



EVIDENCE REVIEW

THE TRANSFORMATIVE POTENTIAL OF TUTORING FOR PREK-12 LEARNING OUTCOMES: LESSONS FROM RANDOMIZED EVALUATIONS

This publication summarizes a forthcoming academic review paper on tutoring, “PreK-12 Tutoring Programs and Student Learning Outcomes: A Systematic Review and Meta-Analysis of the Experimental Evidence,” by Andre Joshua Nickow (Northwestern University), Philip Oreopoulos (University of Toronto), and Vincent Quan (J-PAL North America, MIT).

OVERVIEW AND POLICY ISSUES

In the United States, millions of students are behind grade level. In 2019, only 41 percent of fourth graders were considered “proficient” in math. This figure drops to 34 percent by eighth grade. For reading, only 35 percent of fourth graders and 34 percent of eighth graders met or exceeded the 2019 proficiency benchmark.¹ These numbers are troubling as once students are behind, it can be difficult to catch up.

Falling behind in early years of schooling impacts many students into adulthood. Research has linked third grade reading proficiency with high school graduation rates, noting that students who are not reading proficiently in third grade are four times less likely to graduate high school than children with proficient reading skills.²

Poverty exacerbates these issues: students from low-income families are more likely to begin school already behind their more affluent peers³ and face challenges catching up.⁴ Further, school districts that serve large populations of students of color

and students from low-income families receive far less funding for student resources than those serving student communities who are predominantly white or affluent.⁵ Consequently, the United States persistently reports racial and income-based achievement gaps among students.

Among the most widespread and versatile educational tools, tutoring—supplemental one-on-one or small group instruction—has been promoted as an effective method for helping students learn, particularly those who have fallen behind. In this review, we summarize a recent meta-analysis of randomized evaluations of tutoring programs, focusing on literature from high-income countries. The meta-analysis finds that tutoring programs have consistently large, positive impacts on students across a wide range of program characteristics. The magnitude and consistency of the findings point to tutoring as one of the most agreed-upon and impactful tools available to educators for improving student learning. The following summary shares additional key findings and highlights areas for future inquiry.

KEY LESSONS

Across all studies included in this analysis, **tutoring programs consistently lead to large improvements in learning outcomes for students**, with an overall pooled effect size of 0.37 standard deviations. This impact translates to a student advancing from the 50th percentile to nearly the 66th percentile. Effect sizes greater than 0.3 standard deviations are considered to be large impacts, especially in the context of education interventions.

Tutoring programs led by **teacher or paraprofessional tutors are generally more effective** than programs that used nonprofessional (volunteer) or parent tutors. Paraprofessional tutors include, among others, school staff members, undergraduate students in education, and service fellows.

The effects of tutoring programs tend to be **strongest among students in earlier grades**, though a smaller set of programs at the secondary level were also found to be effective at improving learning outcomes.

While overall effects for math and reading tutoring programs are similar, **reading tutoring tends to be relatively more effective for students in preschool through first grade, while math tutoring tends to be more effective for students in second through fifth grade.**

Tutoring programs conducted during school tend to have larger impacts than those conducted after school. Many programs shown to have weaker effects used parents as tutors or took place in an after-school program. In these circumstances, it is difficult to ensure that tutoring actually occurs.

¹ The Nation's Report Card. "Results from the 2019 Mathematics and Reading Assessments" Accessed August 3, 2020. https://www.nationsreportcard.gov/mathematics/supportive_files/2019_infographic.pdf

² The Annie E. Casey Foundation. *Double Jeopardy: How Third Grade Reading Skills and Poverty Influence High School Graduation*. Baltimore: The Annie E. Casey Foundation, 2012. Accessed August 3, 2020. <https://www.aecf.org/resources/double-jeopardy/#summary>

³ Isaacs, Julia B. *Starting School at a Disadvantage: The School Readiness of Poor Children*, Brookings Institution. March 2012. Accessed August 11. <https://www.brookings.edu/research/starting-school-at-a-disadvantage-the-school-readiness-of-poor-children/#:~:text=Poor%20children%20in%20the%20United,a%2027%20percentage%20point%20gap>



METHODOLOGY

This publication reviews a meta-analysis of randomized evaluations on tutoring. A meta-analysis is an examination of data from a number of independent studies on a given subject in order to determine overall trends. This meta-analysis examines the data from 96 randomized evaluations (see Appendix A).

META-ANALYSIS STUDY INCLUSION CRITERIA

All of the 96 studies included in this meta-analysis met the following selection criteria:

1. All included studies are randomized evaluations.
2. Studies compared a group of students who received tutoring to a group of students who did not receive tutoring. To this end, the meta-analysis omitted studies that exclusively compared various tutoring methods to each other, as well as studies that did not have a treatment arm in which tutoring was the only intervention. For example, studies where the only group receiving tutoring also received computer-based activities or other non-tutoring activities were excluded. These exclusions represent an effort to better understand the effect of receiving tutoring as compared to business as usual.
3. Studies examined interventions that took place at the preschool through secondary level.
4. Studies evaluated interventions wherein the tutors were not classmates or schoolmates of the tutees. For the purposes of this review, peer and cross-age “tutoring” programs are considered collaborative learning experiences that are similar to, but distinct from, “tutoring” as the term is used most widely, and were excluded.
5. Studies estimated the impact of tutoring programs on academic learning outcomes. Studies that focused exclusively on outcomes like attention or disruptive behavior were excluded.
6. Studies were published after 1980.
7. Studies presented the necessary data to compute effect sizes.

For additional information on study characteristics, see Appendix B

WHY RANDOMIZED EVALUATION?

Randomized evaluations, when properly implemented, are generally considered the strongest research design for quantitatively estimating the average effect of a program or policy. Randomly sorting a population into two groups—one that receives a program and one that does not—ensures that the groups are, on average, balanced at the beginning of the study. Therefore, any differences in outcomes between the two groups at the end of the study can be attributed to the program in question.

COMPARING IMPACT

Comparing results across the different tutoring studies can be difficult. Studies are conducted in different contexts, with different grade levels, and often measure different outcomes. It is also the case that studies use different assessments to look at the same outcome. While these differences can never be completely eliminated, we can contextualize results using a roughly comparable unit called a standard deviation. Standard deviations can give us a sense of the general size of impact across contexts (see table 1).

TABLE 1. STANDARD DEVIATIONS⁶

EFFECT SIZE	INTERPRETATION ⁷
0.10 standard deviations	50 th percentile to 54 th percentile
0.20 standard deviations	50 th percentile to 58 th percentile
0.30 standard deviations	50 th percentile to 62 nd percentile
0.40 standard deviations	50 th percentile to 66 th percentile

DEFINING TUTORING AND ITS GOAL

Measuring the impact of tutoring interventions first requires defining the term “tutoring.” For the purposes of this review, tutoring programs are defined as one-on-one or small-group human (i.e. non-computer) instruction aimed at supplementing, rather than replacing, classroom-based education.

This review identifies the primary goals of tutoring as improving learning outcomes and advancing equity in educational systems. The majority of tutoring interventions target students who perform below particular academic thresholds.

⁴ Sparks, Sarah D. 2012. “Students Who Struggle Early Rarely Catch Up, Study Says” *Education Week*, December 11, 2012. https://blogs.edweek.org/edweek/inside-school-research/2012/12/Helping_struggling_students_catch_up.html

⁵ Amerikaner, Ary and Ivy Morgan. *Funding Gaps: An Analysis Of School Funding Equity Across the U.S. And Within Each State*. The Education Trust, 2018. Accessed August 3, 2020. <https://edtrust.org/resource/funding-gaps-2018/>

⁶ Table 1 says that an intervention with an effect size of 0.10 standard deviations moves a student who scored at the 50th percentile up to the 54th percentile, for example. This interpretation assumes a normal distribution.

⁷ Mark W. Lipsey et al. *Translating the Statistical Representation of the Effects of Education Interventions into More Readily Interpretable Forms*. Washington, DC: National Center for Special Education Research, Institute of Education Sciences, U.S. Department of Education. (November 2012). <http://ies.ed.gov/ncser/>

Tutoring programs can take many different forms. Below are some of the key components that differentiate various tutoring interventions:



Tutor Type

Four broad categories of tutor type emerged from the review of the literature: teachers, paraprofessionals, nonprofessionals, and parents.

- **Teacher**

In teacher tutoring interventions, certified classroom teachers fulfill the role of the tutor.

- **Paraprofessional**

Paraprofessional tutoring interventions employ tutors who are professionally engaged in their tutoring roles but who are not certified teachers. This category of tutors includes non-teacher school staff, undergraduate and graduate students in the education field, and fellows in professional development and service programs.

- **Nonprofessional**

Nonprofessional tutoring interventions deploy volunteers who are not professionally engaged within the education field, including community residents and retired adults. These interventions are often referred to as volunteer tutoring.

- **Parent**

Parent tutoring interventions provide instruction and guidance to caretakers for tutoring their children, typically at home and outside of school hours.



Curriculum Characteristics

The effectiveness of tutoring programs may depend substantially on the content being taught. Subject area is a clear defining characteristic of different tutoring programs. The programs analyzed in this review fall into the categories of math and literacy. Curriculum for a given subject area may change across grade level as well as on a program by program basis. For instance, one early literacy program may focus on phonics while another may focus on comprehension.

While subject and grade level are included within the meta-analysis, other aspects of content and teaching strategies were not possible to reliably code across all studies included in the meta-analysis.



Mode of Delivery

There are various modes of delivery for tutoring programs. Variables include the size of tutoring groups as well as the timing and location of program delivery.

- **Tutor to student ratio**

Tutoring programs included in the review vary in the number of students assigned to one tutor at a given time. Students may meet with tutors individually (one-on-one), in pairs, or in small groups.

- **Timing and location of delivery**

Tutoring programs included in the review took place during the school day or after school. Programs that operated during the school day took place at school and those that operated after school took place in after-school programs or outside of school.



Frequency and Duration

Tutoring programs vary widely in terms of frequency and length of session, as well as program duration and overall number of lessons. Program models generally call for tutoring between one and five days per week. Sessions vary in their length from 10-15 minutes to more than an hour, with most programs suggesting sessions of between 30 and 60 minutes. Overall program durations may vary in length from several weeks to one or two school years, although the majority of the prominent tutoring programs included in the review lasted between ten weeks and one school year.

RESULTS

Across all estimates and studies, tutoring interventions show a large and statistically significant effect on learning outcomes of 0.37 standard deviations. This impact translates to a student advancing from the 50th percentile to nearly the 66th percentile. These substantial effects on learning outcomes occur across a wide range of program characteristics. However, the data offer meaningful insights about which types of tutoring are most effective and for whom.

Tutor Type

Teacher tutoring programs yield the largest impacts on learning outcomes, followed by paraprofessional tutoring programs. Nonprofessional and parent tutoring interventions tended to have smaller but still significant positive impacts.

Seventeen studies looked at tutoring programs that employed teachers as tutors. Across these seventeen studies, the pooled effect size of teacher tutoring programs was 0.50 standard deviations. Forty-seven studies evaluated interventions that used paraprofessional tutors. Across these studies, the pooled effect size was 0.40 standard deviations. The 24 studies that evaluated nonprofessional tutoring programs and the eleven studies that evaluated parent tutoring programs had smaller pooled effect sizes of 0.21 and 0.23 standard deviations, respectively. Teacher-led tutoring programs may yield the largest impacts due to the training and experience that teachers already have as educators.

Much of the effect size difference between teacher tutoring and paraprofessional tutoring programs in this analysis is driven by several successful evaluations of a program called Reading Recovery, which account for five of the seventeen teacher-tutor studies analyzed. Reading Recovery requires tutors to be certified teachers and complete graduate level coursework. Teachers then draw on their extensive training to customize lessons for each student. Though Reading Recovery was the most prominently featured teacher program in the meta-analysis, the effects of other teacher tutoring interventions tended to be high as well, suggesting that there is more to teacher tutoring's success than Reading Recovery's intensive training regimen and structured curriculum.

Despite the higher average effects of teacher tutoring programs relative to paraprofessional tutoring programs, effect sizes for paraprofessional tutoring programs were also large and substantially more consistent than those for teacher-led programs. The ability for these programs to consistently generate large and significant effects is especially notable given the wide range of tutors who are classified as "paraprofessional." The evidence suggests that well-designed paraprofessional programs have the potential to yield effects similar to teacher tutoring programs, but at lower costs.



PHOTO: TECTONIC

Teacher and paraprofessional tutoring substantially outperformed nonprofessional and parent tutoring programs. There may be several explanations for these differences. To begin with, paraprofessional tutoring is more likely to occur at school and during the school day while nonprofessional and parent tutoring is more likely to take place after school and at a different location, such as at a community center or at home. This analysis finds that tutoring that takes place during school typically outperforms after-school tutoring, perhaps due in part to fewer distractions and increased time on task. Additionally, paraprofessional tutors tend to receive more thorough training and can be held more accountable than nonprofessional or parent tutors. Though not professional teachers, paraprofessional tutors are still typically formally employed, either by schools or as service corps members. This formal tie to their tutor role presents a level of accountability that nonprofessional and parent tutors do not face, likely increasing the quality of their tutoring.

Lastly, it should be noted that even the smaller effects of 0.21 and 0.23 standard deviations reported for nonprofessional and parent tutoring interventions, respectively, may be promising due to the very low costs and high accessibility of these types of interventions.

The tutoring interventions examined in this review attempt to improve student learning outcomes by supplementing classroom-based education. In particular, the majority of interventions cater to students who perform below particular thresholds. Why might tutoring interventions be expected to improve learning in this context?

Additional instructional time

One possible mechanism through which tutoring improves learning is by simply providing students who have fallen behind with more instructional time. Additional focused instruction on a specific content area like math or reading may be what students need in order to catch up.

Customization of learning

One common theory for why tutoring is effective is the customization of learning. A robust and still growing body of evidence has established the importance of tailoring instruction to students' learning levels.⁸ When students miss out on foundational knowledge and fall behind, they are less able to follow along in a classroom setting. In a tutoring scenario, the content is typically customized to match the students' learning level, making instructional time more productive.

Alternative pedagogies

Tutoring interventions may also embody pedagogical or teaching strategies that are fundamentally distinct from classroom education. One-on-one and small group settings may, for instance, allow for more engagement and rapid feedback, enabling educational activities that would not be possible in the classroom. There may also be fewer distractions during tutoring sessions, allowing students to spend more time on task than in regular classes.

Mentorship bonds

Another potentially important element of tutoring interventions is the human connection generated by tutor-student relationships. Tutoring programs may engender mentorship relationships that go beyond the academic content of the tutoring session and may positively impact academic learning processes more broadly.

Grade Level and Subject

Grade level:

While tutoring programs improve student learning outcomes overall, program effectiveness varies by subject and grade level. In this analysis, tutoring programs that focus on literacy tend to become less effective as students get older. Conversely, tutoring programs that focus on math tend to become more effective as students advance through fifth grade.

Literacy programs have large benefits for younger students, yielding effects of 0.50 standard deviations for preschoolers and kindergarteners and 0.43 standard deviations for first graders. These sizable impacts shrink to 0.22 standard deviations, which is still a fairly large impact, for students in second through fifth grade. The few literacy programs for middle and high school students included in the meta-analysis did not improve learning outcomes.

Math tutoring programs, on the other hand, tend to be more effective for students in second through fifth grade. Math tutoring programs have a substantial impact of 0.38 standard deviations for students in first grade that grows to 0.44 standard deviations for students in second through fifth grade. The number of math programs for preschoolers, kindergarteners, and middle and high schoolers included in the meta-analysis was too small to determine significant trends.

Subject:

The overall effects for math and literacy tutoring interventions are similar to one another, at 0.38 and 0.35 standard deviations, respectively. However, comparing the two is difficult given the much smaller and less diverse selection of math tutoring programs included in the meta-analysis. Even so, the evidence suggests tutoring instruction can improve learning outcomes for both math and literacy.

⁸ Abdul Latif Jameel Poverty Action Lab (J-PAL). 2019. "Tailoring instruction to students' learning levels to increase learning." J-PAL Policy Insights. Last modified January 2019. <https://doi.org/10.31485/pi.2522.2019>

Saga Education is a nonprofit organization that utilizes a specific tutoring model for high school students who have fallen behind. The model rests on five main characteristics: daily tutoring sessions, in-school delivery, personalized instruction, supportive relationships with tutors, and a research-based curriculum. Saga employs paraprofessional tutors—typically recent college graduates, individuals changing careers, and retirees—who meet with two students at a time. An evaluation of Saga’s program in Chicago Public Schools found profound effects on students’ academic achievement. Students in Saga learned an extra one to two years’ worth of math beyond what their peers learned in an academic year. Tutoring raised participants’ average national percentile rank on 9th and 10th grade math exams by more than 20 percent. GPAs increased by 0.58 out of a 4.0 grade point scale, and the students’ failure rates in math fell by more than 50 percent.⁹

Program Delivery

During vs. After School

Tutoring programs that take place during the school day tend to be more effective than those that take place after school. The pooled effect size for tutoring programs that take place during the school day is nearly twice as large as the effect size for after-school programs, at 0.40 and 0.21 standard deviations, respectively. During-school interventions are more effective across all grade-level categories.

These findings should only be interpreted in the context of paraprofessional and nonprofessional programs.¹⁰ The effects of during-school and after-school programs are also difficult to compare, as only 18 percent of the studies included in the meta-analysis evaluated after-school tutoring. Researchers hypothesize that the school setting makes it easier for instructors and program operators to ensure that tutoring actually occurs during the scheduled time. After-school programs may also present more distractions to tutees.

⁹ Abdul Latif Jameel Poverty Action Lab (J-PAL). 2019. “Individualized tutoring to improve learning.” J-PAL Evidence to Policy Story. Last modified May 2020. <https://www.povertyactionlab.org/case-study/individualized-tutoring-improve-learning>

¹⁰ Researchers were unable to compare the effectiveness of during- and after-school tutoring for teacher and parent tutoring programs because all teacher tutoring programs included in the meta-analysis occurred during school and all but one parent tutoring program occurred after school.

Group Size

The impact of group size on student learning differs by grade level for students in preschool through 5th grade. One-on-one tutoring outperformed paired and small group tutoring for students in preschool, kindergarten, and first grade, with average effects of 0.51 standard deviations for preschoolers and kindergarteners and 0.44 standard deviations for first graders.

Conversely, for students in second through fifth grade, tutoring programs where three or more students are paired to a tutor generated an effect nearly twice as large as that generated by one-on-one programming—0.46 standard deviations as compared to 0.25 standard deviations, respectively.

It may be that younger children need the one-on-one connection and bond made with a tutor to fully benefit from the program, while the older elementary school children benefit from customized learning alongside peers. This finding is particularly notable when considering programs’ capacity to scale at lower cost.

This meta-analysis cannot draw a comparison of the effectiveness of one-on-one versus small group tutoring for nonprofessional or parent tutoring programs, as nearly all of these programs in the meta-analysis were one-on-one. Additionally, there are not enough tutoring programs for middle and high school students in the meta-analysis to determine trends regarding group size.



PHOTO: TECTONIC



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EARLY ELEMENTARY LITERACY TUTORING— MINNESOTA READING CORPS

Minnesota Reading Corps (MRC) is a tutoring program that seeks to improve literacy outcomes for students in kindergarten through third grade. Paraprofessional tutors work on reading skills with pairs of students during the school day. An evaluation of Minnesota Reading Corps programming found that MRC increased kindergarteners' reading scores by 1.06 standard deviations and first graders' reading scores by 0.37 standard deviations. These substantial effect sizes are particularly promising given the program's lower cost as compared to teacher-tutoring interventions.

Frequency

Younger students appear to benefit the most from a high frequency of tutoring sessions. For students in second through fifth grade, additional sessions per week can result in relatively smaller effects. This trend may be due to the key role repetition plays in early learning and skill development and mastery.

For all grade levels, increasing tutoring frequency from one or two sessions per week to three sessions per week benefits student learning. However, preschool, kindergarten, and first grade students are the only groups that appear to benefit from a fourth or fifth day of tutoring. For preschoolers and kindergarteners, three sessions per week generate an effect of 0.40 standard deviations while 4-5 sessions per week boost the impact to 0.49 standard deviations. For first graders, three sessions yield an effect of 0.34 standard deviations while four to five sessions increase the impact to 0.48 standard deviations.

For students in second through fifth grade, three days of tutoring per week yield larger academic impacts than four or five days of tutoring per week. Tutoring programs that provide three sessions per week generate an effect size of 0.37 standard deviations. Adding a fourth or fifth session of tutoring per week decreases the effect size to 0.28 standard deviations. This insight suggests that, in some cases, tutoring programs could produce larger impacts while reducing costs.

Counterintuitively, tutoring programs that last longer than twenty weeks show a pooled effect size that is slightly smaller than shorter-term interventions. These results may be a reflection of the fact that teacher tutoring programs tend to have relatively short durations while nonprofessional tutoring programs tend to have longer durations.

There were too few studies in the meta-analysis that evaluated tutoring programs for middle and high schoolers to identify trends regarding tutoring frequency.

POLICY IMPLICATIONS

The results of this meta-analysis affirm that tutoring programs can have large impacts across a wide range of learners and tutor program types. However, there remain opportunities for further exploration.

Room for growth for paraprofessional tutoring

While teacher tutoring programs displayed the largest average effect size, paraprofessional tutoring programs resulted in comparable learning gains and produced more consistent outcomes than programs led by teachers. Further, requiring teachers to serve as tutors may present an important barrier to scale for these programs given the limited supply of qualified teacher tutors and high cost of employing them.

Overall, it is not clear that the effectiveness differentials between trained teachers and paraprofessionals outweigh the potential cost differentials. Paraprofessional tutoring presents an expansive area for growth given the potential for transformative effects at relatively low costs.

Nonprofessional tutoring programs have also shown positive results, but it is less clear that volunteers will consistently represent a suitable pool of tutors as programs scale up, particularly given the limited training and commitment requirements of these programs. As for parent tutoring, the research is fragmented, and program designers have limited control over parent tutoring implementation.

Given these realities, paraprofessional tutoring presents a promising priority area for future tutoring planning. Non-teacher school staff and recent graduates in service or professional fellowship programs represent promising pools of potential tutors.

Expansion at the secondary level

There is a large scope for the growth of tutoring services at the secondary level. While effect sizes tend to be higher at the early elementary level than for higher grades, the impacts of secondary level tutoring programs still have the potential to significantly improve student learning outcomes. The research on tutoring programs for high school students is limited, but promising interventions have been identified.

Saga Education, outlined above, is an example of a successful program implemented at the high school level. Saga's model, which uses paraprofessional tutors, occurs during the school day, and matches two students to each tutor, presents a model for expansion.

Focus on during-school programming

Ensuring that tutoring actually occurs during the scheduled time is critical for tutoring implementation at scale. The relatively lower effects found among after-school and parent tutoring may largely be due to difficulties in ensuring that tutoring occurs as planned in these contexts. Programs implemented during the school day may be more successful at ensuring that tutoring actually occurs, making these programs more cost effective.

Further, tutoring that occurs during the school day, particularly in the context of public schools, may present a more accessible option for students from low-income families who may be behind in school. During-school tutoring is not only the most effective timing for a tutoring program, but it also decreases the steps that students and families must take to access additional instruction, which can better enable tutoring programs to work as intended and advance equity within the education system.

LIMITATIONS

As with all studies, this meta-analysis faces some limitations that should be considered when interpreting results. First and foremost, the findings of a meta-analysis can only be drawn from programs that have been evaluated. Researchers attempted to mitigate this risk by using a large study sample size with consistent methodology (randomized evaluations) and a well-defined definition of tutoring.

Second, this meta-analysis is not able to compare or speak to the effectiveness of various curriculum or pedagogical characteristics of tutoring interventions. There are many high-quality experimental studies that examine the pedagogical methods used by tutoring interventions. While some were included in the meta-analysis, the differences in curriculum were too subtle and multifaceted for researchers to code and quantitatively analyze. The results of this review are therefore unable to speak to strengths of particular tutoring pedagogies, curricula, or teaching styles.

CONCLUSIONS

In a field where there is little consensus over what works, tutoring presents a promising strategy to overcome academic achievement gaps and help all students succeed in school. With an average effect size of over one-third of a standard deviation and impacts consistently significant across a wide range of program characteristics, research points to the power of tutoring as a versatile and potentially transformative learning tool.

As program characteristics and implementation contexts vary, the research identifies several trends:

Of the four major types of tutoring programs—teacher, paraprofessional, nonprofessional, and parent—**programs led by teachers and paraprofessionals resulted in the strongest effects.** Training and accountability are likely key factors that contribute to tutor success.

Paraprofessional tutoring programs represent a promising area for exploration and program development due to their consistently large impacts and relatively low costs as compared to teacher tutoring programs.

Tutoring programs tend to be most effective for students in earlier grades. That being said, programs at the secondary level retain the potential to produce large learning gains. There is a relatively small body of rigorous evidence on tutoring for older students, and the topic of high school tutoring presents intriguing questions for future research.

The overall impacts of math and literacy tutoring programs are similar. However, reading programs yield their highest effect sizes in earlier grades, while math tutoring programs increase in efficacy through fifth grade.

Tutoring programs conducted during school tend to have larger impacts than those conducted after school. In an after-school setting, it is more difficult to ensure that tutoring actually occurs during the allotted time.

ABOUT J-PAL NORTH AMERICA

J-PAL North America is a regional office of the Abdul Latif Jameel Poverty Action Lab (J-PAL), a global network of researchers who use randomized evaluations to answer critical policy questions in the fight against poverty. Our mission is to reduce poverty by ensuring that policy is informed by scientific evidence.

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APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Al Otaiba, S., Schatschneider, C., & Silverman, E. (2005). Tutor-assisted intensive learning strategies in kindergarten: How much is enough?. <i>Exceptionality</i> , 13(4), 195-208.	Literacy	Nonprofessional	Kindergarten	During
Allor, J., & McCathren, R. (2004). The efficacy of an early literacy tutoring program implemented by college students. <i>Learning Disabilities Research & Practice</i> , 19(2), 116-129.	Literacy	Paraprofessional	Grade 1	During
Baker, S., Gersten, R., & Keating, T. (2000). When less may be more: A 2-year longitudinal evaluation of a volunteer tutoring program requiring minimal training. <i>Reading Research Quarterly</i> , 35(4), 494-519.	Literacy	Nonprofessional	Grades 1-2	During
Barnes, M. A., Klein, A., Swank, P., Starkey, P., McCandliss, B., Flynn, K., ... & Roberts, G. (2016). Effects of tutorial interventions in mathematics and attention for low-performing preschool children. <i>Journal of Research on Educational Effectiveness</i> , 9(4), 577-606.	Math	Paraprofessional	Pre-K	During
Benner, G. J. (2004). An investigation of the effects of an intensive early literacy support program on the phonological processing skills of kindergarten children at-risk of emotional and behavioral disorders.	Literacy	Nonprofessional	Kindergarten	During
Blachman, B. A., Schatschneider, C., Fletcher, J. M., Francis, D. J., Clonan, S. M., Shaywitz, B. A., & Shaywitz, S. E. (2004). Effects of intensive reading remediation for second and third graders and a 1-year follow-up. <i>Journal of Educational Psychology</i> , 96(3), 444.	Literacy	Teacher	Grades 2-3	During
Bøg, M., Dietrichson, J., & Aldenius, A. (2019). A multi-sensory tutoring program for students at-risk of reading difficulties: Evidence from a randomized field experiment (No. 2019: 7). Working Paper.	Literacy	Teacher	Kindergarten & Grade 1	During
Borman, G. D., Borman, T. H., Park, S. J., & Houghton, S. (2019). A Multisite Randomized Controlled Trial of the Effectiveness of Descubriendo la Lectura. <i>American Educational Research Journal</i> , 0002831219890612.	Literacy	Teacher	Grade 1	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Bryant, D. P., Bryant, B. R., Roberts, G., Vaughn, S., Pfannenstiel, K. H., Porterfield, J., & Gersten, R. (2011). Early numeracy intervention program for first-grade students with mathematics difficulties. <i>Exceptional children</i> , 78(1), 7-23.	Math	Paraprofessional	Grade 1	During
Case, L., Speece, D., Silverman, R., Ritchey, K., Schatschneider, C., Montanaro, E., & Jacobs, D. (2010). Validation of a supplemental reading intervention for first-grade children. <i>Journal of Learning Disabilities</i> , 43(5), 402-417.	Literacy	Paraprofessional	Grade 1	During
Case, L., Speece, D., Silverman, R., Schatschneider, C., Montanaro, E., & Ritchey, K. (2014). Immediate and long-term effects of tier 2 reading instruction for first-grade students with a high probability of reading failure. <i>Journal of Research on Educational Effectiveness</i> , 7(1), 28-53.	Literacy	Paraprofessional	Grade 1	During
Center, Y., Wheldall, K., Freeman, L., Outhred, L., & McNaught, M. (1995). An evaluation of reading recovery. <i>Reading research quarterly</i> , 240-263.	Literacy	Teacher	Grade 1	During
Clarke, B., Doabler, C. T., Smolkowski, K., Baker, S. K., Fien, H., & Strand Cary, M. (2016). Examining the efficacy of a Tier 2 kindergarten mathematics intervention. <i>Journal of learning disabilities</i> , 49(2), 152-165.	Math	Paraprofessional	Kindergarten	During
Clarke, B., Doabler, C. T., Kosty, D., Kurtz Nelson, E., Smolkowski, K., Fien, H., & Turtura, J. (2017). Testing the efficacy of a kindergarten mathematics intervention by small group size. <i>AERA open</i> , 3(2).	Math	Paraprofessional	Kindergarten	During
Cook, J. A. (2001). "Every moment counts: Pairing struggling young readers with minimally trained tutors." Unpublished doctoral dissertation, Arizona State University.	Literacy	Nonprofessional	Grades 1-3	During
Cook, P. J., Dodge, K., Farkas, G., Fryer, R. G., Guryan, J., Ludwig, J., ... & Steinberg, L. (2015). Not too late: Improving academic outcomes for disadvantaged youth. <i>Institute for Policy Research Northwestern University Working Paper WP-15-01</i> .	Math	Paraprofessional	Grades 9-10	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Denton, C. A., Anthony, J. L., Parker, R., & Hasbrouck, J. E. (2004). Effects of two tutoring programs on the English reading development of Spanish-English bilingual students. <i>The Elementary School Journal</i> , 104(4), 289-305.	Literacy	Paraprofessional	Grades 2-5	During
Doabler, C. T., Clarke, B., Kosty, D. B., Kurtz-Nelson, E., Fien, H., Smolkowski, K., & Baker, S. K. (2016). Testing the efficacy of a tier 2 mathematics intervention: A conceptual replication study. <i>Exceptional Children</i> , 83(1), 92-110.	Math	Paraprofessional	Kindergarten	During
Erion, R. J. (1994). "Parent tutoring, reading instruction and curricular assessment." Doctoral dissertation, Indiana University of Pennsylvania, 1994.	Literacy	Parent	Grade 2	Outside
Fives, A., Kearns, N., Devaney, C., Canavan, J., Russell, D., Lyons, R., ... & O'Brien, A. (2013). A one-to-one programme for at-risk readers delivered by older adult volunteers. <i>Review of Education</i> , 1(3), 254-280.	Literacy	Nonprofessional	Grades 1-2	During
Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Appleton, A. C. (2002). Explicitly Teaching for Transfer: Effects on the Mathematical Problem-Solving Performance of Students with Mathematics Disabilities. <i>Learning Disabilities Research & Practice</i> , 17(2), 90-106.	Math	Paraprofessional	Grade 4	During
Fuchs, L. S., Compton, D. L., Fuchs, D., Paulsen, K., Bryant, J. D., & Hamlett, C. L. (2005). The prevention, identification, and cognitive determinants of math difficulty. <i>Journal of educational psychology</i> , 97(3), 493.	Math	Paraprofessional	Grade 1	During
Fuchs, L. S., Seethaler, P. M., Powell, S. R., Fuchs, D., Hamlett, C. L., & Fletcher, J. M. (2008A). Effects of preventative tutoring on the mathematical problem solving of third-grade students with math and reading difficulties. <i>Exceptional children</i> , 74(2), 155-173.	Math	Paraprofessional	Grade 3	During
Fuchs, L. S., Fuchs, D., Craddock, C., Hollenbeck, K. N., Hamlett, C. L., & Schatschneider, C. (2008B). Effects of small-group tutoring with and without validated classroom instruction on at-risk students' math problem solving: Are two tiers of prevention better than one?. <i>Journal of educational psychology</i> , 100(3), 491.	Math	Paraprofessional	Grade 3	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Fuchs, L. S., Powell, S. R., Seethaler, P. M., Cirino, P. T., Fletcher, J. M., Fuchs, D., ... & Zumeta, R. O. (2009). Remediating number combination and word problem deficits among students with mathematics difficulties: A randomized control trial. <i>Journal of educational psychology</i> , 101(3), 561.	Math	Paraprofessional	Grade 3	During
Fuchs, L. S., Powell, S. R., Seethaler, P. M., Cirino, P. T., Fletcher, J. M., Fuchs, D., & Hamlett, C. L. (2010). The effects of strategic counting instruction, with and without deliberate practice, on number combination skill among students with mathematics difficulties. <i>Learning and individual differences</i> , 20(2), 89-100.	Math	Paraprofessional	Grade 3	During
Fuchs, L. S., Geary, D. C., Compton, D. L., Fuchs, D., Schatschneider, C., Hamlett, C. L., ... & Bryant, J. D. (2013). Effects of first-grade number knowledge tutoring with contrasting forms of practice. <i>Journal of Educational Psychology</i> , 105(1), 58.	Math	Paraprofessional	Grade 1	During
Fuchs, D., Kearns, D. M., Fuchs, L. S., Elleman, A. M., Gilbert, J. K., Patton, S., ... & Compton, D. L. (2019). Using moderator analysis to identify the first-grade children who benefit more and less from a reading comprehension program: A step toward aptitude-by-treatment interaction. <i>Exceptional children</i> , 85(2), 229-247.	Literacy	Paraprofessional	Grade 1	During
Gersten, R., Rolfhus, E., Clarke, B., Decker, L. E., Wilkins, C., & Dimino, J. (2015). Intervention for first graders with limited number knowledge: Large-scale replication of a randomized controlled trial. <i>American Educational Research Journal</i> , 52(3), 516-546.	Math	Paraprofessional	Grade 1	During
Gilbert, J. K., Compton, D. L., Fuchs, D., Fuchs, L. S., Bouton, B., Barquero, L. A., & Cho, E. (2013). Efficacy of a first-grade responsiveness-to-intervention prevention model for struggling readers. <i>Reading Research Quarterly</i> , 48(2), 135-154.	Literacy	Paraprofessional	Grade 1	During
Goudey, J. (2009). "A parent involvement intervention with elementary school students: The effectiveness of parent tutoring on reading achievement." Doctoral dissertation. University of Alberta.	Literacy	Parent	Grades 2-4	Outside

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Harper, J., & Schmidt, F. (2016). Effectiveness of a group-based academic tutoring program for children in foster care: A randomized controlled trial. <i>Children and Youth Services Review, 67</i> , 238-246.	Math & Literacy	Nonprofessional	Grades 1-8	Outside
Hickey, A. J., & Flynn, R. J. (2019). Effects of the TutorBright tutoring programme on the reading and mathematics skills of children in foster care: a randomised controlled trial. <i>Oxford Review of Education, 45(4)</i> , 519-537.	Math & Literacy	Paraprofessional	Grades 1-11	Outside
Jacob, R., Armstrong, C., Bowden, A. B., & Pan, Y. (2016). Leveraging volunteers: An experimental evaluation of a tutoring program for struggling readers. <i>Journal of Research on Educational Effectiveness, 9(sup1)</i> , 67-92.	Literacy	Nonprofessional	Grades 2-5	During and Outside
Jenkins, J. R., Peyton, J. A., Sanders, E. A., & Vadasy, P. F. (2004). Effects of reading decodable texts in supplemental first-grade tutoring. <i>Scientific Studies of Reading, 8(1)</i> , 53-85.	Literacy	Paraprofessional	Grade 1	During
Jung, P. G. (2015). Effects of data-based instruction for students with intensive early writing needs: A randomized control trial. Ph.D. dissertation, University of Minnesota.	Literacy	Paraprofessional	Grades 1-3	During
Lachney, R. P. (2002). Adult-mediated reading instruction for third through fifth grade children with reading difficulties.	Literacy	Nonprofessional	Grades 3-5	During
Lam, S. F., Chow-Yeung, K., Wong, B. P., Lau, K. K., & Tse, S. I. (2013). Involving parents in paired reading with preschoolers: Results from a randomized controlled trial. <i>Contemporary Educational Psychology, 38(2)</i> , 126-135.	Literacy	Parent	Preschool	Outside
Lane, K. L., Fletcher, T., Carter, E. W., Dejud, C., & Delorenzo, J. (2007). Paraprofessional-led phonological awareness training with youngsters at risk for reading and behavioral concerns. <i>Remedial and Special Education, 28(5)</i> , 266-276.	Literacy	Paraprofessional	Grade 1	During
Lane, H. B., Pullen, P. C., Hudson, R. F., & Konold, T. R. (2009). Identifying essential instructional components of literacy tutoring for struggling beginning readers. <i>Literacy Research and Instruction, 48(4)</i> , 277-297.	Literacy	Paraprofessional	Grade 1	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Lee, Y. S., Morrow-Howell, N., Jonson-Reid, M., & McCrary, S. (2011). The effect of the Experience Corps® program on student reading outcomes. <i>Education and Urban Society</i> , 44(1), 97-118.	Literacy	Nonprofessional	Grades 1-3	During
Lindo, E. J., Weiser, B., Cheatham, J. P., & Allor, J. H. (2018). Benefits of structured after-school literacy tutoring by university students for struggling elementary readers. <i>Reading & Writing Quarterly</i> , 34(2), 117-131.	Literacy	Nonprofessional	Grades K-6	Outside
Loenen, A. (1989). The effectiveness of volunteer reading help and the nature of the reading help provided in practice. <i>British Educational Research Journal</i> , 15(3), 297-316.	Literacy	Nonprofessional	Ages 7-11	During
Lorenzo, S. L. (1993). <i>Effects of an experimental mentoring program on measures of performance of at-risk elementary students</i> (Doctoral dissertation, University of South Florida).	Math & Literacy	Teacher	Grades 2-5	During
Markovitz, C.; Hernandez, M.; Hedberg, E.; Silbergliitt, B. (2014). Impact Evaluation of the Minnesota Reading Corps K-3 Program. NORC at the University of Chicago: Chicago, IL.	Literacy	Paraprofessional	Kindergarten – 3rd grade	During
Marquis, R. (2013). <i>The Gender Effects of a Foster Parent-Delivered Tutoring Program on Foster Children’s Academic Skills and Mental Health: A Randomized Field Trial</i> . University of Ottawa (Canada).	Math & Literacy	Parent	Grades 2-7	Outside
Mathes, P. G., Denton, C. A., Fletcher, J. M., Anthony, J. L., Francis, D. J., & Schatschneider, C. (2005). The effects of theoretically different instruction and student characteristics on the skills of struggling readers. <i>Reading Research Quarterly</i> , 40(2), 148-182.	Literacy	Teacher	Grade 1	During
Mattera, S., Jacob, R., & Morris, P. (2018). Strengthening children’s math skills with enhanced instruction: The impacts of Making Pre-K Count and High 5s on kindergarten outcomes. <i>New York: MDRC, March</i> .	Math	Paraprofessional	Pre-K & Kindergarten	Outside
Mayfield, L. G. (2000). The effects of structured one-on-one tutoring in sight word recognition of first-grade students at-risk for reading failure. (Doctoral dissertation, Louisiana Tech University)	Literacy	Paraprofessional	Grade 1	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Mears, P. R. (2007). The Effects of the Fast Start Program on the Reading Achievement of Emergent and Beginning Readers: A Replication and Extension. Doctoral dissertation, George Fox University.	Literacy	Parent	Kindergarten & Grade 1	Outside
Mehran, M., & White, K. R. (1988). Parent tutoring as a supplement to compensatory education for first-grade children. <i>Remedial and Special Education, 9</i> (3), 35-41.	Literacy	Parent	Grade 1	Outside
Miller, B. V., & Kratochwill, T. R. (1996). An evaluation of the paired reading program using competency-based training. <i>School Psychology International, 17</i> (3), 269-291.	Literacy	Parent	Grades 2-4	Outside
Miller, S., & Connolly, P. (2013). A randomized controlled trial evaluation of time to read, a volunteer tutoring program for 8-to 9-year-olds. <i>Educational Evaluation and Policy Analysis, 35</i> (1), 23-37.	Literacy	Nonprofessional	Ages 8-9	During
Miller, S., Connolly, P., & Maguire, L. K. (2012). The effects of a volunteer mentoring programme on reading outcomes among eight-to nine-year-old children: A follow up randomized controlled trial. <i>Journal of Early Childhood Research, 10</i> (2), 134-144.	Literacy	Nonprofessional	Ages 8-9	During
Mooney, P. J. (2003). An investigation of the effects of a comprehensive reading intervention on the beginning reading skills of first graders at risk for emotional and behavioral disorders. Doctoral dissertation, University of Nebraska-Lincoln.	Literacy	Nonprofessional	Grade 1	During
Morris, D., Shaw, B., & Perney, J. (1990). Helping low readers in grades 2 and 3: An after-school volunteer tutoring program. <i>The Elementary School Journal, 91</i> (2), 133-150.	Literacy	Nonprofessional	Grades 2-3	Outside
Nielson, B. B. (1992). Effects of parent and volunteer tutoring on reading achievement of third grade at-risk students.	Literacy	Nonprofessional/ Parent	Grade 3	During
O'Connor, R. E., Bell, K. M., Harty, K. R., Larkin, L. K., Sackor, S. M., & Zigmond, N. (2002). Teaching reading to poor readers in the intermediate grades: A comparison of text difficulty. <i>Journal of Educational Psychology, 94</i> (3), 474.	Literacy	Teacher	Grades 3-5	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
O'Connor, R. E., Bocian, K., Beebe-Frankenberger, M., & Linklater, D. L. (2010). Responsiveness of students with language difficulties to early intervention in reading. <i>The Journal of Special Education, 43</i> (4), 220-235.	Literacy	Paraprofessional	Kindergarten	During
Parker, D. C., Nelson, P. M., Zaslofsky, A. F., Kanive, R., Foegen, A., Kaiser, P., & Heisted, D. (2019). Evaluation of a math intervention program implemented with community support. <i>Journal of Research on Educational Effectiveness, 12</i> (3), 391-412.	Math	Paraprofessional	Grades 4-8	During
Pinnell, G. S., DeFord, D. E., & Lyons, C. A. (1988). <i>Reading Recovery: Early intervention for at-risk first graders</i> . Educational Research Service.	Literacy	Teacher	Grade 1	During
Pinnell, G. S., Lyons, C. A., Deford, D. E., Bryk, A. S., & Seltzer, M. (1994). Comparing instructional models for the literacy education of high-risk first graders. <i>Reading Research Quarterly, 9</i> -39.	Literacy	Teacher	Grade 1	During
Powell, S. R., & Driver, M. K. (2015). The influence of mathematics vocabulary instruction embedded within addition tutoring for first-grade students with mathematics difficulty. <i>Learning Disability Quarterly, 38</i> (4), 221-233.	Math	Paraprofessional	Grade 1	During
Powell, S. R., Fuchs, L. S., Fuchs, D., Cirino, P. T., & Fletcher, J. M. (2009). Effects of fact retrieval tutoring on third-grade students with math difficulties with and without reading difficulties. <i>Learning Disabilities Research & Practice, 24</i> (1), 1-11.	Math	Paraprofessional	Grade 3	During
Powell, S. R., Driver, M. K., & Julian, T. E. (2015). The effect of tutoring with nonstandard equations for students with mathematics difficulty. <i>Journal of Learning Disabilities, 48</i> (5), 523-534.	Math	Paraprofessional	Grade 2	During
Powell-Smith, K. A., Stoner, G., Shinn, M. R., & Good III, R. H. (2000). Parent tutoring in reading using literature and curriculum materials: Impact on student reading achievement. <i>School Psychology Review, 29</i> (1), 5-27.	Literacy	Parent	Grade 2	Outside

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Pullen, P. C., Lane, H. B., & Monaghan, M. C. (2004). Effects of a volunteer tutoring model on the early literacy development of struggling first grade students. <i>Literacy Research and Instruction, 43</i> (4), 21-40.	Literacy	Paraprofessional	Grade 1	During
Rasinski, T., & Stevenson, B. (2005). The effects of fast start reading: a fluency-based home involvement reading program, on the reading achievement of beginning readers. <i>Reading Psychology, 26</i> (2), 109-125.	Literacy	Parent	Grade 1	Outside
Rebok, G. W., Carlson, M. C., Glass, T. A., McGill, S., Hill, J., Wasik, B. A., ... & Rasmussen, M. D. (2004). Short-term impact of Experience Corps® participation on children and schools: Results from a pilot randomized trial. <i>Journal of Urban Health, 81</i> (1), 79-93.	Literacy	Nonprofessional	Grades K-3	During
Rimm-Kaufman, S. E., Kagan, J., & Byers, H. (1998). The effectiveness of adult volunteer tutoring on reading among “at risk” first grade children. <i>Literacy Research and Instruction, 38</i> (2), 143-152.	Literacy	Nonprofessional	Grade 1	During
Ritter, G., & Maynard, R. (2008). Using the right design to get the ‘wrong’ answer? Results of a random assignment evaluation of a volunteer tutoring programme. <i>Journal of Children's Services, 3</i> (2), 4-16.	Math & Literacy	Nonprofessional	Grades 2-5	During
Schwartz, R. M. (2005). Literacy Learning of At-Risk First-Grade Students in the Reading Recovery Early Intervention. <i>Journal of Educational Psychology, 97</i> (2), 257.	Literacy	Teacher	Grade 1	During
Sirinides, P., Gray, A., & May, H. (2018). The Impacts of Reading Recovery at scale: Results from the 4-year i3 external evaluation. <i>Educational Evaluation and Policy Analysis, 40</i> (3), 316-335.	Literacy	Teacher	Grade 1	During
Smith, T. M., Cobb, P., Farran, D. C., Cordray, D. S., & Munter, C. (2013). Evaluating math recovery: Assessing the causal impact of a diagnostic tutoring program on student achievement. <i>American Educational Research Journal, 50</i> (2), 397-428.	Math	Teacher	Grade 1	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Swanson, H. L., Moran, A., Lussier, C., & Fung, W. (2014). The effect of explicit and direct generative strategy training and working memory on word problem-solving accuracy in children at risk for math difficulties. <i>Learning Disability Quarterly</i> , 37(2), 111-123.	Math	Paraprofessional	Grade 3	During
Toste, J. R., Capin, P., Vaughn, S., Roberts, G. J., & Kearns, D. M. (2017). Multisyllabic word-reading instruction with and without motivational beliefs training for struggling readers in the upper elementary grades: A pilot investigation. <i>The Elementary School Journal</i> , 117(4), 593-615.	Literacy	Paraprofessional	Grades 3-4	During
Toste, J. R., Capin, P., Williams, K. J., Cho, E., & Vaughn, S. (2019). Replication of an experimental study investigating the efficacy of a multisyllabic word reading intervention with and without motivational beliefs training for struggling readers. <i>Journal of Learning Disabilities</i> , 52(1), 45-58.	Literacy	Paraprofessional	Grades 4-5	During
Vadasy, P. F. & Sanders, E. A. (2008A). Code-oriented instruction for kindergarten students at risk for reading difficulties: A replication and comparison of instructional groupings. <i>Reading and Writing</i> , 21(9), 929-963.	Literacy	Paraprofessional	Kindergarten	During
Vadasy, P. F. & Sanders, E. A. (2008B). Repeated reading intervention: Outcomes and interactions with readers' skills and classroom instruction. <i>Journal of Educational Psychology</i> , 100(2), 272.	Literacy	Paraprofessional	Grades 2-3	During
Vadasy, P. F. & Sanders, E. A. (2008C). Benefits of repeated reading intervention for low-achieving fourth-and fifth-grade students. <i>Remedial and Special Education</i> , 29(4), 235-249.	Literacy	Paraprofessional	Grades 4-5	During
Vadasy, P. F. & Sanders, E. A. (2009). Supplemental fluency intervention and determinants of reading outcomes. <i>Scientific Studies of Reading</i> , 13(5), 383-425.	Literacy	Teacher, Paraprofessional	Grades 2-3	During
Vadasy, P. F. & Sanders, E. A. (2010). Efficacy of supplemental phonics-based instruction for low-skilled kindergarteners in the context of language minority status and classroom phonics instruction. <i>Journal of Educational Psychology</i> , 102, 786.	Literacy	Paraprofessional	Kindergarten	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Vadasy, P. F. & Sanders, E. A. (2011). Efficacy of supplemental phonics-based instruction for low-skilled first graders: How language minority status and pretest characteristics moderate treatment response. <i>Scientific Studies of Reading</i> , 15(6), 471-497.	Literacy	Paraprofessional	Grade 1	During
Vadasy, P. F., Jenkins, J. R., Antil, L. R., & Wayne, S. K. (1997A). Community-based early reading intervention for at-risk first graders. <i>Learning Disabilities Research & Practice</i> .	Literacy	Nonprofessional	Grade 1	Outside
Vadasy, P. F., Jenkins, J. R., Antil, L. R., Wayne, S. K., & O'Connor, R. E. (1997B). The effectiveness of one-to-one tutoring by community tutors for at-risk beginning readers. <i>Learning Disability Quarterly</i> , 20(2), 126-139.	Literacy	Nonprofessional	Grade 1	Outside
Vadasy, P. F., Jenkins, J. R., & Pool, K. (2000). Effects of tutoring in phonological and early reading skills on students at risk for reading disabilities. <i>Journal of Learning Disabilities</i> , 33(6), 579-590.	Literacy	Nonprofessional	Grade 1	During
Vadasy, P. F., Sanders, E. A., & Peyton, J. A. (2006A). Code-oriented instruction for kindergarten students at risk for reading difficulties: A randomized field trial with paraeducator implementers. <i>Journal of Educational Psychology</i> , 98(3), 508.	Literacy	Paraprofessional	Kindergarten	During
Vadasy, P. F., Sanders, E. A., & Peyton, J. A. (2006B). Paraeducator-supplemented instruction in structural analysis with text reading practice for second and third graders at risk for reading problems. <i>Remedial and Special Education</i> , 27(6), 365-378.	Literacy	Paraprofessional	Grades 2-3	During
Vadasy, P. F., Sanders, E. A., & Tudor, S. (2007). Effectiveness of paraeducator-supplemented individual instruction: Beyond basic decoding skills. <i>Journal of Learning disabilities</i> , 40(6), 508-525.	Literacy	Paraprofessional	Grades 2-3	During
Vaughn, Sharon, et al. "Effectiveness of an English intervention for first-grade English language learners at risk for reading problems." <i>The Elementary School Journal</i> 107.2 (2006): 153-180.	Literacy	Teacher	Grade 1	During

APPENDIX A:

Studies included in the meta-analysis

STUDY	SUBJECT	TUTOR TYPE	GRADE LEVEL(S)	DURING SCHOOL OR OUTSIDE OF SCHOOL
Vaughn, S., Roberts, G. J., Miciak, J., Taylor, P., & Fletcher, J. M. (2019). Efficacy of a word-and text-based intervention for students with significant reading difficulties. <i>Journal of Learning Disabilities</i> , 52(1), 31-44.	Literacy	Teacher	Grades 4-5	During
Villiger, C., Hauri, S., Tettenborn, A., Hartmann, E., Nöpflin, C., Hugener, I., & Niggli, A. (2019). Effectiveness of an extracurricular program for struggling readers: A comparative study with parent tutors and volunteer tutors. <i>Learning and Instruction</i> , 60, 54-65.	Literacy	Parent, Nonprofessional	Grade 3	Outside
Wanzek, J., & Roberts, G. (2012). Reading interventions with varying instructional emphases for fourth graders with reading difficulties. <i>Learning Disability Quarterly</i> , 35(2), 90-101.	Literacy	Teacher	Grade 4	During
Wolff, U. (2011). Effects of a randomised reading intervention study: An application of structural equation modelling. <i>Dyslexia</i> , 17(4), 295-311.	Literacy	Teacher	Age 9	During
Woo, D. G. (2005). <i>America Reads: The effects of a federal work-study tutoring program on literacy achievement and attitudes of teachers, tutors, and children</i> . Rutgers The State University of New Jersey-New Brunswick.	Literacy	Nonprofessional	K-3	During
Young, C., Pearce, D., Gomez, J., Christensen, R., Pletcher, B., & Fleming, K. (2018). Read Two Impress and the Neurological Impress Method: Effects on elementary students' reading fluency, comprehension, and attitude. <i>The Journal of Educational Research</i> , 111(6), 657-665.	Literacy	Paraprofessional	Grades 1-3	During



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APPENDIX B:

Review Sample

A total of 96 studies met all of the criteria to be included in the meta-analysis. The breakdown of the studies included in the analysis is as follows:

- Literacy tutoring programs are far more common within the sample of 96 studies than math tutoring programs. Nearly 80 percent of the included studies evaluate a tutoring program with a literacy component while just over 25 percent evaluate a program with a math tutoring component.
- Paraprofessional tutoring accounts for the largest share of tutor type in our meta-analysis, making up nearly half of the sample. Paraprofessional studies are followed by nonprofessional, teacher, and then parent tutoring studies.
- Tutoring programs for elementary school students make up a large majority of the sample, with only 7 percent of interventions involving students in sixth grade and above. Further, almost half of all of the studies involve first graders.
- Over 80 percent of the tutoring programs in the sample occur during the school day, while just under 20 percent occur after-school.
- One-on-one tutoring programs represent the most common tutor-student ratio in the sample, followed by small groups of three or more students and then pairs.