

Smaller Classes Yield Higher Test Scores among Young Children

By Marianne Page, UC Davis and Erika Jackson, UC Office of the President

Smaller classes help students, many argue, especially those most “at risk.” Research shows that on average this is true. However, when “risk” is defined beyond ethnicity or socioeconomic status, the picture of who most benefits becomes less clear.

In a recent study, Center for Poverty Research Deputy Director Marianne Page, and Erika Jackson a former graduate student in Sociology at UC Davis, find that smaller classes yield the highest test-score increases among high achievers, but also that African American children at nearly every test score percentile benefit most.

Key Findings

- Gains in test scores from smaller class sizes are largest for the highest-scoring students.
- Differences in test scores at nearly every percentile are larger for African American children than for white children.
- Policymakers should think carefully about the definition of “at risk” when evaluating the distributional effects of education policies.

As education policies go, class-size reduction has been among the most widely supported policies in the U.S. These policies have often been formulated under the auspices of improving educational opportunities for disadvantaged students.

During the 2006-07 school year, California dedicated over \$1.7 billion to keep K-3 classes to no more than 20 students. At the federal level, the Clinton administration’s 1999 budget proposal included \$12 billion to reduce class sizes. The Tennessee STAR (Student-Teacher Achievement Ratio) experiment was commissioned by the Tennessee state legislature from 1985-89. It involved over 11,000 elementary school students. Most analyses of Project STAR conclude that smaller classes increase average test scores.

These studies do not focus on low-achieving students per se. Instead, they focus on subgroups that typically have low achievement, such as minorities and children from low-income families. One problem with this approach is that the impact of class-size reduction policies may vary more within subgroups than across subgroups.

To understand how education policies affect children at different achievement levels is critical to answering one of the center-stage questions in education policy: how can resources be optimally allocated so as to increase achievement for students at risk of failure without compromising the learning opportunities of more advantaged children?

About the Center

Over the past 50 years, the U.S. has experienced a rising standard of living without reducing the fraction of the population that live in poverty. In response to this, the Center for Poverty Research at UC Davis is one of three federally designated National Poverty Centers whose mission is to facilitate non-partisan academic research on poverty in the U.S., to disseminate this research, and to train the next generation of poverty scholars. Our research agenda spans four themed areas of focus:

- Labor Markets and Poverty
- Children and the Intergenerational Transmission of Poverty
- The Non-traditional Safety Net, focusing on health and education
- The Relationship Between Poverty and Immigration

The Center was founded in the fall of 2011 with core funding from the Office of the Assistant Secretary for Planning and Evaluation in the U.S. Department of Health and Human Services.

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Comparing achievement

Project STAR randomly assigned K-3 students at public schools to either a small class (13 to 17 students), a regular-size class (22 to 25 students), or a regular-size class with a full-time teacher's aide. The schools were large and small, urban and rural, and from wealthy and poor districts. As a result, the schools included in Project STAR are thought to include most of the educational conditions that exist in the U.S. This study focuses on children in kindergarten and first grade.

The measure of achievement is the Stanford Achievement Test that includes math, reading and word identification. For their analysis, the researchers combined all subject scores into a single composite score.

Rather than measure the average differences between small- and regular-sized classes, as most studies have done, this study measured the differences in test scores between small- and regular-sized classes by percentile. For example, the difference in test scores between the 10th percentile of students in small classes and the 10th percentile of students in regular-sized classes estimate the impact of class size for students at 10th percentile scores.

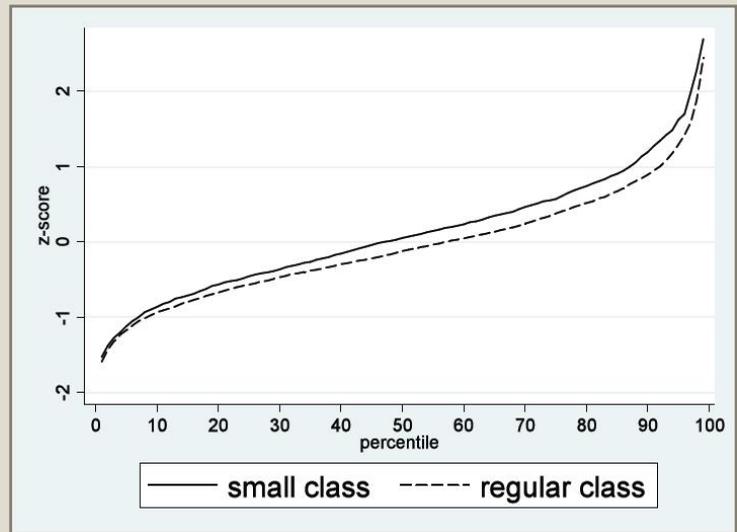
Real benefits in smaller classes

While students in smaller classes scored higher overall than those in regular-sized classes, the biggest differences was between students with the highest scores. Among kindergartners, students at the 90th percentile in a small class scored about 1/3 of a standard deviation higher than 90th-percentile students in regular classes. The differences at the 10th percentile are less than ten percent of a standard deviation.

Our estimates are consistent with earlier research findings that low-achievers do not benefit more than high achievers from smaller classes, but this study's findings are even stronger. We find that the gains to small-classes actually increase with achievement.

These findings seem to be at odds with earlier studies that found smaller classes most benefit disadvantaged children, specifically minorities and children from low-income families who typically score lower on standardized tests. By estimating the differences at all points in the test-score distribution, rather than comparing average differences in test scores between groups divided by ethnicity or socioeconomic status, the researchers found a more complicated picture.

This study found no benefits from smaller classes among low-income children in kindergarten or first grade. However, it did find larger benefits among African American children than among white children at nearly every point in the test-score distribution. In other words, the benefit among African



This figure shows the distribution of test scores for all students in small- and regular-sized kindergarten classes.

American children is nearly always more than the gain to white children.

Defining "at-risk" children

Why do high achievers benefit more from smaller classes? One hypothesis is that in small classes teachers are better able to identify high achievers and to use instructional approaches that work well for them. However, it is hard to imagine why this benefits high-achieving students more than low achievers.

One possibility is that high achievers are, on average, more motivated than low achievers, which allows them to take better advantage of targeted instruction. This possibility might be particularly salient if teachers in smaller classes spend less time dealing with disruptive behavior and have more time to devote to on-task learning opportunities.

This study's conclusions call into question how we define vulnerable students. This may have implications for how we evaluate education policies such as school accountability, voucher programs, and curricular development. As we see in the case of Tennessee STAR, we might draw different conclusions about who benefits if we use a broader definition of which students are "at risk."

Meet the Researchers

Marianne Page, is the Deputy Director of the Center for Poverty Research, and Professor of Economics at UC Davis. Her research focuses on intergenerational mobility and the impact of social programs on children's outcomes.

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