

## REL Southwest Ask A REL Response

May 2018

### Question:

*What current research exists regarding the effect of class size on learning?*

### Response:

Thank you for the question you submitted to our REL Reference Desk. We have prepared the following memo with research references to help answer your question. For each reference, we provide an abstract, excerpt, or summary written by the study's author or publisher. Following an established Regional Educational Laboratory (REL) Southwest research protocol, we conducted a search for research reports as well as descriptive study articles on current evidence-based class size effects on student learning. The sources included ERIC and other federally funded databases and organizations, research institutions, academic research databases, and general Internet search engines (For details, please see the Methods section at the end of this memo).

We have not evaluated the quality of references and the resources provided in this response. We offer them only for your reference. Also, we searched the references in the response from the most commonly used resources of research, but they are not comprehensive, and other relevant references and resources may exist. References provided are listed in alphabetical order, not necessarily in order of relevance.

### Research References

Babcock, P., & Betts, J.R. (2009). Reduced class distinctions: Effort, ability, and the education production function. *Journal of Urban Economics*, Vol. 65, 314–322.

<https://www.classsizematters.org/wp-content/uploads/2012/11/Babcock-and-Betts.pdf>

*From the abstract:* “Do smaller classes boost achievement mainly by helping teachers impart specific academic skills to students with low academic achievement? Or do they do so primarily by helping teachers engage poorly behaving students? The analysis uses the grade 3 to 4 transition in San Diego Unified School District as a source of exogenous variation in class size (given a California law funding small classes until grade 3). Grade 1 report cards allow separate identification of low-effort and low-achieving students. Results indicate that elicitation of effort or engagement, rather than the teaching of specific skills, may be the dominant channel by which small classes influence disadvantaged students.”

Bowne, J. B., Magnuson, K. A., Schindler, H. S., Duncan, G. J., & Yoshikawa, H. (2017). A meta-analysis of class sizes and ratios in early childhood education programs: Are thresholds of quality associated with greater impacts on cognitive, achievement, and socioemotional outcomes? *Educational Evaluation and Policy Analysis*, 39(3), 407-428.  
<http://journals.sagepub.com/doi/pdf/10.3102/0162373716689489>

*From the abstract:* “This study uses data from a comprehensive database of U.S. early childhood education program evaluations published between 1960 and 2007 to evaluate the relationship between class size, child-teacher ratio, and program effect sizes for cognitive, achievement, and socioemotional outcomes. Both class size and child-teacher ratio showed nonlinear relationships with cognitive and achievement effect sizes. For child-teacher ratios 7.5:1 and lower, the reduction of this ratio by one child per teacher predicted an effect size of 0.22 standard deviations greater. For class sizes 15 and smaller, one child fewer predicted an effect size of 0.10 standard deviations larger. No discernible relationship was found for larger class sizes and child--teacher ratios. Results were less clear for socioemotional outcomes due to a small sample.”

Dee, T. S. & West, M. R. (2011). The non-cognitive returns to class size. *Educational Evaluation and Policy Analysis*, v33(1), 23-46.

<https://www.classsizematters.org/wp-content/uploads/2011/04/The-Non-Cognitive>Returns-to-Class-Size.pdf>

*From the abstract:* “The authors use nationally representative survey data and a research design that relies on contemporaneous within-student and within-teacher comparisons across two academic subjects to estimate how class size affects certain non-cognitive skills in middle school. Their results indicate that smaller eighth-grade classes are associated with improvements in several measures of school engagement, with effect sizes ranging from 0.05 to 0.09 and smaller effects persisting 2 years later. Patterns of selection on observed traits and falsification exercises suggest that these results accurately identify (or possibly understate) the causal effects of smaller classes. Given the estimated earnings impact of these non-cognitive skills, the implied internal rate of return from an eighth-grade class-size reduction is 4.6% overall, but 7.9% in urban schools. (Contains 15 notes, 10 tables, and 2 figures.)”

Konstantopoulos, S., & Chung, V. (2009). What are the long-term effects of small classes on the achievement gap? Evidence from the lasting benefits study. *American Journal of Education*, v116(1), 25-154. [https://www.classsizematters.org/wp-content/uploads/2011/04/Konstantopoulos\\_20091.pdf](https://www.classsizematters.org/wp-content/uploads/2011/04/Konstantopoulos_20091.pdf)

*From the abstract:* “The findings on the social distribution of the immediate and lasting benefits of small classes have been mixed. We used data from Project STAR and the Lasting Benefits Study to examine the long-term effects of small classes on the achievement gap in mathematics, reading, and science scores (Stanford Achievement Test). The results consistently indicated that all types of students benefit more in later grades from being in small classes in early grades. These positive effects are significant through grade 8. Longer periods in small classes produced higher increases in

achievement in later grades for all types of students. For certain grades, in reading and science, low achievers seem to benefit more from being in small classes for longer periods. It appears that the lasting benefits of the cumulative effects of small classes may reduce the achievement gap in reading and science in some of the later grades.”

Krueger, A. B. (2003). Economic considerations and class size. *Economic Journal*, 113(485), F34-F63. <https://www.classsizematters.org/wp-content/uploads/2011/04/economic-considerations-and-class-size.pdf>

*From the abstract:* “This paper examines evidence on the effect of class size on student achievement. First, it is shown that results of quantitative summaries of the literature, such as Hanushek (1997), depend critically on whether studies are accorded equal weight. When studies are given equal weight, resources are systematically related to student achievement. When weights are in proportion to their number of estimates, resources and achievements are not systematically related. Second, a cost-benefit analysis of class size reduction is performed. Results of the Tennessee STAR class-size experiment suggest that the internal rate of return from reducing class size from 22 to 15 students is around 6%.”

Shin, Y. (2012). Do Black children benefit more from small classes? Multivariate instrumental variable estimators with ignorable missing data. *Journal of Educational and Behavioral Statistics*, 37(4). <https://www.classsizematters.org/wp-content/uploads/2014/08/do-black-children-benefit-more-from-small-classes.pdf>

*From the abstract:* “Does reduced class size cause higher academic achievement for both Black and other students in reading, mathematics, listening, and word recognition skills? Do Black students benefit more than other students from reduced class size? Does the magnitude of the minority advantages vary significantly across schools? This article addresses the causal questions via analysis of experimental data from Tennessee's Student/Teacher Achievement Ratio study where students and teachers are randomly assigned to small or regular class type. Causal inference is based on a three-level multivariate simultaneous equation model (SM) where the class type as an instrumental variable (IV) and class size as an endogenous regressor interact with a Black student indicator. The randomized IV causes class size to vary which, by hypothesis, influences academic achievement overall and moderates a disparity in academic achievement between Black and other students. Within each subpopulation characterized by the ethnicity, the effect of reduced class size on academic achievement is the average causal effect. The difference in the average causal effects between the race ethnic groups yields the causal disparity in academic achievement. The SM efficiently handles ignorable missing data with a general missing pattern and is estimated by maximum likelihood. This approach extends Rubin's causal model to a three-level SM with cross-level causal interaction effects, requiring intact schools and no interference between classrooms as a modified Stable Unit Treatment Value Assumption. The results show that, for Black students, reduced class size causes higher academic achievement in the four domains each year from kindergarten to third grade, while for other students, it improves the four outcomes except for first-grade listening in kindergarten and first grade only. Evidence

shows that Black students benefit more than others from reduced class size in first-, second-, and third-grade academic achievement. This article does not find evidence that the causal minority disparities are heterogeneous across schools in any given year. (Contains 3 figures, 4 tables, and 1 note.)”

## Additional Organization to Consult

Class Size Matters – <https://www.classsizematters.org/research-and-links/>

*From the website:* “Class Size Matters is a non-profit organization that advocates for smaller classes in NYC’s public schools and the nation as a whole... We are dedicated to providing information on the significant and wide-ranging benefits of smaller classes, particularly for at-risk children, to boost student learning, engagement, and graduation rates, and lower disciplinary referrals.”

This site provides bibliographies of seminal works, case studies and commissioned and peer-reviewed research reports conducted in the US and abroad, on class size effects.

## Methods

### Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

- Class size
- Class size + effects
- Class size + achievement
- Teacher-pupil ratio

### Databases and Resources

We searched ERIC for relevant, peer-reviewed research references. ERIC is a free online library of more than 1.6 million citations of education research sponsored by the Institute of Education Sciences (IES). Additionally, we searched Google Scholar and PsychInfo.

### Reference Search and Selection Criteria

When we were searching and reviewing resources, we considered the following criteria:

- *Date of the publication:* References and resources published from 2003 to present, were included in the search and review.
- *Search priorities of reference sources:* Search priority is given to study reports, briefs, and other documents that are published and/or reviewed by IES and other federal or federally funded organizations, academic databases, including ERIC, EBSCO databases, JSTOR database, PsychInfo, PsychArticle, and Google Scholar.

- *Methodology*: The following methodological priorities/considerations were given in the review and selection of the references: (a) study types—randomized control trials, quasi-experiments, surveys, descriptive data analyses, literature reviews, policy briefs, and so forth, generally in this order; (b) target population, samples (representativeness of the target population, sample size, volunteered or randomly selected, and so forth), study duration, and so forth; and (c) limitations, generalizability of the findings and conclusions, and so forth.

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This memorandum is one in a series of quick-turnaround responses to specific questions posed by stakeholders in the Southwest Region (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas), which is served by the Regional Educational Laboratory (REL) Southwest at AIR. This memorandum was prepared by REL Southwest under a contract with the U.S. Department of Education’s Institute of Education Sciences (IES), Contract ED-IES-91990018C0002, administered by AIR. Its content does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.