

A Policy Information Memorandum

Subject: The Effect of Class Size on Achievement: What the Research Says

From: Harold Wenglinsky

Introduction

Across the country, a bipartisan effort has pushed class size reductions to the top of the national education agenda, leading many policy-makers to wonder what hiring more teachers buys the American people. President Clinton, in his "state of the union" address, proposed to spend \$1.1 billion this year, with an additional \$11 billion over the next six years to reduce class size in elementary school to 18 students per teacher. In California this year, the Republican governor proposed to spend \$1.5 billion to reduce fourth-grade classes to 20 students or less after having done so for 834,000 students in kindergarten through third grade during the 1996-1997 academic year. And in Pennsylvania, a report from its bipartisan legislative commission on urban school restructuring recently recommended capping class sizes in kindergarten through grade 3 in urban districts at 20 students per teacher.

The notion underlying all of these initiatives is that smaller classes will improve student performance. Yet, political leaders wonder, does the research really provide empirical evidence of this notion, or will the purchase of more teachers be a waste of money?

What the Research Says

The empirical evidence is clear: smaller classes can mean higher levels of student achievement, at least in the elementary school grades, and particularly for disadvantaged students. The two major pieces of research on this issue -- a recent national study of 20,000 students in fourth and eighth grades around the country and a state study of 7,000 students in Tennessee -- found that students in small classes performed substantially better on tests in various subjects than their counterparts in large classes.

The national study (*When Money Matters*) by the Policy Information Center:

- Covered 10,000 fourth graders in 203 school districts across the country and 10,000 eighth graders in 182 school districts across the country, making it the first study of class size since 1966 to use a national sample.
- Matched students' scores on the National Assessment of Educational Progress (NAEP) mathematics assessment for 1992 to class sizes and other factors that might influence test scores, such as student socioeconomic status, educational expenditures, and regional cost of living.

- Defined small classes as those of less than 20 students and large classes as those of more than 20 students.

When Money Matters found that:

- Students in small classes performed better than students in large classes for both grade levels, even taking into account student demographics, the overall resource levels, and cost of living.
- Gains were larger for fourth graders than for eighth graders. Fourth graders in small classes were one-third of a grade level ahead of their counterparts in large classes. The difference for eighth graders was one-eighth of a grade level. These gains mean that a fourth grader in a small class could be expected to progress 33 percent more quickly than he or she would have in a large class, and that an eighth grader in a small class could be expected to progress 12.5 percent more quickly than he or she would have in a large class.
- The gains were larger for inner-city students than for any other group. For fourth graders in inner cities, the difference was three-quarters of a grade level, meaning that an inner-city student in a small class could be expected to progress 75 percent more quickly than he or she would have in a large class.

The state study (Project STAR):

- Covered 7,000 students in grades K to 3 in 80 schools. Students were randomly placed in small and large classes, making the study the first and only statewide randomized experiment in class size research.
- Measured differences in student scores on tests in mathematics, reading, and writing, both while students were divided into small and large classes (grades K to 3) and after they had been mixed back together (grades 4 to 8).
- Defined small classes as those with 13-17 students and large classes as those with 22-27 students.

Project STAR found that:

- Students in small classes performed better than students in large classes in each grade from kindergarten through third. These differences remained even through eighth grade, four years after students in small classes had been placed in regular classes.
- The gains were larger for minority students than for white students.

Opposing Views

A few researchers have suggested that the evidence on class size is more ambiguous. Gene Glass and Mary Lee Smith, in 1979, and Allan Odden, in 1990, found that studies of class size indicate achievement gains for only *very* small classes (i.e. less than 15 students). These reviews of the research, however, predated the findings of *When Money Matters* and Project STAR,

and the two studies addressed methodological shortcomings of the earlier work.

One researcher has suggested that there is no relationship whatsoever between class size and student achievement. Eric Hanushek, most recently in a paper released in response to President Clinton's initiative, has made the following points:

- In a review of largely the same studies reviewed by Allan Odden in 1990, Hanushek again found the class size - achievement link to be weak. Yet, as was the case with Odden's review, the Hanushek review did not take into account the methodological advances made by Project STAR or *When Money Matters*.
- In discussing Project STAR, Hanushek pointed out that differences in test scores between small and large classes did not grow over the years; they manifested themselves at the end of kindergarten and remained constant through eighth grade. He concluded from this that class size reductions would not make a difference except, perhaps, in kindergarten.

It might be countered, however, that the gains in kindergarten through third grade remained constant despite new students being added to the classes each year. Many students, for instance, do not even begin school until first grade, and these students experienced the same kinds of gains as the kindergartners had in their first exposure to small classes. Also, the persistence of the gains through four years of large classes (between the fourth and eighth grades) should suggest the effectiveness of the intervention; many early interventions are criticized because their effects dissipate over the years, which did not happen in this case.

- Hanushek made no mention of *When Money Matters*.

In Sum

The two major studies on class size support the notion that class size initiatives will improve student performance. Not only did the studies find that students in small classes perform better than students in large classes, they also found that the effect is most pronounced for students in the elementary grades in classes of less than 20 students, which is consistent with the targets of most of the class size proposals. It should be noted, however, that this conclusion is also based upon my assessment of the methodological rigor of the earlier studies. Thus, while the perspective presented here is that class size reductions will be effective, the reader is encouraged to consult more detailed discussions of this question. A few such resources are provided below.

For Further Reading

Harold Wenglinsky, *When Money Matters: How Educational Expenditures Improve Student Performance and How They Don't*, Policy Information Perspective. Princeton, NJ: Policy Information Center, Educational Testing Service, April 1997. Available from Educational Testing Service's Policy Information Center for \$9.50 by calling (609) 734-5694 or e-mailing pic@ets.org.

Eric Hanushek, *The Evidence on Class Size*. 1998
(www.edexcellence.net/library/sunhanu.html).

Alan B. Krueger, *Experimental Estimates of Educational Production Functions*. NBER Working Paper. Cambridge, MA: 1997.

Allan Odden, "Class Size and Student Achievement: Research-Based Policy Alternatives," *Educational Evaluation and Policy Analysis*, 12 (2), 213-227, 1990.

Gene Glass and M.L. Smith, "Meta-analysis of Research on Class Size and Achievement," *Educational Evaluation and Policy Analysis*, 1 (1), 2-16, 1979.