

Reference: Finn, J. D., Gerber, S. B., Achilles, C. M., & Boyd-Zaharias, J. (2001). The enduring effects of small classes. Teachers College Record, 103 (2), pp. 145-183.

STRUCTURED ABSTRACT

Background: Project STAR was the randomized-controlled experiment of class size in Tennessee where students were randomly assigned to small or regular class sizes in kindergarten in 1985 and then kept in those small or regular class sizes for four years through third grade. It is one of the most important educational investigations ever conducted to date in the United States. The quality, scale, and duration of Project STAR together constitute a definitive examination of the effects of small class size in the early grades. New analyses of Project STAR data make it possible to extend previous findings in order to assess the different impact of attending small classes for one to four years on short-term and long-term student achievement.

Purpose: To evaluate the differential effect of attending small classes in the early grades for one, two, three, or four years, both on short-term and long-term student achievement.

Setting: Approximately 80 schools in inner-city, urban, suburban, and rural districts throughout the state of Tennessee.

Participants: The first phase of the study began with a cohort of 6,325 students who started kindergarten in 1985. By the time the study's first phase ended four years later in 1989, 11,600 students had participated. Approximately one-third of the participating students were African-American. The second phase observed the school performance of these participants over time after they resumed elementary school under normal conditions (i.e., in regular size classes) in fourth grade through eighth grade.

Intervention: In the first phase of the study, called Project STAR, students and teachers were randomly assigned to one of three experimental conditions: small class size kindergarten (13 to 17 pupils), regular class size kindergarten (22 to 25 students), or regular class size kindergarten (22 to 25 students) with a teacher's aide. Each participating school had at least three classrooms in the appropriate grade (i.e., kindergarten in 1985, first grade in 1986) participating in Project STAR to represent each of the three experimental conditions, allowing within-school comparisons. Participating schools received funds for additional teachers and teacher aides, but had to supply the extra classrooms themselves and did not get additional financial support. Students in the small class size kindergarten subsequently had small classes (13 to 17 pupils) in first, second, and third grade over the four-year course of the study. Students in the small classes remained in those small classes all day and every day throughout the school year; there were no pull-out programs. Students in the regular class size kindergartens subsequently remained in regular size classes (22 to 25 students) in first, second, and third grades. In the second year of the study, all students in the regular size classes were re-randomized to regular size classes with or without a teacher's aide and then remained in those classroom conditions for the next three years. New teachers were assigned to each class each year in both small and regular class sizes. New special textbooks or curricula were not allowed to be introduced in the Project STAR classrooms during the study. Project STAR began in 1985 and concluded at the end of the school year in 1989.

The second phase of the Tennessee class size study, called the Lasting Benefits Study, did not feature a new intervention but rather continued the evaluation of the randomized-controlled class size intervention of Project STAR by observing the school performance of the participating students over time after they returned to regular size classes in fourth grade. This study followed student performance through eighth grade.

Research Design: Randomized-controlled field trial (Project STAR); Quantitative comparison follow-up study (Lasting Benefits Study).

Data Collection and Analysis: To assess the reading and math performance of participants in Project STAR, students took both a nationally-normed standardized test (i.e., the Stanford Achievement Test) in the spring of each school year and a state-specific curriculum-based test (i.e., the Tennessee Basic Skills First test). In the Lasting Benefits, students each year took another nationally-normed standardized test (i.e., the Comprehensive Tests of Basic Skills) as well as the Tennessee Basic Skills First tests in reading and math. Test data were analyzed using hierarchical linear modeling, a statistical procedure that takes into account that individual students are “nested” (or contained) within classes, and that classes are themselves “nested” within schools.

Findings: During the four-year course of Project STAR, students in the small size classes consistently showed substantial academic gains over their counterparts in the regular size classes. In kindergarten the average effect size of small classes on student achievement in reading and math was about 0.2; in first grade, about 0.3; in second grade, about 0.25; in third grade, about 0.19.

These data were analyzed again after classifying students by the number of years actually spent attending small classes. These findings showed a clear association between student achievement and number of years in a small class. In reading achievement, for example, the effect size of small classes at the end of first grade was 0.4 for students who had attended small classes for two years (i.e. kindergarten and first grade), compared to an effect size of 0.16 for first graders who had attended small classes for only one year. In second grade, the effect size on reading achievement was 0.36 for students who had attended small classes for three years; 0.24 for students who attended small classes for two years; and 0.12 for students who had attended small classes for one year. In third grade, the effect size on reading achievement was 0.32 for students who had attended small classes for four years; 0.24 for students who attended small classes for three years; and 0.14 for students who had attended small classes for two years. There was no significant difference in third grade in reading for students attending small classes for only one year and students in regular size classes.

The association between student achievement and number of years in a small class was consistent for every achievement test, including math and word study skills. In the analysis of data from the Lasting Benefits Study, a similar link was found in grades 4, 6, and 8 between student achievement and numbers of year attending a small class in the early grades. The largest observed effect size for small classes was for students who had been in small classes for four years, from kindergarten through third grade. For these students, the median

effect size of small classes was 0.29 in fourth grade and 0.21 in sixth and eighth grades. In other findings, the effect size in fourth grade of small classes for students who had been in small classes for three years was about 0.2; the effect sizes were smaller and nonsignificant for students who had been in small classes for only one or two years. In sixth grade, the effect size of small classes for students who had been in small classes for three years was about 0.14; in eighth grade, the corresponding effect size was 0.12.

In general, no academic benefits were found for students in regular classes with a teacher aide.

Conclusions: This study demonstrates that students who entered a small class in kindergarten or first grade and remained in a small class for at least three consecutive years on average had significant gains in academic achievement through at least eighth grade. It also shows that the number of years that students actually spent attending a small class is a crucial factor to consider when studying the impact of small class size in the early grades. Researchers who lump together students who attend small classes for short and long periods of time may fail to observe the significant and persistent effects of small class size on student achievement when students attend small classes for two or more consecutive years in the early grades. In addition, this study indicates that the age at which students enter small classes is an important consideration, with students who begin attending small classes in kindergarten or first grade achieving the greatest academic gains.