

When does intervention count?

The beneficial relationship between early educational intervention and contemporaneous test scores is well known among educators, economists, and policymakers. Numerous studies have confirmed increases in children's test scores during participation in federal programs such as Head Start and Early Head Start and in a spate of state-sponsored programs. But a key question remains largely unanswered: do short-term improvements in test scores from various early childhood interventions translate into long-term improvements in well-being? In a working paper titled "Experimental Evidence on the Effect of Childhood Investments on Postsecondary Attainment and Degree Completion" (National Bureau of Economic Research, Working Paper 17533, October 2011, <http://papers.nber.org/papers/w17533>), Susan Dynarski, Joshua M. Hyman, and Diane Whitmore Schanzenbach provide a partial answer to this question. Lamenting the several studies that have produced answers, but not without a number of confounding variables, these authors pick out one specific intervention—small class size—and trace its effect on later educational attainment in the form of, foremost, college attendance, but also degree completion and field of study.

To identify the effect of elementary-school class size on postsecondary educational attainment, Dynarski, Hyman, and Schanzenbach analyzed college outcome data for students who had been in the Student/Teacher Achievement Ratio program (Project STAR), an early intervention program established in Tennessee. These early elementary school students, now in their thirties, had been randomly assigned to

smaller or larger classes, and the authors matched the students' contemporaneous test results with data from the National Student Clearinghouse, a database that covers about 90 percent of U.S. college students.

In the main thrust of the study, the authors find that attending a small class in the early elementary grades produces a statistically significant increase of 2.7 percentage points in the likelihood of attending college. This result appears to refute the consistent finding of other research that students in the STAR program who are assigned to small classes experience contemporaneous test score gains of about a fifth of a standard deviation but the gains disappear after third grade, when the program ends. Instead, Dynarski, Hyman, and Schanzenbach show that either whatever improvement is lost after third grade is regained by the time the students are of college age or the research indicating that the gains disappear is flawed.

But that is not all. The authors also find several statistically significant improvements in the likelihood of subsequent college attendance among various populations: college attendance rose by 5.8 percentage points among Black students, 4.4 percentage points among students who were eligible for a free school lunch at the time they were in the STAR program, 3.2 percentage points among boys (twice as much as that among girls), and, perhaps most important of all, 11 percentage points among those identified as least likely to attend college. These improvements signal the policy consideration that it may be cost effective to offer small class sizes to all elementary school students, and the authors investigate that possibility. Unfortunately, their analysis demonstrates that the cost of achieving the gains mentioned is, in many cases, high

and even prohibitive. However, in some cases—most noteworthy, Head Start—the authors consider the cost to be reasonable and may even deem it inexpensive.

Another finding that emerges from the authors' analysis is that the gains due to small classes are not limited to college attendance: having been in small classes in elementary school increases the likelihood, not just of attending college, but of subsequently earning a degree, by a marginally significant 1.6 percentage points across the entire sample and a highly significant 4.2 percentage points among those judged least likely to earn a college degree. Moreover, although small classes appear to have no effect on students' subsequent choices to attend a higher quality college across the entire sample, a 6.2-percentage-point increase was found among those deemed least likely to attend such a college. Similarly, small classes increased the likelihood of earning a degree in one of the high-paying fields of science, technology, engineering, mathematics, business, and economics by 1.3 percent (statistically significant at $p = .05$) among those with the lowest probability of completing any college degree, but had no effect on the overall sample.

In sum, besides establishing the foregoing specific findings, the authors have shown, more generally, that "the short-term effect of a small class on test scores is an excellent predictor of adult educational attainment. In fact, the effect of small classes on college attendance is *completely captured* [italics added] by their positive effect on contemporaneous test scores." This finding is in direct contrast to those of other researchers, which, though also establishing a general linkage between short- and long-term effects, cannot single out *which particular* short-term effects influence which long-term ones. □