

Proven Practices



Initial Evidence and Insight on K-3 Math Corps Impact

Math Corps is an AmeriCorps-powered tutoring program that provides K-8 grade students up to 100 min of weekly tutoring in small groups. Math Corps complements any curriculum and focuses explicitly on foundational skills for working with whole and rational numbers, which have both short and long-term benefits for overall math development (National Mathematics Advisory Panel, 2008). The program uses data for instructional decision-making and provides multiple layers of coaching to the AmeriCorps tutor. Math Corps in grades 4-8 has participated in two randomized controlled trials, both of which provided rigorous evidence for its impact on students. Math Corps in grades K-3 is a newer addition and this project was designed to provide initial evidence for its impact on math learning.

The Project

The current project leveraged the fact that in most schools, more students need Math Corps than can be provided services. A subset of K-3 Math Corps schools partnered with the NSSC to examine the performance of students receiving Math Corps relative to similar students who did not. In this project, we examined spring achievement scores focusing explicitly on students who began tutoring in the fall.

Why It Matters

Math Corps was designed to accelerate math learning for students who need additional support. The primary instructional strategies of Math Corps are all evidence-based (see Table 1), but research is needed to determine if the overarching Math Corps program itself—including its instructional strategies, use of data, and AmeriCorps-based tutoring—is effective.

Table 1. Instructional Strategies of Math Corps

	Concrete Representational Abstract (CRA)	Cover Copy Compare (CCC)	Cognitive Strategy Instruction (CSI)
Skill focus	Conceptual Understanding	Computational Proficiency	Word Problem Solving
Description	Intervention scaffolds students' understanding by using progressive representations of a given math concept, such as 3D manipulatives (e.g., base-10 blocks), 2D illustrations (e.g., area model), and symbols (e.g., numerals).	Intervention strengthens students' computation skills through modeling procedural steps, providing multiple opportunities to respond, and giving immediate feedback.	Intervention develops students' self-regulator problem solving using a 7-step process that teaches sequenced, predictable procedures to identify, engage with, estimate solutions for, and ultimately solve various applied word problems.
Materials	Manipulatives, illustrations, symbols	CCC worksheet	Multi-step process list
Research Review	Carbonneau, K. J., Marley, S. C., & Selig, J. P. (2013). A meta-analysis of the efficacy of teaching mathematics with concrete manipulatives. <i>Journal of Educational Psychology, 105</i> , 380-400.	Joseph, L. M., Konrad, M., Cates, G., Vaicner, T., Eveleigh, E., & Fishley, K. M. (2012). A meta-analytic review of the cover-copy-compare and variations of this self-management procedure. <i>Psychology in the Schools, 49</i> , 122-136.	Zhang, D., & Xin, Y. P. (2012). A follow-up meta-analysis for word-problem-solving interventions for students with mathematics difficulties. <i>The Journal of Educational Research, 105</i> , 303-318.

Methodology Overview

The evaluation took place in 11 schools in MN. Students who began tutoring before November first (n = 369) were matched to similar students within their grade at a ratio of 4:1 (n = 1,452). This was possible due to the large number of students in the data file who did not receive Math Corps despite having similar fall aMath/earlyMath scores. We used multi-level regression to evaluate program impact within K-1 and 2-3. In each case, spring achievement scores were used as the outcome and fall scores, grade-level, race, and treatment were used as predictors. We also included an additional analysis in which we examined a subgroup of tutored students—specifically those who completed a number of lessons in the Math Corps sequence equal to the program average. We refer to this group as “Optimal Dosage” as it reflects students who received a more optimal dosage experience with the Math Corps curriculum.

Results

Statistically significant and positive results were observed among tutored students in grades K-1. The standardized effect was equal to 0.18 among all tutored students, and 0.28 among students in the Optimal Dosage group. These effects are meaningful and generally align with those observed in

previous evaluations of Math Corps in grades 4-8 (e.g., Parker et al., 2019; Codding et al., 2023).

Results for students in grades 2-3 were not statistically significant in this study, but were descriptively positive for students receiving optimal dosage. Future research with K-3 Math Corps may better understand program effects by using

more rigorous methodology (e.g., a randomized controlled trial), examining the factors that promote larger program effects, or considering reasons why student growth on Math Corps skills may not immediately show up on broader assessments of Math Achievement.

Table 1. Achievement data and effect sizes across grades

K-1	<i>Fall earlyMath</i>	<i>Spring earlyMath</i>	<i>Effect Size^a</i>
Comparison	23.5	58.1	
Math Corps	22.7	60.8	0.18*
Optimal Dosage	23.7	63.2	0.28**
2-3	<i>Fall aMath</i>	<i>Spring aMath</i>	
Comparison	195.2	203.8	
Math Corps	194.5	203.0	ns
Optimal Dosage	196.5	204.0	ns

^a Effect size is reported in standard deviation units.
* $p < .05$; ** $p < .01$

Key Takeaways

- A matched comparison analysis of K-3 Math Corps observed that students who received tutoring in grades K-1 demonstrated positive and statistically significant improvement on their math achievement relative to matched peers.
- As this was an initial investigation, it demonstrates the impact of K-3 Math Corps for younger students while also identifying directions for future research examining K-3 Math Corps, including the application of more rigorous methodology, further definition of effective implementation conditions, and identification of the most meaningful indicators of impact.