94.5(1.6)	95.3(1.3)	96.7(2.0)	99.3(0.5)	4.8(1.6)	4.0(1.4)	2.6(2.1)
DISADVANTAGED URBAN	91.4(1.4)	91.8(1.5)	94.3(1.4)	97.4(1.5)	6.0(2.1)	5.6(2.1)	3.1(2.1)
ADVANTAGED URBAN	99.5(0.4)	99.6(0.4)	99.6(0.3)	99.9(0.2)	0.4(0.4)	0.3(0.4)	0.3(0.3)
OTHER	97.0(0.3)	97.5(0.4)	97.8(0.4)	99.1(0.2)	2.1(0.4)	1.6(0.4)	1.3(0.4)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	92.2(1.1)	90.9(1.6)	93.9(1.8)	97.9(1.2)	5.6(1.6)	7.0(2.0)	3.9(2.1)
GRADUATED H.S.	97.1(0.4)	97.6(0.4)	97.4(0.5)	98.7(0.4)	1.6(0.6)	1.1(0.6)	1.2(0.6)
SOME EDUC AFTER H.S.	98.5(0.6)	98.2(0.6)	98.9(1.0)	99.1(0.6)	0.7(0.8)	0.9(0.8)	0.3(1.2)
GRADUATED COLLEGE	98.8(0.3)	98.8(0.3)	99.0(0.3)	99.5(0.3)	0.7(0.4)	0.8(0.4)	0.5(0.4)
UNKNOWN	95.6(0.5)	96.3(0.5)	97.4(0.6)	99.0(0.3)	3.4(0.6)	2.6(0.6)	1.6(0.7)
TYPE OF SCHOOL							
PUBLIC	96.4(0.3)	96.8(0.4)	97.7(0.3)	99.0(0.2)	2.6(0.4)	2.2(0.4)	1.3(0.4)
PRIVATE	99.0(1.0)	99.0(0.4)	98.7(0.8)	99.7(0.3)	0.7(1.0)	0.6(0.5)	1.0(0.8)
QUARTILES							
UPPER	100.0(0.0)	100.0(0.0)	100.0(0.0)	100.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
MIDDLE TWO	99.9(0.1)	100.0(0.0)	100.0(0.0)	100.0(0.0)	0.1(0.1)	0.0(0.0)	0.0(0.0)
LOWER	85.9(0.9)	88.4(1.2)	91.6(1.1)	95.3(0.8)	9.4(1.2)	7.8(1.4)	4.6(1.4)

From Mullis et al., 1991, p. 270

Table 10.2
NAEP 1990 Mathematics Trend Assessment-Age 9
Percentage of Students with Mathematics Proficiency At or Above Anchor Level 200

	1977-78	1981-82	1985-86	1989-90	DIFFERENCE 1978-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	70.4(0.9)	71.4(1.2)	74.1(1.2)	81.5(1.0)	11.0(1.3)	10.0(1.5)	7.3(1.6)
SEX							
MALE	68.9(1.0)	68.8(1.3)	74.0(1.4)	80.6(1.0)	11.7(1.4)	11.8(1.7)	6.6(1.8)
FEMALE	72.0(1.1)	74.0(1.3)	74.3(1.3)	82.3(1.3)	10.4(1.6.	8.3(1.8)	8.1(1.8)
RACE/ETHNICITY							
WHITE	76.3(1.0)	76.8(1.2)	79.6(1.3)	86.9(0.9)	10.6(1.3)	10.0(1.5)	7.3(1.6)
BLACK	42.0(1.4)	46.1(2.4)	53.4(2.5)	60.0(2.8)	17.9(3.1)	13.9(3.6)	6.6(3.7)
HISPANIC	54.2(2.8)	55.7(2.3)	57.6(2.9)	68.4(3.0)	14.2(4.1)	12.7(3.8)	10.9(4.2)
OTHER	80.3(3.6)	85.2(3.4)	70.4(8.0)	87.0(5.4)	6.6(6.5)	1.8(6.4)	16.5(9.7)
REGION							
NORTHEAST	78.7(2.3)	78.0(2.1)	77.9(3.2)	85.9(2.2)	7.2(3.2)	7.9(3.1)	8.0(3.9)
SOUTHEAST	60.3(1.8)	62.5(2 3)	70.6(2.7)	75.1(2.8)	14.8(3.3)	12.5(3.7)	4.5(3.9)
CENTRAL	75.9(1.7)	73.8(2.7)	77.6(2.5)	83.7(1.3)	7.8(2.1)	9.9(3.0)	6.1(2.8)
WEST	65.6(1.7)	71.9(2.2)	70.5(2.9)	81 4(1.8)	15.8(2.5)	9.5(2.9)	10.9(3.4)
TYPE OF COMMUNITY							
EXTREME RURAL	63 4(3.7)	63.7(3.0)	73.3(7.4)	82.5(3.4)	19.1(5.0)	18.8(4.5)	9.2(8.1)
DISADVANTAGED URBAN	49.0(3.4)	49.7(2.5)	55.6(2 9)	67.4(6.3)	18.4(7.1)	17.6(6.8)	11.8(6.9)
ADVANTAGED URBAN	87.7(1.6)	89.1(2.0)	89.2(2.0)	92.6(1.0)	5.0(1.9)	3.5(2.2)	3.4(2.2)
OTHER	70.6(0.9)	72.2(1.1)	72.2(1.6)	81.2(1.1)	10.6(1.4)	9.1(1.5)	9.0(2.0)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	51.8(2.7)	51.0(2.6)	50.1(3.9)	63.4(4.7)	11.5(5.4)	12.4(5.3)	13.3(6.1)
GRADUATED H.S.	71.7(1.4)	72.1(1.4)	72.2(2.1)	79.3(1.6)	7.6(2.1)	7.3(2.1)	7.1(2.7)
SOME EDUC AFTER H.S.	80.7(2.0)	77.9(2.5)	80.7(2.7)	85.7(2.3)	4.9(3.0)	7.7(3.4)	4.9(3.5)
GRADUATED COLLEGE	82.1(1.3)	80.3(1.5)	82.6(1.2)	87.2(1.3)	5.1(1.8)	6.9(2.0)	4.6(1 8)
UNKNOWN	63.6(1.3)	64.9(2.2)	67.7(1.6)	77.1(1.4)	13.5(1.9)	12.2(2.6)	9.5(2.2)
TYPE OF SCHOOL							
PUBLIC	68.8(0.9)	69.4(1.2)	72.7(1.4)	80.5(1.1)	11.7(1 4)	11.1(1.6)	7.8(1.8)
PRIVATE	83.3(1.9)	84.3(2.1)	81.8(2.3)	89.3(1.8)	6.0(2.6)	5.0(2.8)	7.5(2.9)
QUARTILES							
UPPER	99.5(0.1)	99.7(0.2)	99.9(0.2)	100.0(0.2)	0 4(0.2)	0.3(0.3)	0.1(0.3)
MIDDLE TWO	82.2(0.6)	84.3(0.7)	89.5(0 9)	95.8(0 5)	13.6(0.7)	11.5(0.9)	6.3(1.0)
LOWER	17 7(0.9)	17.5(1.6)	17.6(1.5)	34.3(2.2)	16.6(2.4)	16.7(2.7)	16.7(2.6)

From Mullis et al., 1991, p. 271.

Table 10.3
NAEP 1990 Mathematics Trend Assessment-Age 9
Percentage of Students with Mathematics Proficiency
At or Above Anchor Level 250

	1977-78	1981-82	1985-86	1989-90	DIFFERENCE 1978-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	19.6(0.7)	18.8(1.0)	20.7(0.9)	27.7(0.9)	8.1(1.1)	8.9(1.3)	7.0(1.2)
SEX							
MALE	19.2(0.6)	18.1(1.1)	20.9(1.1)	27.5(1.0)	8.3(1.2)	9.4(1.4)	6.7(1.5)
FEMALE	19.9(1.0)	19.5(1.1)	20.6(1.3)	27.9(1.3)	8.0(1.7)	8.4(1.7)	7.4(1.8)
RACE/ETHNICITY							
WHITE	22.9(0.9)	21.8(1.1)	24.6(1.0)	32.7(1.0)	9.9(1.4)	10.9(1.5)	8.1(1.5)
BLACK	4.1(0.6)	4.4(0.8)	5.6(0.9)	9.4(1.7)	5.3(1.8)	5.1(1.9)	3.8(1.9)
HISPANIC	9.2(2.5)	7.8(1.7)	7.3(2.8)	11.3(3.5)	2.0(4.3)	3.5(3.9)	4.0(4.5)
OTHER	25.1(3.6)	38.3(4.7)	25.1(6.4)	31.7(3.6)	6.6(5.1)	-6.6(5.8)	6.6(7.3)
REGION							
NORTHEAST	25.9(1.6)	23.8(1.4)	24.8(2.7)	34.4(2.1)	8.5(2.6)	10.6(2.5)	9.6(3.4)
SOUTHEAST	13.4(0.8)	13.6(1.7)	17.2(2.4)	24.0(2.0)	10.6(2.1)	10.4(2.6)	6.7(3.2)
CENTRAL	23.2(1.4)	19.9(2.5)	24.7(1.8)	27.5(1.8)	4.3(2.2)	7.6(3.1)	2.9(2.5)
WEST	14.9(1.1)	18.6(1.4)	16.3(2.2)	25.6(1.5)	10.7(1.9)	7.0(2.1)	9.3(2.7)
TYPE OF COMMUNITY							
EXTREME RURAL	16.3(1.6)	13.0(3.3)	18.4(5.2)	28.6(3.5)	12.2(3.9)	15.6(4.8)	10.1(7.1)
DISADVANTAGED URBAN	7.2(1.6)	6.0(1.4)	8.3(2.5)	14.2(3.6)	7.0(3.9)	8.2(3.8)	5.9(4.4)
ADVANTAGED URBAN	35.6(2.5)	36.6(2.7)	36.8(3.2)	42.4(3.0)	6.9(3.9)	5.8(4.1)	5.6(4.4)
OTHER	18.7(0.7)	18.4(0.8)	18.2(1.3)	26.9(1.0)	8.2(1.2)	8.4(1.3)	8.7(1.6)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	7.5(1.2)	7.1(1.5)	6.4(2.3)	9.9(2.8)	2.4(2.9)	2.8(3.0)	3.5(3.5)
GRADUATED H.S.	18.8(1.1)	16.4(1.3)	17.4(2.1)	23.6(1.6)	4.8(2.0)	7.1(2.1)	6.2(2.7)
SOME EDUC AFTER H.S.	29.2(1.9)	23.7(2.9)	26.6(2.6)	35.0(4.2)	5.8(4.6)	11.4(5.1)	8.5(4.9)
GRADUATED COLLEGE	30.4(1.3)	27.2(1.3)	29.6(1.4)	35.6(1.7)	6.2(2.2)	9.4(2.1)	7.0(2.2)
UNKNOWN	13.4(1.1)	13.6(1.3)	13.3(1.1)	19.7(1.1)	6.3(1.6)	6.1(1.7)	6.3(1.6)
TYPE OF SCHOOL							
PUBLIC	18.5(0.7)	17.3(0.9)	19.1(1.1)	26.8(1.0)	8.3(1.2)	9.5(1.3)	7.7(1.5)
PRIVATE	28.4(2.0)	28.6(2.6)	28.9(2.7)	35.2(3.3)	6.8(3.8)	6.6(4.2)	6.3(4.3)
QUARTILES							
UPPER	59.7(1.4)	60.0(1.6)	67.9(1.4)	79.8(1.3)	20.1(1.9)	19.8(2.1)	11.9(1.9)
MIDDLE TWO	9.3(0.6)	7.7(0.7)	7.5(0.7)	15.5(0.8)	6.2(1.0)	7.8(1.0)	8.1(1.0)
LOWER	0.1(0.1)	0.0(0.1)	0.0(0.1)	0.1(0.2)	0.0(0.2)	0.0(0.2)	0.0(0.2)

From Mullis et al., 1991, p. 272.

Table 10.4
NAEP 1990 Mathematics Trend Assessment-Age 9
Percentage of Students with Mathematics Proficiency
At or Above Anchor Level 300

	1977-78	1981-82	1985-86	1989-90	DIFFERENCE 1978-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	0.8(0.1)	0.6(0.1)	0.6(0.2)	1.2(0.3)	0.4(0.3)	0.6(0.3)	0.5(0.4)
SEX							
MALE	0.7(0.2)	0.6(0.1)	0.7(0.3)	1.3(0.4)	0.6(0.5)	0.7(0.5)	0.6(0.5)
FEMALE	0.8(0.2)	0.5(0.1)	0.6(0.3)	1.0(0.3)	0.2(0.4)	0.5(0.3)	0.5(0.4)
RACE/ETHNICITY							
WHITE	0.9(0.2)	0.6(0.1)	0.8(0.3)	1.5(0.4)	0.5(0.4)	0.8(0.4)	0.7(0.5)
BLACK	0.0(0.0)	0.0(0.0)	0.1(0.0)	0.1(0.1)	0.0(0.1)	0.0(0.1)	0.0(0.1)
HISPANIC	0.2(0.5)	0.0(0.5)	0.1(0.5)	0.2(0.5)	0.0(0.8)	0.2(0.6)	0.1(0.6)
OTHER	1.9(0.9)	3.7(2.1)	0.8(0.8)	2.0(1.0)	0.1(1.3)	-1.7(2.3)	1.2(1.3)
REGION							
NORTHEAST	1.3(0.5)	0.9(0.3)	1.0(0.4)	2.1(0.7)	0.8(0.9)	1.2(0.8)	1.1(0.9)
SOUTHEAST	0.3(0.2)	0.3(0.1)	0.3(0.2)	1.2(0.6)	0.8(0.6)	0.9(0.6)	0.8(0.6)
CENTRAL	1.1(0.3)	0.6(0.3)	1.0(0.7)	0.6(0.2)	-0.5(0.4)	0.1(0.3)	-0.4(0.7)
WEST	0.4(0.2)	0.6(0.1)	0.2(0.2)	0.9(0.4)	0.6(0.4)	0.3(0.4)	0.7(0.4)
TYPE OF COMMUNITY							
EXTREME RURAL	0.6(0.6)	0.3(0.2)	0.3(0.6)	0.9(0.6)	0.3(0.8)	0.6(0.6)	0.6(0.6)
DISADVANTAGED URBAN	0.1(0.2)	0.1(0.1)	0.0(0.1)	0.1(0.1)	0.0(0.2)	0.1(0.2)	0.1(0.2)
ADVANTAGED URBAN	2.1(0.7)	2.0(0.4)	1.9(1.2)	3.0(1.2)	0.9(1.4)	0.9(1.3)	1.1(1.7)
OTHER	0.7(0.1)	0.5(0.1)	0.4(0.1)	1.0(0.3)	0.4(0.3)	0.6(0.3)	0.6(0.3)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	0.1(0.2)	0.0(0.2)	0.0(0.2)	0.0(0.2)	-0.1(0.3)	0.0(0.3)	0.0(0.3)
GRADUATED H.S.	0.6(0.2)	0.4(0.2)	0.4(0.4)	0.4(0.4)	-0.2(0.5)	0.0(0.4)	0.0(0.6)
SOME EDUC AFTER H.S.	1.6(0.6)	0.5(0.5)	1.2(0.9)	1.4(0.8)	-0.1(1.0)	0.9(1.0)	0.3(1.2)
GRADUATED COLLEGE	1.6(0.5)	1.0(0.3)	1.2(0.5)	2.1(0.5)	0.6(0.7)	1.1(0.6)	1.0(0.7)
UNKNOWN	0.3(0.1)	0.4(0.2)	0.2(0.1)	0.5(0.3)	0.2(0.3)	0.1(0.4)	0.3(0.3)
TYPE OF SCHOOL							
PUBLIC	0.7(0.2)	0.5(0.1)	0.6(0.2)	1.1(0.3)	0.4(0.3)	0.6(0.3)	0.5(0.4)
PRIVATE	1.2(0.4)	1.0(0.6)	1.1(0.6)	1.8(1.2)	0.6(1.2)	0.8(1.3)	0.7(1.3)
QUARTILES							
UPPER	3.0(0.5)	2.2(0.3)	2.6(0.8)	4.6(1.1)	1.6(1.3)	2.3(1.2)	2.0(1.4)
MIDDLE TWO	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.1(0.1)	0.0(0.1)	0.0(0.1)	0.0(0.1)
LOWER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)

From Mullis et al., 1991, p. 273.

Table 10.5
NAEP 1990 Mathematics Trend Assessment-Age 9
Percentage of Students with Mathematics Proficiency
At or Above Anchor Level 350

	1977-78	1981-82	1985-86	1989-90	DIFFERENCE 1978-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
SEX							
MALE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
FEMALE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
RACE/ETHNICITY							
WHITE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
BLACK	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
HISPANIC	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
OTHER	0.0(0.0)	0.1(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	-0.1(0.0)	0.0(0.0)
REGION							
NORTHEAST	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
SOUTHEAST	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
CENTRAL	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
WEST	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
TYPE OF COMMUNITY							
EXTREME RURAL	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
DISADVANTAGED URBAN	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
ADVANTAGED URBAN	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
OTHER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
GRADUATED H.S.	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
SOME EDUC AFTER H.S.	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
GRADUATED COLLEGE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
UNKNOWN	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
TYPE OF SCHOOL							
PUBLIC	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
PRIVATE	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
QUARTILES							
UPPER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
MIDDLE TWO	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
LOWER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)

From Mullis et al., 1991, p. 274.

Table 11
Mathematics Achievement-Grade 4
Percent[1] of Students who Scored Within Various Achievement Levels,[2] 1990

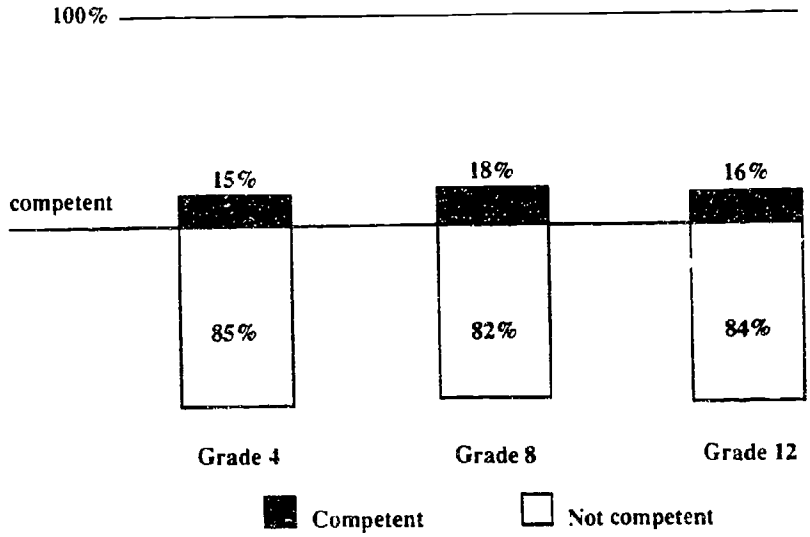
	Below Basic	Basic	Competent Proficient	Competent Advanced
All students	37%	48%	14%	1%
American Indian/ Alaskan Native	44%	50%	5%	<1%
Asian/Pacific Islander	22%	49%	27%	2%
Black	70%	28%	2%	<1%
Hispanic	58%	36%	5%	<1%
White	26%	55%	18%	1%

Percents may not add up to 100% because of rounding.
Complete descriptions of each level can be found in Appendix B.

From National Education Goals Panel, 1991, p. 46.

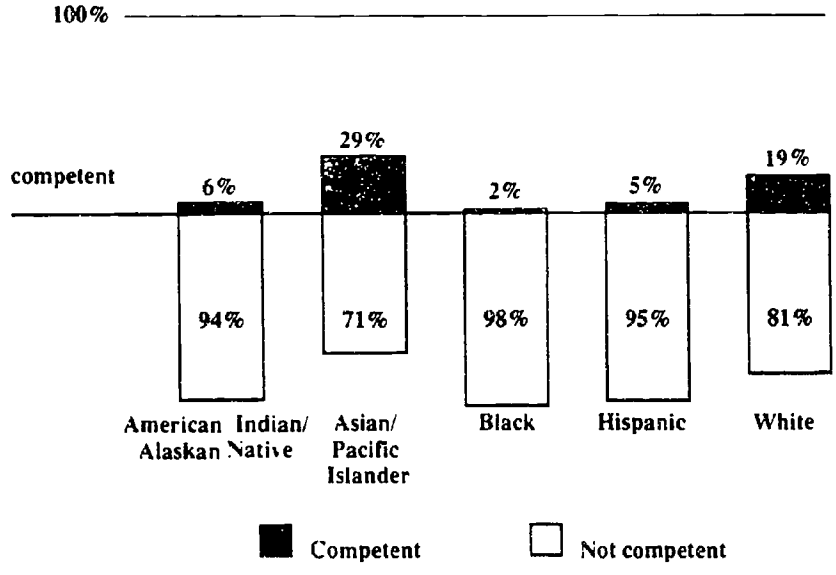
Figures 13 and 14

Competency in Mathematics
Percent of 4th, 8th, and 12th graders who are competent[1] in mathematics, 1990



[1]A complete description of "competency" can be found in Appendix B

Competency in Mathematics-Grade 4
Percent of 4th graders who are competent[1] in mathematics, 1990



[1]A complete description of "competency" can be found in Appendix B

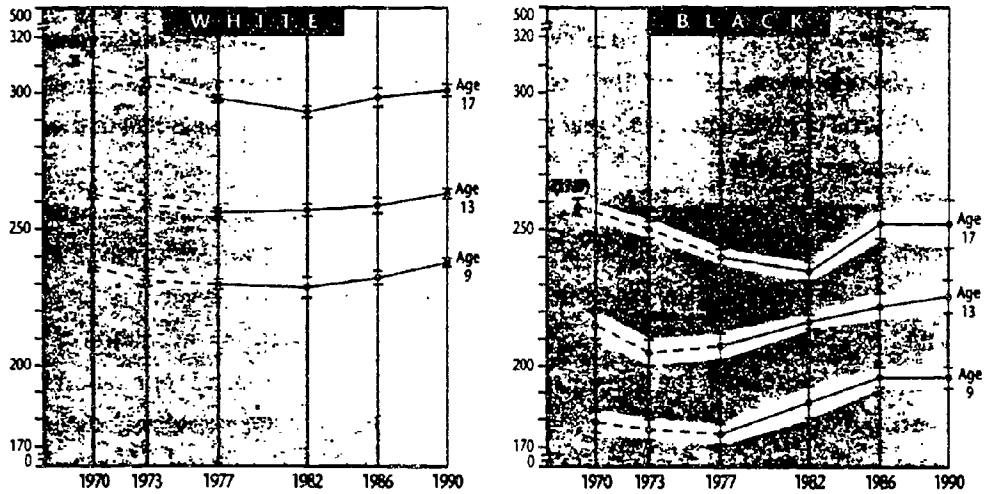
From National Education Goals Panel, 1991, p. 12.

Table 12
NAEP 1990 Science Trend Assessment-Age 9
Average Science Proficiency Across Assessment Years

	1976-77	1981-82	1985-86	1989-90	DIFFERENCE 1977-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	219.9(1.2)	220.8(1.8)	224.3(1.2)	228.7(0.8)	8.8(1.4)	7.8(1.9)	4.4(1.5)
SEX							
MALE	222.1(1.3)	221.0(2.3)	227.3(1.4)	230.3(1.1)	8.2(1.7)	9.3(2.5)	3.0(1.8)
FEMALE	217.6(1.2)	220.7(2.0)	221.3(1.4)	227.1(1.0)	9.5(1.6)	6.4(2.2)	5.7(1.8)
RACE/ETHNICITY							
WHITE	229.6(0.9)	228.0(1.9)	231.9(1.2)	237.5(0.8)	7.9(1.2)	8.4(2.1)	5.6(1.4)
BLACK	174.8(1.8)	187.0(3.0)	195.2(1.8)	195.4(2.0)	21.6(2.6)	9.4(3.6)	0.2(2.7)
HISPANIC	191.9(2.7)	169.0(4.2)	195.[illegible] 3.1)	206.2(2.2)	14.4(3.5)	17.3(4.7)	6.8(3.8)
OTHER	214.4(5.4)	222.8(5.3)	220.[illegible] .6)	227.4(3.6)	13.0(6.5)	4.6(6.4)	6.7(5.8)
REGION							
NORTHEAST	224.4(1.6)	221.8(2.9)	228.2(3.5)	231.1(2.4)	6.6(2.9)	9.3(3.7)	2.9(4.3)
SOUTHEAST	205.1(2.9)	213.9(3.6)	218.8(3.1)	219.9(1.9)	14.8(3.5)	6.0(4.0)	1.1(3.7)
CENTRAL	225.2(2.2)	226.3(3.5)	227.9(2.2)	234.2(1.7)	8.9(2.8)	7.9(3.9)	6.3(2.8)
WEST	220.9(2.2)	218.9(4.1)	222.1(3.2)	229.5(1.8)	8.6(2.9)	9.6(4.5)	7.3(3.7)
TYPE OF COMMUNITY							
EXTREME RURAL	224.5(3.2)	212.4(5.3)	224.0(4.4)	233.0(4.3)	8.5(5.4)	20.6(6.8)	9.0(6.2)
DISADVANTAGED URBAN	180.5(3.4)	192.2(5.7)	191.6(3.8)	208.5(5.9)	28.0(6.8)	16.3(8.2)	16.9(7.0)
ADVANTAGED URBAN	242.0(2.2)	243.2(4.3)	243.1(2.4)	241.2(1.6)	-0.8(2.7)	-2.0(4.5)	-1.9(2.8)
OTHER	220.2(1.4)	221.5(2.1)	222.7(1.7)	228.6(1.2)	8.4(1.8)	7.2(2.4)	6.0(2.1)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	198.5(2.2)	198.2(6.0)	203.6(2.9)	209.8(2.7)	11.3(3.5)	11.6(8.6)	6.2(4.0)
GRADUATED H.S.	223.0(1.4)	218.0(3.3)	219.6(1.5)	225.8(1.7)	2.8(2.2)	7.7(3.7)	6.2(2.3)
SOME EDUC AFTER H.S.	237.2(1.5)	229.1(3.2)	235.8(2.6)	237.6(2.1)	0.4(2.6)	8.4(3.8)	1.8(3.4)
GRADUATED COLLEGE	232.3(1.4)	230.5(2.3)	235.2(1.4)	236.2(1.3)	3.9(1.9)	5.7(2.8)	1.1(1.9)
UNKNOWN	211.0(1.4)	210.8(2.8)	215.3(1.5)	221.5(1.2)	10.5(1.8)	10.7(3.0)	6.2(1.9)
TYPE OF SCHOOL							
PUBLIC	218.0(1.4)	219.7(2.0)	222.6(1.4)	227.7(0.9)	9.7(1.7)	8.0(2.2)	5.1(1.7)
PRIVATE	234.6(2.2)	231.5(3.2)	233.0(2.9)	236.8(2.4)	2.2(3.3)	5.3(4.0)	3.7(3.8)
QUARTILES							
UPPER	285.6(0.9)	288.3(1.8)	288.8(1.2)	271.0(0.8)	5.4(1.2)	2.7(2.0)	2.2(1.5)
MIDDLE TWO	222.1(0.5)	221.7(1.1)	225.8(0.8)	231.0(0.5)	8.9(0.7)	9.3(1.2)	5.2(0.8)
LOWER	169.6(1.1)	171.4(2.0)	176.7(1.0)	181.9(0.9)	12.3(1.5)	10.5(2.2)	5.2(1.4)

From Mullis et al., 1991, p. 225.

Figure 15
Trends in Average Science Proficiency by Race/Ethnicity, 1969-70 to 1990



	1970	1973	1977	1982	1986	1990
Age 17	312(0.8)*	304(0.8)†	298(0.7)†	293(1.0)*†	298(1.7)†	301(1.1)†
	—	—	83(1.3)*	81(2.0)*	78(0.5)*†	73(0.5)†
Age 13	263(0.8)	259(0.8)*†	256(0.8)*†	257(1.1)*†	259(1.4)*	264(0.9)
	—	—	80(1.6)*	79(2.1)	77(1.0)	73(0.7)†
Age 9	236(0.9)	231(0.9)*†	230(0.9)*†	229(1.9)*†	232(1.2)*	238(0.8)
	—	—	80(1.6)	79(2.6)	77(1.1)	75(1.1)

	1970	1973	1977	1982	1986	1990
Age 17	258(1.5)	250(1.5)†	240(1.5)*†	235(1.7)*†	253(2.9)	253(4.5)
	—	—	12(1.1)*	13(1.4)	14(0.3)*	16(0.3)†
Age 13	215(2.4)	205(2.4)*	208(2.4)*	217(1.3)	222(2.5)	226(3.1)
	—	—	13(1.2)*	14(1.9)	14(0.9)	16(0.3)†
Age 9	179(1.9)*	177(1.9)*	175(1.8)*	187(3.0)	196(1.9)†	196(2.0)†
	—	—	14(1.4)	14(2.1)	15(0.5)	16(0.7)

	1977	1982	1986	1990
Age 17	262(2.2)	249(2.3)*†	259(3.8)	262(4.4)
	4(0.9)	5(1.1)	6(0.3)	7(0.4)
Age 13	213(1.9)*	226(3.9)†	226(3.1)†	232(2.6)†
	5(1.1)	5(1.0)	7(1.1)	7(0.5)
Age 9	192(2.7)*	189(4.2)*	199(3.1)	206(2.2)†
	5(0.9)	5(1.3)	6(1.1)	6(0.6)

Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

Ξ 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

* Statistically significant difference from 1990 and † statistically significant difference from 1969–70 (for proficiencies for White and Black students) or 1977 (for proficiencies for Hispanic students and for all percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0.) The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian/Pacific Islander students and American Indian students, the sample sizes were insufficient to permit robust trend estimates.

From Mullis et al., 1991, p. 26.

Figure 16
Levels of Science Proficiency

LEVEL 350 **INTEGRATES SPECIALIZED SCIENTIFIC INFORMATION**

Students at this level can infer relationships and draw conclusions using detailed scientific knowledge from the physical sciences, particularly chemistry. They also can apply basic principles of genetics and interpret the societal implications of research in this field.

LEVEL 300 **ANALYZES SCIENTIFIC PROCEDURES AND DATA**

Students at this level can evaluate the appropriateness of the design of an experiment. They have more detailed scientific knowledge, and the skill to apply their knowledge in interpreting information from text and graphs. These students also exhibit a growing understanding of principles from the physical sciences.

LEVEL 250 **APPLIES GENERAL SCIENTIFIC INFORMATION**

Students at this level can interpret data from simple tables and make inferences about the outcomes of experimental procedures. They exhibit knowledge and understanding of the life sciences, including a familiarity with some aspects of animal behavior and of ecological relationships. These students also demonstrate some knowledge of basic information from the physical sciences.

LEVEL 200 **UNDERSTANDS SIMPLE SCIENTIFIC PRINCIPLES**

Students at this level are developing some understanding of simple scientific principles, particularly in the life sciences. For example, they exhibit some rudimentary knowledge of the structure and function of plants and animals.

LEVEL 150 **KNOWS EVERYDAY SCIENCE FACTS**

Students at this level know some general scientific facts of the type that could be learned from everyday experiences. They can read simple graphs, match the distinguishing characteristics of animals, and predict the operation of familiar apparatus that work according to mechanical principles.

From Mullis et al., 1991, p. 38.

Table 12.1
NAEP 1990 Science Trend Assessment-Age 9
Percentage of Students with Science Proficiency
At or Above Anchor Level 150

	1976-77	1981-82	1985-86	1989-90	DIFFERENCE 1977-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	93 5(0 6)	95 2(0 7)	96 2(0 3)	97 0(0 3)	3 4(0 7)	1.7(0.8)	0 8(0 5)
SEX							
MALE	94 3(0 5)	95 0(1 0)	96 8(0 5)	96.8(0 5)	2 5(0 7)	1 8(1 1)	0 0(0 7)
FEMALE	92 8(0 7)	95 5(1 2)	95 6(0 6)	97 1(0 4)	4 4(0 8)	1.6(1 2)	1 5(0 7)
RACE/ETHNICITY							
WHITE	97 7(0 3)	98 3(0 4)	98 2(0 3)	99 2(0 2)	1.5(0.4)	0 9(0.5)	1 0(0 4)
BLACK	72 4(1 8)	82 1(3 0)	88.6(1 4)	88 0(1 3)	15.6(2.2)	5.8(3 3)	-0 6(2 0)
HISPANIC	84.6(1.8)	85 1(3 1)	89 6(2 4)	93 6(1.5)	9 0(2 4)	8.6(3.5)	4.0(2 8)
OTHER	94.9(2 4)	95 7(3 2)	95 9(1 8)	96 3(2.6)	1 4(3.6)	0.6(4.1)	0 4(3 2)
REGION							
NORTHEAST	94 6(0 7)	94 5(1 4)	96 7(0 9)	97 1(0 6)	2 5(0 9)	2 6(1.5)	0 4(1 0)
SOUTHEAST	87.8(1 8)	92 7(1 6)	95 0(1 2)	94 6(0 9)	6 8(2 0)	1 9(1.8)	-0 4(1 5)
CENTRAL	95.5(0 8)	97 5(1 1)	97 1(0 6)	98 4(0 7)	2 9(1.0)	0.9(1.3)	1 3(0 9)
WEST	94 9(1.1)	95 4(1 3)	95 9(0 7)	97 7(0.7)	2.8(1.3)	2.3(1 5)	1 8(1 0)
TYPE OF COMMUNITY							
EXTREME RURAL	96.6(0 9)	94 3(2.6)	97 0(1 8)	97.6(1 0)	1 0(2 0)	3 3(3 1)	0 6(2 5)
DISADVANTAGED URBAN	74.9(2.4)	85 2(4 3)	86 3(2 0)	92 2(2 3)	17 3(3 3)	7 0(4 9)	6 0(3 1)
ADVANTAGED URBAN	98.9(0 4)	99 7(0 4)	99 3(0 4)	99 6(0 3)	0 7(0.5)	-0.2(0.5)	0 3(0 5)
OTHER	94.3(0.6)	95 6(0 7)	96.3(0.5)	97.0(0 4)	2 7(0 7)	1.4(0.8)	0 8(0 6)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	86 0(1.7)	85 5(3 5)	90 1(3 4)	93 3(2 3)	7 2(2 8)	7 8(4.2)	3 2(4 1)
GRADUATED H.S	95.0(0.5)	96.1(1 0)	95 6(0 6)	96 9(0 8)	1 9(1 0)	0 7(1 3)	1 3(1 0)
SOME EDUC AFTER H.S.	87.1(0.9)	96 6(1.8)	98 0(1.1)	97 6(1 2)	0 5(1 5)	1.0(2.1)	-0 3(1 6)
GRADUATED COLLEGE	96.8(0.6)	97 2(0 7)	98.0(0 4)	98 1(0 4)	1 3(0 7)	0.9(0.8)	0 0(0 5)
UNKNOWN	91.4(0.8)	93 8(1.9)	95.0(0 6)	96 0(0 6)	4 6(1 0)	2.2(2.0)	1 0(0 9)
TYPE OF SCHOOL							
PUBLIC	93 0(0 7)	94 9(0 8)	95 8(0 4)	96 7(0 4)	3 8(0 8)	1 9(0 9)	0 9(0 5)
PRIVATE	98.1(0.6)	98 9(1 4)	98 2(0 7)	98 7(0 9)	0 5(1 1)	-0 2(1.6)	0 5(1 1)
QUARTILES							
UPPER	100.0(0.0)	100 0(0 0)	100 0(0 0)	100 0(0 0)	0 0(0 0)	0 0(0 0)	0 0(0 0)
MIDDLE TWO	99 5(0 1)	100 0(0 1)	99 8(0 1)	100 0(0 0)	0 5(0 2)	0 0(0 1)	0 1(0 1)
LOWER	75 2(1 4)	81.0(2 5)	85 2(1 1)	87 9(1 2)	12 6(1 8)	6 9(2 7)	2 7(1 6)

From Mullis et al., 1991, p. 228.

Table 12.2
NAEP 1990 Mathematics Trend Assessment-Age 9
Percentage of Students with Science Proficiency
At or Above Anchor Level 200

	1976-77	1981-82	1985-86	1989-90	DIFFERENCE 1977-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	25.7(0.7)	24.3(1.8)	27.5(1.4)	31.1(0.8)	5.4(1.1)	6.8(2.0)	3.6(1.6)
SEX							
MALE	27.4(0.9)	25.6(2.6)	29.9(2.0)	33.1(1.1)	5.7(1.4)	7.5(2.8)	3.2(2.2)
FEMALE	24.0(0.9)	23.0(2.0)	25.1(1.4)	29.1(1.0)	5.1(1.4)	6.1(2.3)	4.0(1.7)
RACE/ETHNICITY							
WHITE	30.8(0.7)	29.4(2.1)	32.7(1.5)	37.5(1.1)	6.8(1.3)	8.2(2.4)	4.9(1.8)
BLACK	3.5(0.6)	3.9(1.3)	8.3(1.5)	8.5(1.1)	5.0(1.2)	4.6(1.7)	0.2(1.9)
HISPANIC	8.8(1.7)	4.2(2.7)	10.7(2.4)	11.6(2.1)	2.8(2.7)	7.4(3.4)	0.8(3.2)
OTHER	20.5(4.9)	23.4(11.1)	27.1(5.8)	30.1(5.0)	9.6(7.7)	6.7(12.6)	3.0(8.3)
REGION							
NORTHEAST	28.9(1.1)	25.8(3.1)	30.5(2.9)	33.4(2.9)	4.6(3.1)	7.7(4.2)	2.9(4.1)
SOUTHEAST	17.2(1.5)	20.2(3.6)	23.3(3.0)	24.9(1.4)	7.7(2.1)	4.6(3.8)	1.5(3.3)
CENTRAL	29.2(1.6)	27.5(3.6)	30.1(2.3)	34.4(1.8)	5.2(2.4)	6.8(4.0)	4.3(2.9)
WEST	25.3(1.2)	23.1(4.6)	26.2(2.6)	31.7(1.7)	6.4(2.1)	8.6(4.9)	5.5(3.1)
TYPE OF COMMUNITY							
EXTREME RURAL	26.4(2.8)	18.3(5.6)	25.9(5.8)	33.8(4.3)	7.4(5.2)	15.5(7.0)	8.0(7.3)
DISADVANTAGED URBAN	6.1(1.2)	7.9(4.7)	7.3(2.2)	16.9(3.7)	10.8(3.9)	9.0(5.9)	9.6(4.3)
ADVANTAGED URBAN	42.7(2.6)	42.8(5.0)	43.3(3.3)	40.5(3.0)	-2.3(4.0)	-2.3(5.8)	-2.8(4.5)
OTHER	25.2(0.9)	24.0(2.5)	25.7(1.6)	31.0(1.2)	5.8(1.5)	7.0(2.8)	5.3(2.0)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	12.7(1.3)	8.6(4.0)	12.7(2.7)	16.3(3.5)	3.5(3.7)	7.7(5.3)	3.5(4.4)
GRADUATED H.S.	27.0(1.2)	20.3(3.1)	23.1(1.8)	27.3(1.8)	0.4(2.1)	7.0(3.5)	4.2(2.5)
SOME EDUC AFTER H.S.	39.4(1.5)	31.9(5.1)	38.5(3.7)	40.7(2.5)	1.3(3.0)	8.9(5.7)	2.2(4.5)
GRADUATED COLLEGE	35.1(1.2)	32.2(2.7)	36.8(1.8)	38.3(1.2)	3.2(1.7)	6.1(2.9)	1.6(2.2)
UNKNOWN	18.9(0.8)	16.1(2.1)	19.5(1.7)	23.9(1.3)	5.0(1.5)	7.8(2.5)	4.4(2.1)
TYPE OF SCHOOL							
PUBLIC	24.5(0.9)	23.9(2.1)	26.3(1.5)	30.3(0.8)	5.9(1.2)	6.4(2.2)	4.0(1.7)
PRIVATE	35.6(1.9)	28.2(5.6)	33.8(2.8)	37.2(3.0)	1.6(3.6)	9.0(6.4)	3.3(4.1)
QUARTILES							
UPPER	70.1(1.1)	79.1(3.0)	76.1(2.0)	80.2(1.5)	10.2(1.8)	1.1(3.3)	4.1(2.5)
MIDDLE TWO	16.2(0.6)	9.1(1.9)	16.9(1.5)	22.1(1.0)	5.9(1.1)	13.1(2.1)	5.2(1.8)
LOWER	0.2(0.1)	0.0(0.1)	0.2(0.2)	0.2(0.1)	0.0(0.2)	0.2(0.2)	0.0(0.2)

From Mullis et al., 1991, p. 229.

Table 12.3
NAEP 1990 Mathematics Trend Assessment-Age 9
Percentage of Students with Science Proficiency
At or Above Anchor Level 250

	1976-77	1981-82	1985-86	1989-90	DIFFERENCE 1977-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	68.0(1.1)	70.7(1.9)	72.0(1.1)	76.4(0.9)	8.4(1.4)	5.6(2.1)	4.3(1.4)
SEX							
MALE	69.5(1.2)	69.7(2.0)	74.1(1.4)	76.3(1.2)	6.8(1.7)	6.6(2.4)	2.2(1.8)
FEMALE	66.5(1.1)	71.8(2.2)	70.0(1.3)	76.4(1.1)	9.9(1.6)	4.6(2.4)	6.5(1.7)
RACE/ETHNICITY							
WHITE	76.8(0.7)	78.4(2.0)	78.9(1.0)	84.4(0.7)	7.6(1.0)	6.0(2.1)	5.4(1.2)
BLACK	27.2(1.5)	38.9(2.7)	46.2(2.3)	46.4(3.1)	19.2(3.5)	7.5(4.1)	0.2(3.9)
HISPANIC	42.0(3.1)	40.2(6.1)	50.1(3.7)	56.3(3.7)	14.3(4.8)	16.1(7.1)	6.3(5.2)
OTHER	62.0(6.9)	77.0(5.6)	67.4(4.1)	76.3(7.0)	14.3(9.8)	-0.7(8.9)	8.9(8.1)
REGION							
NORTHEAST	72.6(1.6)	71.5(3.5)	75.6(2.5)	78.2(2.3)	5.7(2.8)	6.8(4.2)	2.7(3.4)
SOUTHEAST	55.0(2.4)	63.0(3.6)	67.3(3.0)	68.4(2.4)	13.4(3.4)	5.4(4.3)	1.2(3.8)
CENTRAL	72.5(2.1)	75.4(3.7)	75.2(2.1)	81.9(1.3)	9.4(2.5)	6.5(3.9)	6.7(2.5)
WEST	68.5(2.3)	71.4(3.8)	69.9(3.0)	76.8(2.1)	8.3(3.1)	5.4(4.3)	6.9(3.6)
TYPE OF COMMUNITY							
EXTREME RURAL	72.6(3.1)	66.0(5.1)	73.4(3.8)	81.6(3.6)	9.0(4.8)	15.6(6.3)	8.3(5.3)
DISADVANTAGED URBAN	33.5(3.2)	42.5(7.4)	41.0(5.8)	56.5(6.7)	22.9(7.4)	14.0(10.0)	15.5(8.9)
ADVANTAGED URBAN	85.5(1.7)	88.3(4.0)	86.9(1.8)	87.6(1.7)	2.1(2.4)	-0.7(4.3)	0.7(2.4)
OTHER	68.5(1.3)	71.4(2.3)	71.0(1.4)	76.4(1.1)	7.9(1.7)	4.9(2.5)	5.4(1.8)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	49.8(2.4)	54.9(8.7)	55.1(3.6)	60.5(4.2)	10.7(4.8)	5.6(9.6)	5.4(5.5)
GRADUATED H.S.	71.2(1.4)	68.2(4.3)	69.1(1.9)	75.2(2.1)	4.0(2.5)	7.0(4.8)	6.1(2.8)
SOME EDUC AFTER H.S.	81.9(1.5)	80.7(2.4)	80.2(1.9)	81.3(2.3)	-0.6(2.8)	0.6(3.3)	1.1(3.0)
GRADUATED COLLEGE	77.7(1.2)	78.8(2.0)	80.4(1.2)	81.9(1.2)	4.2(1.7)	3.1(2.3)	1.5(1.7)
UNKNOWN	60.8(1.5)	60.9(3.6)	65.0(2.0)	71.3(1.4)	10.6(2.1)	10.4(3.8)	6.3(2.4)
TYPE OF SCHOOL							
PUBLIC	66.4(1.3)	69.5(2.1)	70.5(1.3)	75.5(1.0)	9.0(1.6)	6.0(2.3)	4.9(1.7)
PRIVATE	80.3(1.7)	82.6(3.5)	79.7(2.3)	83.6(2.4)	3.3(2.9)	1.0(4.2)	3.9(3.3)
QUARTILES							
UPPER	99.0(0.3)	100.0(0.3)	99.7(0.2)	99.9(0.1)	0.9(0.3)	-0.1(0.3)	0.2(0.2)
MIDDLE TWO	78.4(0.6)	85.6(1.9)	84.9(1.1)	90.0(0.8)	11.6(1.0)	4.4(2.0)	5.0(1.4)
LOWER	16.4(1.1)	11.6(2.0)	18.6(1.6)	25.6(2.0)	9.4(2.3)	14.0(2.8)	7.0(2.6)

From Mullis et al., 1991, p. 230.

Table 12.4
NAEP 1990 Mathematics Trend Assessment-Age 9
Percentage of Students with Science Proficiency
At or Above Anchor Level 300

	1976-77	1981-82	1985-86	1989-90	DIFFERENCE 1977-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	3.2(0.3)	2.3(0.7)	3.0(0.5)	3.1(0.3)	-0.1(0.4)	0.8(0.7)	0.1(0.6)
SEX							
MALE	3.7(0.3)	2.5(1.0)	3.8(0.6)	4.2(0.6)	0.5(0.6)	1.7(1.2)	0.4(0.8)
FEMALE	2.6(0.3)	2.1(0.6)	2.2(0.5)	2.0(0.3)	-0.6(0.4)	-0.1(0.7)	-0.2(0.6)
RACE/ETHNICITY							
WHITE	3.9(0.3)	2.9(0.9)	3.8(0.6)	3.9(0.4)	0.0(0.5)	1.0(0.9)	0.1(0.7)
BLACK	0.2(0.1)	0.1(0.4)	0.3(0.2)	0.1(0.2)	0.0(0.2)	0.1(0.5)	-0.1(0.3)
HISPANIC	0.3(0.4)	0.0(0.4)	0.2(0.2)	0.4(0.4)	0.0(0.6)	0.4(0.6)	0.2(0.5)
OTHER	1.9(1.0)	0.0(1.0)	2.1(1.1)	3.2(1.5)	1.3(1.9)	3.2(1.9)	1.1(1.9)
REGION							
NORTHEAST	3.5(0.4)	2.6(1.2)	3.7(1.9)	3.4(0.7)	-0.2(0.8)	0.9(1.4)	-0.3(2.1)
SOUTHEAST	1.6(0.3)	1.4(0.5)	2.3(0.4)	2.2(0.7)	0.5(0.7)	0.7(0.9)	-0.2(0.8)
CENTRAL	3.8(0.5)	2.9(1.5)	3.2(0.8)	3.8(0.8)	-0.1(1.0)	0.9(1.7)	0.6(1.1)
WEST	3.2(0.5)	2.1(1.5)	2.7(0.9)	3.0(0.5)	-0.2(0.7)	0.9(1.6)	0.2(1.0)
TYPE OF COMMUNITY							
EXTREME RURAL	2.9(0.8)	0.4(0.8)	2.0(0.9)	3.3(1.2)	0.4(1.4)	2.9(1.4)	1.3(1.5)
DISADVANTAGED URBAN	0.4(0.3)	0.4(0.6)	0.2(0.6)	1.5(1.0)	1.1(1.1)	1.1(1.2)	1.3(1.2)
ADVANTAGED URBAN	7.3(1.3)	5.5(2.2)	6.7(1.0)	4.4(0.9)	-2.9(1.6)	-1.1(2.4)	-2.2(1.4)
OTHER	2.9(0.3)	2.3(0.8)	2.4(0.6)	3.0(0.3)	0.1(0.5)	0.7(0.9)	0.6(0.7)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	0.9(0.4)	0.2(0.4)	0.8(0.9)	0.5(0.5)	-0.5(0.6)	0.2(0.6)	-0.3(1.0)
GRADUATED H.S.	3.2(0.3)	1.8(1.4)	1.6(0.5)	2.0(0.6)	-1.2(0.7)	0.2(1.5)	0.4(0.8)
SOME EDUC AFTER H.S.	5.7(1.0)	2.4(1.8)	4.4(1.4)	5.4(1.3)	-0.3(1.6)	3.0(2.2)	1.0(1.9)
GRADUATED COLLEGE	5.4(0.7)	3.7(1.1)	5.0(1.0)	4.5(0.6)	-0.8(0.9)	0.8(1.3)	-0.5(1.2)
UNKNOWN	1.7(0.4)	0.8(0.5)	1.4(0.4)	1.6(0.5)	0.0(0.6)	0.8(0.7)	0.2(0.7)
TYPE OF SCHOOL							
PUBLIC	2.9(0.3)	2.3(0.7)	2.8(0.6)	3.0(0.4)	0.1(0.5)	0.7(0.8)	0.2(0.7)
PRIVATE	5.1(1.1)	2.1(1.2)	4.0(0.7)	3.9(1.0)	-1.3(1.4)	1.8(1.6)	-0.2(1.2)
QUARTILES							
UPPER	12.0(0.9)	9.1(2.3)	11.7(1.7)	12.1(1.3)	0.0(1.5)	2.9(2.6)	0.4(2.1)
MIDDLE TWO	0.3(0.1)	0.0(0.1)	0.1(0.1)	0.2(0.1)	-0.1(0.2)	0.2(0.2)	0.0(0.2)
LOWER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)

From Mullis et al., 1991, p. 231.

Table 12.5
NAEP 1990 Science Trend Assessment-Age 9
Percentage of Students with Science Proficiency
At or Above Anchor Level 350

	1976-77	1981-82	1985-86	1989-90	DIFFERENCE 1977-90	DIFFERENCE 1982-90	DIFFERENCE 1986-90
-- TOTAL --	0.1(0.0)	0.0(0.1)	0.1(0.1)	0.1(0.0)	0.0(0.0)	0.0(0.1)	0.0(0.1)
SEX							
MALE	0.1(0.0)	0.1(0.2)	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.1(0.2)	0.0(0.1)
FEMALE	0.1(0.0)	0.0(0.0)	0.1(0.1)	0.0(0.1)	-0.1(0.1)	0.0(0.1)	-0.1(0.2)
RACE/ETHNICITY							
WHITE	0.1(0.0)	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.0(0.1)	0.0(0.1)	-0.1(0.1)
BLACK	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
HISPANIC	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
OTHER	0.0(0.0)	0.0(0.0)	0.1(0.0)	0.1(0.0)	0.1(0.0)	0.1(0.0)	0.0(0.0)
REGION							
NORTHEAST	0.1(0.1)	0.0(0.1)	0.2(0.3)	0.0(0.3)	0.0(0.3)	0.0(0.3)	-0.1(0.4)
SOUTHEAST	0.0(0.0)	0.0(0.0)	0.1(0.0)	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.0(0.1)
CENTRAL	0.1(0.1)	0.0(0.3)	0.1(0.1)	0.1(0.1)	0.0(0.2)	0.0(0.3)	-0.1(0.2)
WEST	0.0(0.1)	0.1(0.1)	0.1(0.1)	0.1(0.1)	0.0(0.1)	0.0(0.1)	0.0(0.2)
TYPE OF COMMUNITY							
EXTREME RURAL	0.0(0.0)	0.0(0.0)	0.2(0.7)	0.0(0.7)	0.0(0.7)	0.0(0.7)	-0.1(1.0)
DISADVANTAGED URBAN	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
ADVANTAGED URBAN	0.2(0.2)	0.1(0.2)	0.3(0.2)	0.0(0.1)	-0.1(0.2)	-0.1(0.2)	-0.2(0.3)
OTHER	0.1(0.0)	0.0(0.1)	0.1(0.1)	0.1(0.0)	0.0(0.1)	0.0(0.1)	0.0(0.1)
PARENTS' EDUCATION LEVEL							
LESS THAN H.S.	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
GRADUATED H.S.	0.1(0.1)	0.0(0.1)	0.0(0.2)	0.0(0.2)	-0.1(0.2)	0.0(0.2)	0.0(0.2)
SOME EDUC AFTER H.S.	0.1(0.1)	0.0(0.1)	0.1(0.1)	0.1(0.1)	0.0(0.2)	0.1(0.2)	0.0(0.2)
GRADUATED COLLEGE	0.1(0.1)	0.1(0.2)	0.2(0.2)	0.1(0.1)	0.0(0.1)	0.0(0.2)	-0.1(0.2)
UNKNOWN	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
TYPE OF SCHOOL							
PUBLIC	0.0(0.0)	0.1(0.1)	0.1(0.1)	0.1(0.0)	0.0(0.0)	0.0(0.1)	0.0(0.1)
PRIVATE	0.2(0.2)	0.0(0.2)	0.2(0.2)	0.1(0.2)	-0.1(0.3)	0.1(0.3)	-0.1(0.3)
QUARTILES							
UPPER	0.2(0.1)	0.2(0.3)	0.4(0.3)	0.2(0.1)	0.0(0.2)	0.1(0.4)	-0.2(0.4)
MIDDLE TWO	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)
LOWER	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)	0.0(0.0)

From Mullis et al., 1991, p. 232.

Table 13

	Asian eighth graders	Hispanic eighth graders
LM status, student reported		
LM	73%	77%
Non-LM	27	23
LM students' English proficiency		
High	66	64
Moderate	29	32
Low	4	4
Proportions of students failing to achieve the basic test levels		
Reading achievement test		
High SES	12%	19%
Middle SES	27	27
Low SES	38	37
Non-LM students	23	30
LM students	24	31
High English proficiency	19	28
Moderate proficiency	33	34
Low English proficiency	63	69
Math achievement test		
High SES	14	22
Middle SES	25	34
Low SES	39	41
Non-LM students	27	36
LM students	23	[illegible]
High English proficiency	22	35
Moderate proficiency	25	37
Low English proficiency	24	58

From Bradby, 1992, p. viii.

Table 14
Teachers in public and private elementary and secondary schools, by selected characteristics: 1987-88

Selected characteristics	Total[1]	Percent of teachers, by highest degree earned						Percent of teachers, by years of full-time teaching experience			
		No degree	Associate	Bachelor's	Master's	Education specialist	Doctor's	Less than 3	3 to 9	10 to 20	Over 20
1	2	3	4	5	6	7	8	9	10	11	12
Public schools											
Total	2,323,204	0.2	0.4	52.2	40.0	6.3	0.9	8.0	26.0	44.5	21.4
Sex											
Men	681,161	0.6	1.2	44.2	44.9	7.5	1.6	6.2	19.5	44.3	29.9
Women	1,631,168	(2)	0.1	55.5	37.9	5.7	0.6	8.7	28.8	44.6	17.8
Race/ethnicity											
White	1,994,389	0.2	0.4	52.1	40.3	6.2	0.8	8.0	26.6	44.4	21.0
Black	187,836	(2)	(2)	49.7	42.4	0.6	(2)	6.1	19.4	46.3	28.2
Hispanic	67,084	(2)	(2)	84.5	29.9	6.7	(2)	11.9	33.2	40.9	13.9
Asian or Pacific Islander	20,709	(2)	(2)	52.8	28.7	13.5	(2)	11.2	22.1	43.0	23.7
American Indian or Alaskan Native	23,998	(2)	(2)	50.1	40.5	7.5	(2)	5.7	24.3	49.7	20.2
Age											
Less than 30	310,901	(2)	(2)	82.9	15.4	1.1	(2)	36.5	63.2	(2)	(2)
30 to 39	813,204	(2)	0.3	53.3	40.6	5.2	0.5	6.0	33.6	60.2	(2)
40 to 49	752,301	0.2	0.5	44.2	46.0	7.8	1.3	2.3	14.0	55.0	28.6
50 or more	416,857	0.5	0.8	42.3	45.5	9.3	1.6	1.2	5.7	27.9	65.0
Level											
Elementary	1,181,578	(2)	(2)	56.8	36.9	5.6	0.6	8.4	27.4	44.3	19.8
Secondary	1,141,626	0.4	0.9	47.3	43.2	7.0	1.3	7.6	24.6	44.7	23.0
Private schools											
Total	307,131	2.9	1.5	61.3	29.7	2.9	1.7	18.4	37.4	29.8	13.5
Sex											
Men	66,785	(2)	(2)	50.9	38.2	3.6	5.0	18.5	28.9	33.7	18.6
Women	239,975	3.2	1.7	64.2	27.4	2.7	0.8	18.4	39.8	28.8	12.1
Race/ethnicity											
White	281,152	2.9	1.3	61.2	30.3	2.7	1.6	18.4	37.7	30.2	13.8
Black	7,015	(2)	(2)	69.1	16.6	(2)	(2)	27.0	42.2	21.3	(2)
Hispanic	8,569	(2)	(2)	60.8	19.7	(2)	(2)	22.0	41.4	25.8	(2)
Asian or Pacific Islander	3,491	(2)	(2)	56.2	(2)	(2)	(2)	(2)	(2)	(2)	(2)
American Indian or Alaskan Native	2,747	(2)	(2)	93.7	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Age											
Less than 30	65,843	3.5	(2)	83.4	11.4	(2)	(2)	47.3	51.4	(2)	(2)
30 to 39	104,287	2.6	2.2	59.3	31.4	3.1	(2)	15.6	45.4	38.2	(2)
40 to 49	83,021	2.4	(2)	51.9	39.1	3.1	2.6	8.0	31.6	44.0	15.4
50 or more	49,378	3.3	(2)	52.4	34.7	5.1	(2)	4.0	11.1	27.5	56.8
Level											
Elementary	159,893	3.8	1.8	70.9	21.0	2.1	(2)	18.4	40.5	28.7	11.8
Secondary	147,238	1.9	1.1	50.9	39.2	3.7	3.1	18.5	34.0	31.0	15.4

[1] Total differs from data appearing in other tables because of varying survey processing procedures and time period coverages

[2] Too few sample cases (fewer than 30) for a reliable estimate

SOURCE: U.S. Department of Education, National Center for Education Statistics, "Schools and Staffing Survey, 1987–88." (This table was prepared June 1990.)

From National Center for Education Statistics, 1991, p. 73.

Table 15
Selected characteristics of public school teachers: Spring 1961 to spring 1986

Item	1961	1966	1971	1976	1981	1986
1	2	3	4	5	6	7
Number of teachers, in thousands	**1,408**	**1,710**	**2,055**	**2,196**	**2,184**	**2,207**
Sex (percent)						
Men	31.3	31.1	34.3	32.9	33.1	31.2
Women	68.7	69.0	65.7	67.0	66.9	68.8
Median age (years)						
All teachers	41	36	35	33	37	41
Men	34	33	33	33	38	42
Women	46	40	37	33	36	41
Race (percent)						
White	—	—	88.3	90.8	91.5	89.6
Black	—	—	8.1	8.0	7.8	6.9
Other	—	—	3.6	1.2	0.7	3.4
Marital status (percent)						
Single	22.3	22.0	19.5	20.1	18.5	12.9
Married	68.0	69.1	71.9	71.3	73.0	75.7
Widowed, divorced, or separated	9.7	9.0	8.6	8.6	8.5	11.4
Highest degree held (percent)						
Less than bachelor's	14.6	7.0	2.9	0.9	0.4	0.3
Bachelor's	61.9	69.6	69.6	61.6	50.1	48.3
Master's or specialist degree	23.1	23.2	27.1	37.1	49.3	50.7
Doctor's	0.4	0.1	0.4	0.4	0.3	0.7
College credits earned in last 3 years						
Percent who earned credits	—	—	60.7	63.2	56.1	53.1
Mean number of credits earned [1]	—	—	14	—	9	4
Median years of teaching experience	11	8	8	8	12	15
Teaching for first year (percent)	8.0	9.1	9.1	5.5	2.4	3.1
Average number of pupils per class						
Elementary teachers, not departmentalized	29	28	27	25	25	24
Elementary teachers, departmentalized	—	—	25	23	22	—
Secondary teachers	28	26	27	25	23	25
Mean number of students taught per day by secondary teachers	138	132	134	126	118	94
Average number of hours in required school day	7.4	7.3	7.3	7.3	7.3	7.3
Average number of hours per week spent on all teaching duties.						
All teachers	47	47	47	46	46	49
Elementary teachers	49	47	46	44	44	47
Secondary teachers	46	48	48	48	48	51
Average number of days of classroom teaching in school year	—	181	181	180	180	180
Average number of nonteaching days in school year	—	5	4	5	6	5
Average annual salary as classroom teacher	[2]$5,264	$6,253	$9,261	$12,005	$17,209	$24,504
Total income, including spouse's (if married)	—	—	$15,021	$19,957	$29,831	$43,413
Willingness to teach again (percent)						
Certainly would	49.9	52.6	44.9	37.5	21.8	22.7
Probably would	26.9	25.4	29.5	26.1	24.6	26.3
Chances about even	12.5	12.9	13.0	17.5	17.6	19.8
Probably would not	7.9	7.1	8.9	13.4	24.0	22.0
Certainly would not	2.8	2.0	3.7	5.6	12.0	9.3

[1] Measured in semester hours.
[2] Includes extra pay for extra duties.
—Data not available.

NOTE —Data are based upon sample surveys of public school teachers. Data differs from figures appearing in other tables because of varying procedures and time period coverages. Because of rounding, percents may not add to 100.0.

SOURCE National Education Association, *Status of the American Public School Teacher 1985–86* (Copyright © 1987 by the National Education Association. All rights reserved.) (This table was prepared July 1987.)

From National Center for Education Statistics, 1991, p. 75. 153

Table 16
Federal Resources[1] for Programs that Improve the Education/Provide Services during the Preschool Years, School Years, and Post High School Years

PROGRAM TYPE	CURRENT $ IN MILLIONS			CHANGE 1989 – 1991		
	FY 1989	FY 1990	FY 1991	CURRENT DOLLARS %	CONSTANT DOLLARS[3] $ IN MILLIONS	CONSTANT DOLLARS[3] %
Preschool Years	9,155	11,119	14,200	55%	4,153	41%
School Years	15,203	16,616	18,537	22%	1,851	11%
Post-High School Years	21,868	23,157	24,770	13%	770	3%
Other[2]	1,060	1,094	1,242	17%	79	7%
TOTAL	47,286	51,986	58,749	24%	6,854	13%

[1]Figures rounded to nearest $1 million.
[2]A residual category that captures those programs/activities which do not fitr into one of the three age categories but provide general support related to the National Education Goals.
[3]In 1991 dollars; see Appendix B.

From National Education Goals Panel, 1991, p. 196.

Table 17
Major Federal Programs[1] that Improve the Education/Provide Services during the Preschool Years

PROGRAM[2]	CURRENT $ IN MILLIONS[3]			CHANGE 1989 – 1991			SERVICE LEVELS
	FY 1989	FY 1990	FY 1991	CURRENT DOLLARS %	CONSTANT DOLLARS[4] $ IN MILLIONS	CONSTANT DOLLARS[4] %	
Medicaid for Children (HHS)	2.731	3.614	4.729	73%	1.732	58%	4.8 million young children received Medicaid cards (1990)
WIC (Agriculture)[5]	1.829	2.126	2.350	28%	343	17%	1.9 million pregnant women & infants; 2 million children (89)
Head Start (HHS)	1.235	1.552	1.952	58%	597	44%	596.295 children (1991)
CACFP (Agriculture)[5]	677	814	1.024	51%	281	38%	1.3 million children (1989)
Foster Care (HHS)	440	390	742	61%	259	54%	45.691 avg monthly case load (1990)
Chapter 1 (Education)	494	583	682	35%	140	23%	407.186 children (1988-1989)
MCH Block Grant (HHS)	554	554	587	6%	-21	-3%	N/A
Special Education (Education)	450	478	584	30%	90	18%	356.000 in preschool grant programs (90)
Family Support Payments for Day Care (HHS)[6]	17	135	480	2700%	461	2500%[6]	N/A
Childhood Immunization (HHS)	142	187	218	54%	62	40%	2 million children age 2 months thru kdgtn (1990)
Community & Migrant Health Centers (HHS)	184	190	198	8%	-4	-2%	400 clinics in 40 states & Puerto Rico (1990)
Indian Health Service (HHS)	112	141	173	54%	50	41%	130.000 children, 0-5 years old (1991)
Other[7]	290	355	481	66%	63	51%	N/A
TOTAL	9.155	11.119	14.200	55%	4.153	41%	N/A

[1]Program descriptions are in Appendix C.
[2]Complete Department/Agency titles are in Appendix D.
[3]Figures rounded to nearest $1 million. Tables may not total due to rounding.
[4]In 1991 dollars: see Appendix B.
[5]Obligations.
[6]The program did not begin until 1989. The large increments in funding are due to increases in the number of participating states as the program becomes fully operational.
[7]Other federal programs that improve/provide services to preschool years funded for less than $100 million in FY 1991.

From National Education Goals Panel, 1991, p. 199.

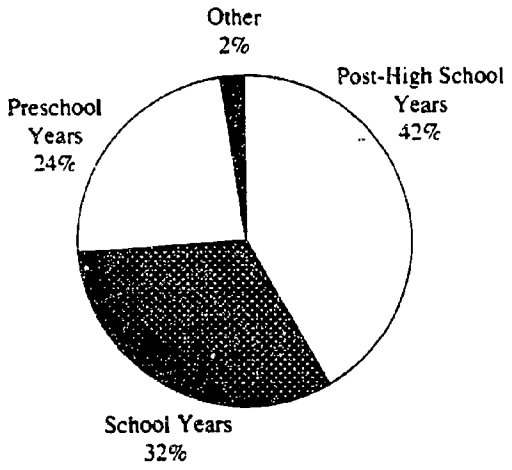
Table 18
Major Federal Programs[1] that Improve Education/Provide Services during the School Years

PROGRAM	CURRENT $ IN MILLIONS[2]			CHANGE 1989 – 1991			SERVICE LEVELS
	FY 1989	FY 1990	FY 1991	CURRENT DOLLARS %	CONSTANT DOLLARS[3] $ IN MILLIONS	CONSTANT DOLLARS[3] %	
Chapter 1 (Education)	4.026	4.721	5.466	36%	1.048	24%	4.650.230 students grades 1-12 (88-89)
School Meals Programs (Agriculture)[4]	3.762	4.007	4.271	14%	142	3%	24.4 million lunches & 4.4 million breakfasts daily; 1.7 million summer meals; 183 million 1/2 pts of milk (1991)
Special Ed. Basic State Grants (Education)	1.366	1.420	1.705	25%	206	14%	4.097.837 children served (1991)
Classroom Instruction (Defense)	845	885	998	18%	71	8%	191.955 students (Sept. 1990)
Job Corps (Labor)	326	353	381	17%	23	6%	27.459 16- & 17-yr-olds completed program (7/89 - 6/90)
Impact Aid Grants (Education)	708	717	741	5%	-36	-5%	N/A
JTPA Summer Jobs (Labor)	709	700	683	-4%	-95	-12%	466.006. 14-17-yr-olds (1990)
Vocational Ed. Basic State Grants (Education)	503	515	518	3%	-34	-6%	97% of all high school students enrolled in at least 1 course (1989)
Drug-free Schools (Education)	323	504	553	71%	199	56%	78% of nation's LEA receive program funds (1988-1989)
Chapter 2 (Education)	463	457	450	-3%	-58	-11%	99% of nation's schools received program funds (84-85)
JTPA II-A (Labor)	286	279	285	0%	-29	-9%	43.841. 14-15-yr-olds (1989)
CN Commodities[4] (Agriculture)	183	218	259	42%	58	29%	N/A
Eisenhower Math/ Science (Education)	128	127	200	56%	60	42%	1/3 of all math/science teachers benefit annually
BIA Indian Schools (Interior)	162	170	192	19%	14	8%	40.841 students (1991)
Bilingual Education (Education)	100	103	109	9%	-1	-1%	281.322 students (1990)
Vocational Rehabilitation State Grants (Education)	116	122	131	13%	4	3%	4.690 served. under 18 yrs. old (1990)
Magnet Schools (Education)	114	113	110	-4%	-15	-12%	54 school districts in 25 states funded (1990)
Other[5]	1.084	1.205	1.485	37%	296	25%	N/A
TOTAL	15.203	16.616	18.537	22%	1.851	11%	N/A

[1]Program descriptions are in Appendix C. Complete Department/Agency titles are in Appendix D.
[2]Figures rounded to nearest $1 million. Tables may not total due to rounding.
[3]In 1991 dollars; see Appendix B.
[4]Obligations.
[5]Other federal programs that improve/provide services during the school years funded for less than $100 million in FY 1991

From National Education Goals Panel, 1991, p. 201

Figure 17



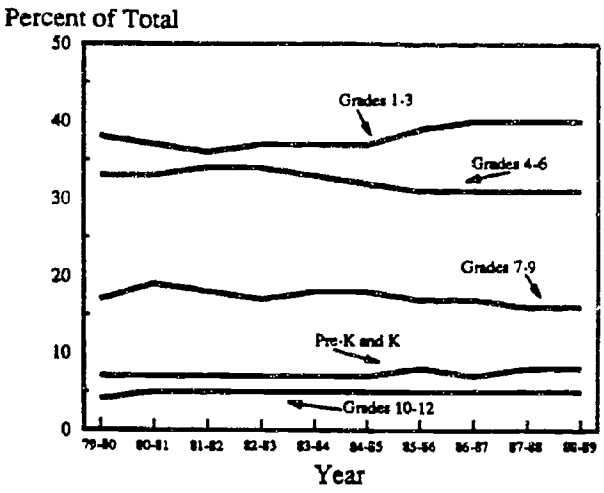
Proportion of 1991 federal resources provided for programs that improve the education/provide services during preschool years, school years, and post-high school years.

From National Education Goals Panel, 1991, p. 197.

Figure 18
Percent of Chapter 1 Participants, by Grade Span 1979-80 through 1988-89

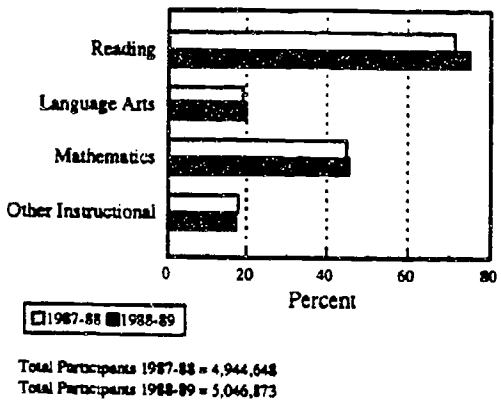
Figure 1.4

Percent of Chapter 1 Participants, by Grade Span 1979-80 through 1988-89



From Sinclair and Gutmann, 1991, p. 10.

Figure 19
Percent of Chapter 1 Participants, Served by Instructional Service Area 1987-88 and 1988-89



Total Participants 1987-88 = 4,944,648
Total Participants 1988-89 = 5,046,873

From Sinclair and Gutmann, 1991, p. 15.

Figure 20
Percent of Title 1/Chapter 1 Students and all Students with Various Characteristics

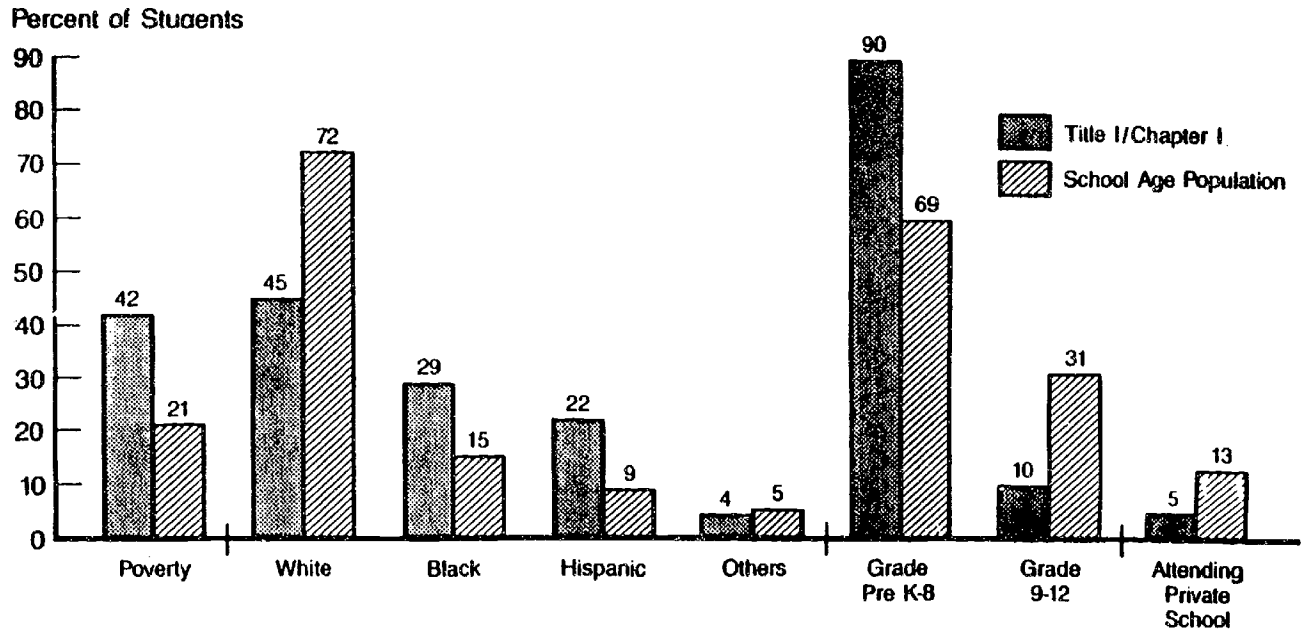


FIGURE READS: "Among Title I students in 1976-77, 42 percent were poor. Among the student population in general in 1976-77, 21 percent were poor."

From Kennedy, Jung, & Orland, 1986, p. 71.

Figure 21
Settings in Which Chapter 1 Reading and Mathematics are Provided by Public Schools, as Reported by School Principals, 1985-86.

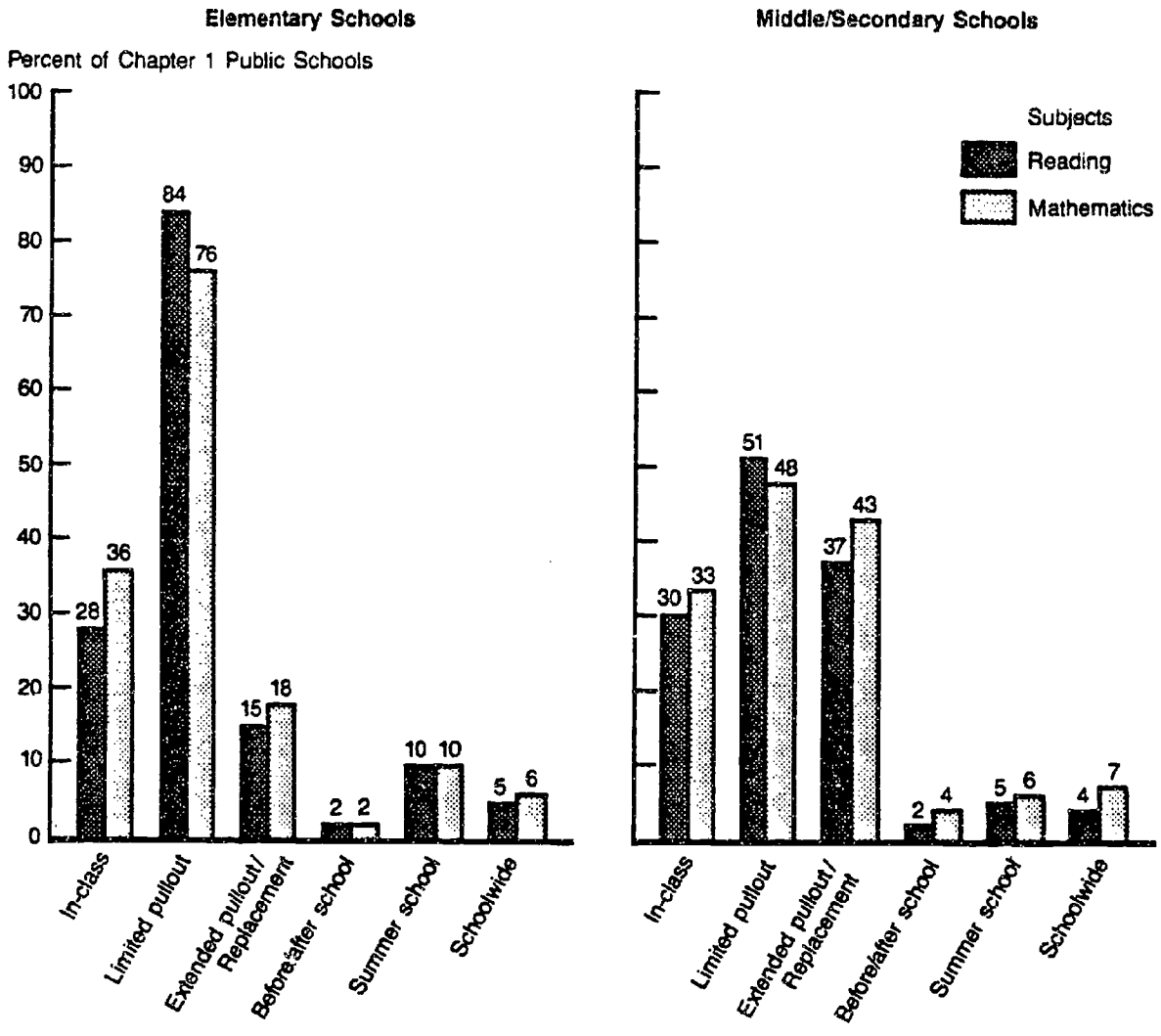


Figure reads: Of all public elementary schools that offer Chapter 1 reading instruction, principals in 28 percent report use of an in-class setting to teach Chapter 1 reading.

From Birman et al., 1987, p. 63.

Table 19
Growth of Three Groups of Students Participating in the Sustaining Effects Study, 1976-77
(Expressed in Standard Deviation Units)

	Representative Sample	Title I Students	Needy Students With No CE
Reading			
Grade 1	1.98	1.79	1.60
2	.87	.85	.77
3	.61	.64	.53
4	.46	.50	.49
5	.42	.38	.34
6	.37	.37	.37
Math			
Grade 1	1.75	1.76	1.40
2	1.24	1.19	1.04
3	1.21	1.13	1.03
4	.84	.90	.79
5	.70	.68	.55
6	.58	.64	.49

1/ All gains are converted to standard deviation units, using the standard deviation of the Fall scores of the Representative Samples.

From Kennedy, Birman, & Demaline, 1986, p. 31.

Figure 22
Reading and Mathematics Achievement of Students Receiving and Not Receiving Compensatory Education, Sustaining Effects Study, 1976-77.

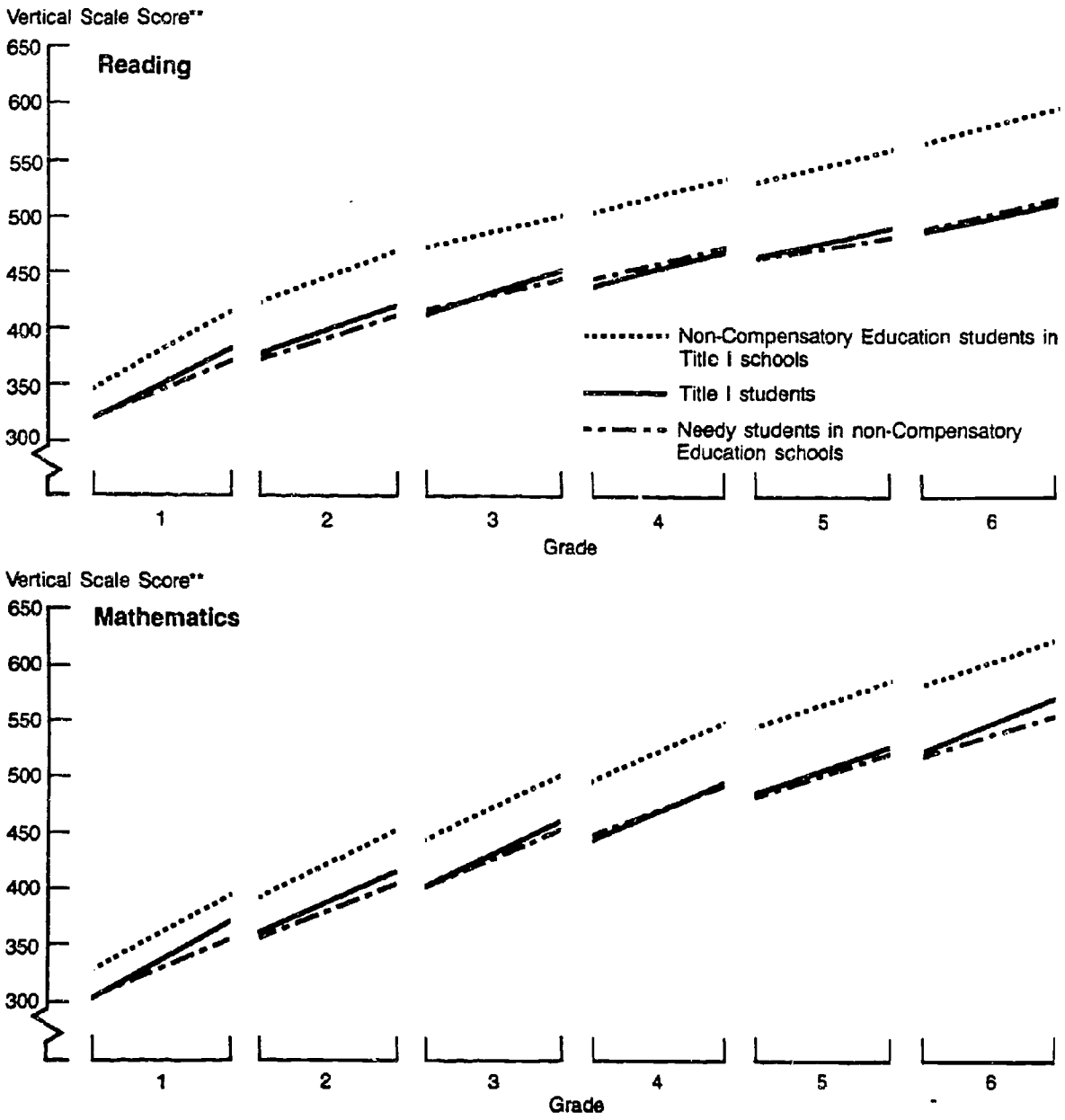
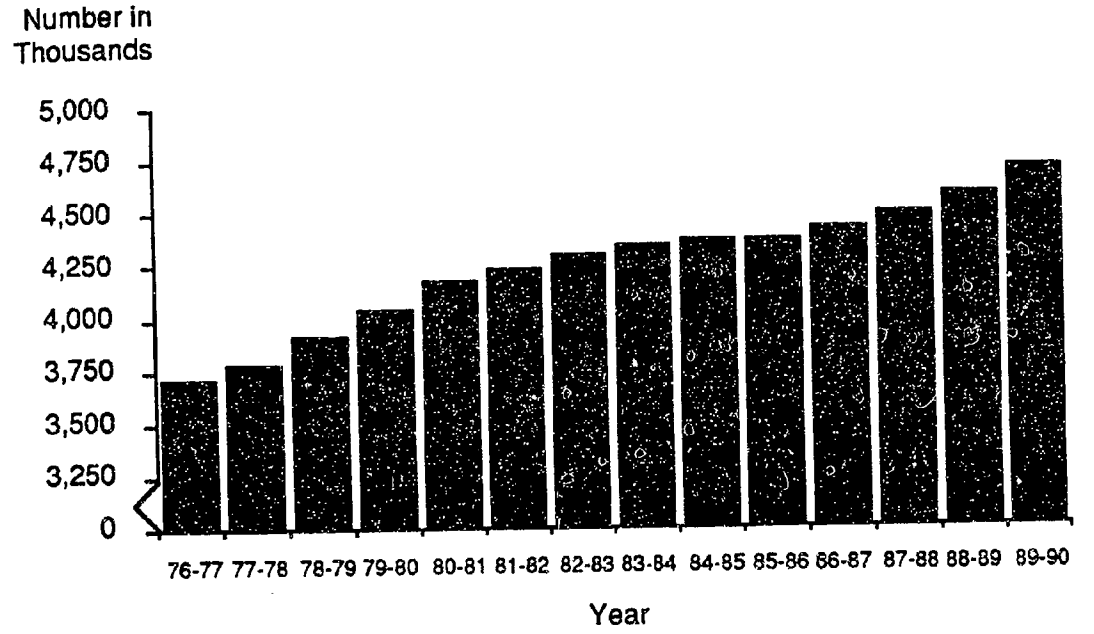
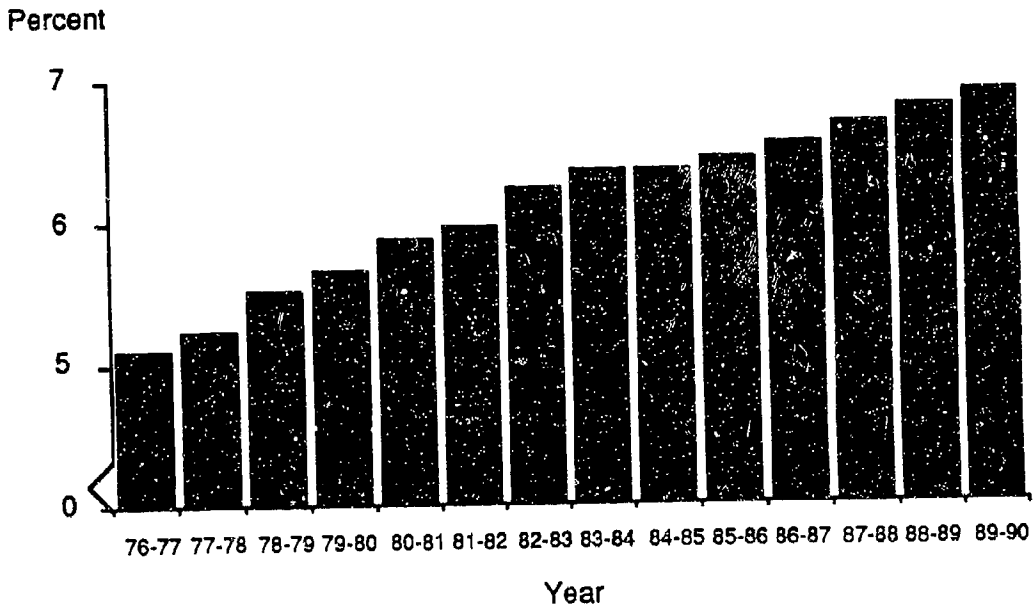


Figure reads: The vertical scale scores of Title I first-grade students for reading and mathematics increased more from the fall to the spring than did those of similar students not enrolled in Title I schools, yet Title I first graders started behind regular first graders in Title I schools who did not receive Chapter I and failed to catch up by the spring.

From Kennedy, Birman, & Demaline, 1986, p. 34.

Figure 23
Number and Percentage of Students Served Under Chapter 1 of ESEA (SOP) and IDEA, Part B School Year 1976-77 through 1989-90





NOTE: The figures represent children birth through 20 years old served under Chapter 1 and children 3 through 21 years old served under Part B. For 1988-89 and 1989-90, the figures represent children birth through age 21 served under Chapter 1.

From U.S. Office of Special Education, 1991, p. 5.

Table 20
Percent of Children Served in Educational Programs for the Handicapped

Type of Handicap	Percent of Children Aged 0-21 Served			
	1976-77	1980-81	1984-85	1988-89
All Conditions	8.33	10.12	11.00	11.30
Learning Disabled	1.80	3.57	4.67	4.94
Mentally Retarded	2.16	2.03	1.77	1.40
Emotionally Disturbed	0.64	0.85	0.95	0.94
Speech Impaired	2.94	2.85	2.87	2.41
Other (deaf, blind,	0.81	0.83	0.73	0.64

Source: Adapted from the U.S. Department of Education, Office of Educational Research and Improvement NCES 91-660 (1990), Digest of Education Statistics 1990.