



RESEARCH BRIEF

Study Results: The Impact of Parent-Child Math Activities for 2- and 3-Year-Old Children

Introduction

Even before they enter preschool, young children can learn math. Parents, as their children's first teachers, are in a good position to help them learn. Math4Littles is a 12-week program designed to provide parents with simple and fun math activities to do with their 2- and 3-year-old children. The activities are designed to be easily incorporated into daily routines. The Math4Littles activities cover six domains of math that very young children can learn about: number knowledge, operations, spatial awareness, shapes, and patterns.

Early Math Domains

Number knowledge activities address learning the number sequence through verbal counting, subitizing (the ability to recognize the number of objects in a set without counting), one-to-one correspondence, and counting objects.

Operations covers concepts of "more" and "less," as well as the more advanced skills of addition and subtraction.

Spatial awareness activities address learning about the position and orientation of objects in space and in relation to one another.

Shapes activities relate to identifying and matching shapes.

Patterns activities address sorting and classifying objects and identifying and making repeating patterns with objects, sounds, and actions.

Measurement includes evaluating measurable properties of objects such as size and temperature.

In 2019, the American Institutes for Research conducted a study of the Math4Littles program.¹ As implemented in the study, the program was delivered through text messaging. Parents received three text messages every week, each of which linked to an activity guide, for a total of 36 activities. Parents were encouraged to use the activities as part of their everyday routines. In 6 of the 12 weeks, parents also received a link to a video that introduced each new content area. Parents also were invited to join an online forum in which they could share their experiences with other parents in the program.

About the Study

The study was conducted in the San Francisco Bay Area. We recruited parents with 2- and 3-year-old children for the study from childcare programs, schools, libraries, social media, and community centers. Once parents were on board, we surveyed them on a variety of topics and assessed the children's skills in the early math domains. After this initial "baseline" data collection, we randomly assigned half of the families to receive the Math4Littles activities. The other half of the parents did not receive the activities but were still part of the study.

¹ At the time we conducted the study, the program was called MiniMath.

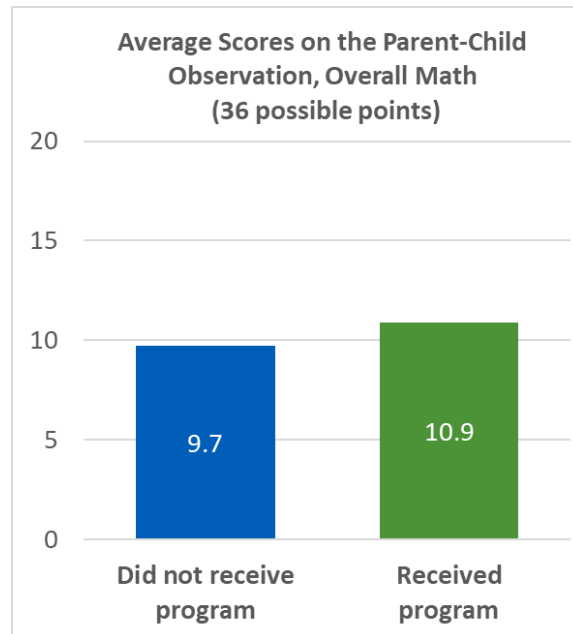
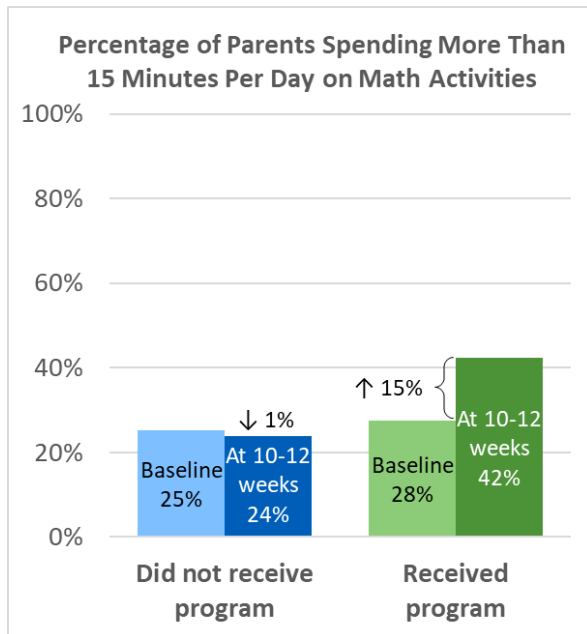
Later on, we assessed the children and surveyed the parents again. We wanted to see whether the parents who received the program increased their use of math activities at home and improved their attitudes about math more than parents who did not receive the program. We also wanted to see whether children’s math skills grew more if they were in families that got the program. Here we report our key findings.³

Participant Characteristics at Start of Study	
Average age of children (in years)	3.1
Children attending a childcare center	57%
Household income less than \$50,000	45%
Parents with no college education	28%
English-speaking parents	75%
Spanish-speaking parents	25%
Total number of participants ²	358

Did the program help parents do math activities with their child?

Ten to twelve weeks into the program, parents receiving the Math4Littles activities reported significantly greater use of math activities with their child, compared both to their own reports before the program and to parents who didn’t get the program. As the left-hand graph below shows, the percentage of Math4Littles parents who said they spend more than 15 minutes per day on math activities increased from 28% before the program to 42% toward the end of the program. There was no similar change for parents who did not receive the program.

Also, 1–3 months after the program ended, we asked parents to play with their children for 20 minutes while we observed. Compared with parents who had not gotten the program, the Math4Littles parents did more math activities during this play session. (See the right-hand graph below.) They also did more math activities that did not involve numbers and counting (like comparing sizes and finding patterns). This finding suggests that the program helped parents understand that math is more than just numbers and that they can engage their children in math in many different ways.

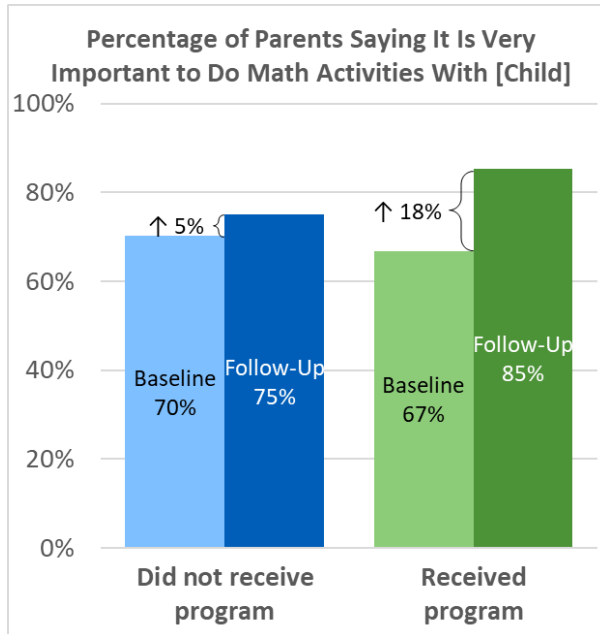


² This total number excludes 17 parents who served as a pilot group; these parents were not included in the impact analyses.

³ More detail about the methods and findings will be available in Holtzman, D., Quick, H., & Keuter, S. (2020). *Math for 2s and 3s: The impact of parent-child math activities on parents’ beliefs and behaviors and young children’s math skill development*. Manuscript submitted for publication.

We did not find any significant changes or differences between the two groups on activities and interactions that did not have to do with math. This is not surprising given that Math4Littles is about math.

Did the program change parents' beliefs about the importance of math for young children?

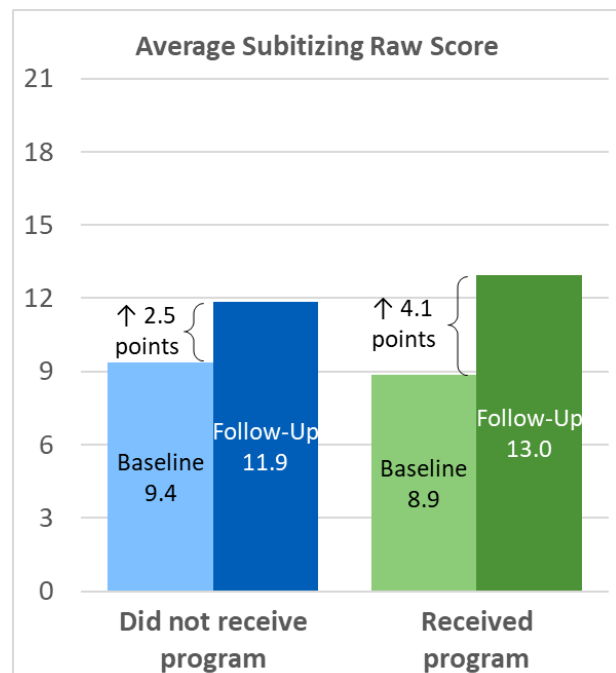


At the start of the study, about two thirds of parents in both the program and nonprogram groups said that math activities are very important for young children. After the program, 85% of the program parents said that, compared with 75% of the other parents. However, we did not find similar changes and differences in parents' own feelings about math more generally (such as whether they thought they were good at math).



Did the program have an effect on children's learning?

Children of parents who received the program had greater gains in their ability to subitize—that is, to identify the number of objects in a group *without counting*. This is an important foundational early math skill. However, the program did not appear to help children in other math skills, such as verbal counting, sorting objects, comparing quantities, and identifying shapes.



Summary

Early exposure to math activities can have a positive impact on future abilities. Rich exploratory math experiences can help young children master the basic skills they need to succeed in school and beyond. Math4Littles provided parents with enriching math activities they could do easily with their young children.



Study Highlights

The Math4Littles program improved parents' beliefs about the **importance of math for young children.**

Math4Littles **increased parents' use of math activities with their child.** Math4Littles parents also did more math activities in non-numbers domains such as patterns, measuring, and operations/relations. Math4Littles parents knew that **math is not just counting!**

Math4Littles **improved children's ability to subitize**, an important early math skill.

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Click [here](#) to access the Math4Littles activity guide.



Math4Littles



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