

Cognition Group Tutoring: Impacts on Students' Math Knowledge and Perceptions

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Middle Years Math Grantee Report Series

This report is one in a series of six reports on math tutoring programs. Over the 2020–2021 and 2021–2022 school years, the Bill & Melinda Gates Foundation invested in rapid-cycle evaluations of a cohort of 10 tutoring providers to learn about their innovative approaches to tutoring as part of its Middle Years Math body of work.¹ The goal of these investments was to understand how different tutoring models might create positive student experiences and lead to improved academic outcomes for students in the foundation’s priority communities—those who are Black, Latino, and/or experiencing poverty. These investments were grounded in the substantial body of evidence supporting the effectiveness of tutoring in improving student math knowledge (Nickow et al., 2020).

To build on this existing evidence of effectiveness, the Gates Foundation sought to develop new early evidence about the success of a range of tutoring approaches. Specifically, these investments targeted two key learning priorities. First, the foundation sought to learn how innovative technologies and tutoring program design features might simultaneously improve the quality and lower the cost of tutoring, making high-quality tutoring available to a large number of students in priority communities. The second priority was to learn the extent to which tutoring programs resulted in positive experiences for participating students. To learn about tutoring design features, the foundation invested in tutoring programs with a wide range of approaches, including group and one-on-one tutoring, virtual and in-person models, professional teachers as tutors, or volunteer tutors who shared aspects of identity with tutored students. Tutoring programs also used different approaches to tutoring curriculum and pedagogy. The goal of this report series is to inform the tutoring field more broadly and support the provision of high-quality tutoring to as many students in the priority communities as possible.

To learn rapidly about tutoring providers’ innovative approaches, Mathematica worked with each one to identify the most rigorous study design that would be feasible for district partners within a one-to-three-month planning period. Some providers were able to design and implement randomized controlled trials; others used quasi-experimental designs such as matched comparison approaches. One study compared growth in math knowledge among participants to the growth observed in national samples because it was not possible to obtain student-level data for comparison students who did not receive tutoring. These relatively small studies were right-sized to the development stage of the tutoring program and sought to demonstrate early evidence of success before moving on to larger-scale effectiveness studies. To help synthesize findings about student experiences from multiple providers, studies used the same student survey measures of tutor relationship, math confidence, and sense of belonging in tutoring sessions. Most of the studies used standardized math knowledge assessments aligned with Common Core State Standards.

Each study also aimed to inform providers’ efforts to refine their programs and support successful implementation. These studies measured the amount of tutoring offered, attendance, and staff impressions about implementation challenges while also gathering qualitative data on students’ experiences. Findings from these studies have helped to direct tutoring providers’ next steps in refining and scaling their tutoring programs.

¹ This publication is based on research funded by the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Bill & Melinda Gates Foundation.

Executive Summary

What is the tutoring program we studied?

Cognition provides live virtual one-to-one and group math tutoring using video conferencing tools and interactive whiteboards; recruits experienced educators as tutors; and provides data on engagement, attendance, and progress towards academic standards to teachers and parents via an online platform. Cognition provides tutoring services to districts and schools either during or after school, and to individual families, which typically occurs after school hours. Cognition recruits and vets experienced teachers to provide tutoring. In 2021, Cognition developed a tutoring platform for groups of up to four students (4:1 tutoring) along with the tools, materials, and training needed to support tutors in delivering effective tutoring to groups. This study focused specifically on Cognition's 4:1 math tutoring provided to 5th-grade students.

What questions does this study answer?

1. Do students who participate in group tutoring score higher on a fractions math assessment than students who do not participate in group tutoring?
2. Do students who participate in group tutoring report higher levels of math confidence and enjoyment than students who do not participate in group tutoring?
3. How do students receiving group tutoring rate the quality of the relationship with their tutors? Does the reported quality of students' relationships vary by student characteristics, or by tutor?

How was the study conducted?

Study design. The study used a randomized controlled trial design, comparing the fractions knowledge of students who were randomly selected to participate in Cognition group tutoring to that of similar students who did not participate in tutoring. We analyzed survey data to understand Cognition students' confidence in math and enjoyment of math, relative to similar peers who did not participate in tutoring. We also analyzed survey data from tutoring participants to understand students' relationships with their tutors. (See Appendix B for details.)

The participating district requested that Cognition provide its fractions-focused tutoring to 5th-grade students who were likely to benefit most from the tutoring program because they were six months to one year behind grade level at the start of the study, based on recent academic performance. One hundred sixty students across 11 elementary schools were recruited to participate in the study; groups of 8 or 16 students were randomly assigned in each of 11 schools to either participate in Cognition group tutoring or else not participate in math tutoring. Four 30-minute tutoring sessions took place every week (Monday through Thursday) during the school day. All schools provided instruction in person. A total of 15 tutors worked with students in group sizes of four, and students attended 92 percent of sessions, on average. Tutoring occurred over 10 weeks (February 23 through May 3, 2022) and comprised eight weeks of instruction. Four 30-minute tutoring sessions took place every week (Monday through Thursday) during the school day. During tutoring time, students in the control group either worked independently on an adaptive platform, collaborated with a peer, or worked with the classroom teacher 1:1 or in a small group on academic work the teacher chose for them. Students in both groups attended their assigned mathematics classrooms. The goal of this

study design was to learn about the impact of Cognition group tutoring by comparing outcomes between treatment group and control group students.

Measures and analysis. The study collected survey and math assessment data before and after the study period to measure outcomes of the group tutoring: a Cognition fractions assessment to measure math knowledge, the Patterns of Adaptive Learning Scale (PALS) to measure confidence in math, the Math and Me survey to measure enjoyment of math, and the Copilot-Elevate survey to measure the student–tutor relationship. We examined the impact of participation in Cognition’s group tutoring using a Bayesian linear regression model, which controlled for students’ scores on the baseline fractions assessment, school, and a series of demographic indicators. The sample included 157 students with complete math achievement data and 139 students with complete survey data measuring math confidence and enjoyment. Students in the treatment group completed a midpoint survey measuring the student–tutor relationship; the survey was based on the Copilot-Elevate teacher caring subscale.

Limitations. The study used a relatively small sample of 160 students, so results may not generalize to broader student populations. In addition, the study used a math knowledge assessment that was designed to align with the fractions content taught during tutoring sessions, so the estimated impact is a measure of improvement in fractions knowledge, not grade-level math content more broadly. Finally, although we compare the findings of this study to findings from an earlier study of 1:1 Cognition tutoring (Roschelle et al. 2020), the current study was designed to estimate the effect of 4:1 online group tutoring relative to receiving non-tutoring education time (the control condition). In other words, this study was not designed to formally compare two different versions of tutoring, so comparisons of the effect measured in 4:1 versus 1:1 tutoring are an informal exploration of findings from the two studies.

What did the study find?

Math knowledge. Students in the treatment group scored 9 percentage points higher on the Cognition fractions assessment than control group students, after accounting for baseline differences. The 9 percentage point difference between tutoring participants and nonparticipants translates to an effect size of 0.44 standard deviations, substantially larger than the benchmark of 0.2 standard deviations that is often used to identify large effects. A Bayesian analysis indicated with 99 percent confidence that Cognition tutoring had a positive effect on student learning. This effect size is similar to that of a 2020 efficacy study of Cognition’s 1:1 tutoring offering (Roschelle et al., 2020).

Student perceptions and beliefs. Students in the treatment group experienced higher levels of math confidence and enjoyment than students in the control group. Though not statistically significant, confidence in math among treatment group students exceeded that of students in the control group by 0.05 points on a 5-point scale, and enjoyment of math exceeded that of students in the control group by 0.07 points on a 5-point scale. Students who participated in Cognition group tutoring rated their relationship with their tutor at 4.25 on a 5-point scale, on average, indicating agreement or strong agreement that their relationship with their tutor was positive.

This study presents compelling early evidence for the impact of Cognition’s group virtual tutoring on student math outcomes. Cognition’s impact on student math outcomes is large compared to other online tutoring models (Gortazar et al., 2022; Carlana and La Ferrara, 2021). The impact is comparable to the impact observed in a recent study of its 1:1 tutoring offering (Roschelle et al., 2020), and the group model lowers the cost per student to the

district client. These findings suggest the next step of implementing a larger randomized controlled trial to validate whether virtual group tutoring can produce effects comparable to in-person tutoring interventions.

Introduction

Cognition delivers virtual tutoring in math and ELA, led by experienced educators. Their approach focuses on data-informed instruction and collaborative learning that encourages student-to-student interaction to build students' conceptual understanding. After a 2020 efficacy study of its 1:1 math tutoring offering, Cognition developed a group tutoring offering to reduce the per-student cost of tutoring while maintaining the quality of learning. In this setting, students are encouraged to collaborate with each other while working together on open-ended tasks as the tutor facilitates the session using video conferencing tools and interactive whiteboards.

This study aims to provide evidence on the impact of remote, virtual tutoring on student fractions knowledge and perceptions of math using a randomized controlled trial design. Specifically, we examined the impact of participating in Cognition group math tutoring sessions on 5th-grade students' math achievement, confidence, and enjoyment. In this evaluation, we sought to answer the following research questions:

1. Do students who participate in group tutoring score higher on a fractions math assessment than students who do not participate in group tutoring?
2. Do students who participate in group tutoring report higher levels of math confidence and enjoyment than students who do not participate in group tutoring?
3. How do students receiving group tutoring rate the quality of the relationship with their tutors? Does the reported quality of students' relationships vary by student characteristics, or by tutor?

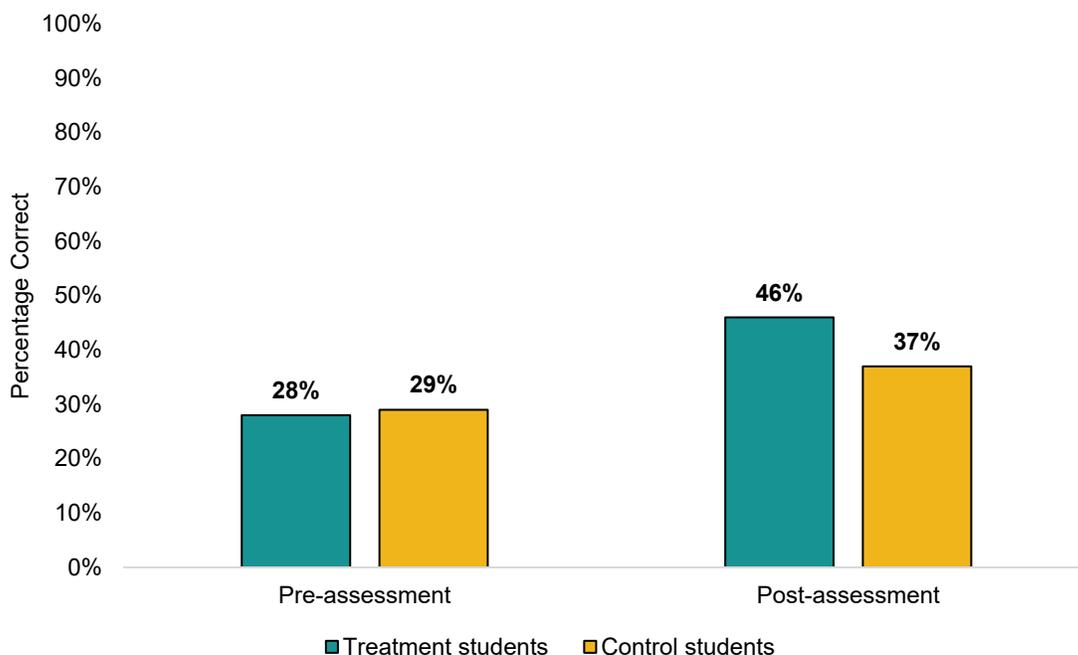
Summary of Findings

At the conclusion of the tutoring intervention, students who were randomly selected to participate in Cognition group tutoring demonstrated higher levels of fractions knowledge, confidence in math, and enjoyment of math than similar students who did not participate. Tutoring participants also reported positive relationships with their tutors, with little variation by tutor.

Key Findings

Students who participated in Cognition group tutoring demonstrated more knowledge of fractions than similar students who did not participate in tutoring.

At the end of the study, students who were randomly selected to participate in Cognition group tutoring performed, on average, 9 percentage points higher on the fractions assessment than similar students who were not selected to participate in tutoring (Figure 1). After accounting for the precision of the estimated effect, the analysis supports 99 percent confidence that Cognition tutoring had a positive effect on student learning. The 9 percentage point difference between tutoring participants and nonparticipants translates to an effect size of 0.44 standard deviations.

Figure 1. Post-tutoring fractions assessment scores (percentage correct)

Source: Assessment administered by Cognition in program weeks 1 and 10.

Note: This figure includes all students who completed the fractions assessment at both weeks 1 and 10 ($n = 157$).

Students who participated in Cognition group tutoring reported higher levels of confidence in and enjoyment of math than similar students who did not participate in tutoring.

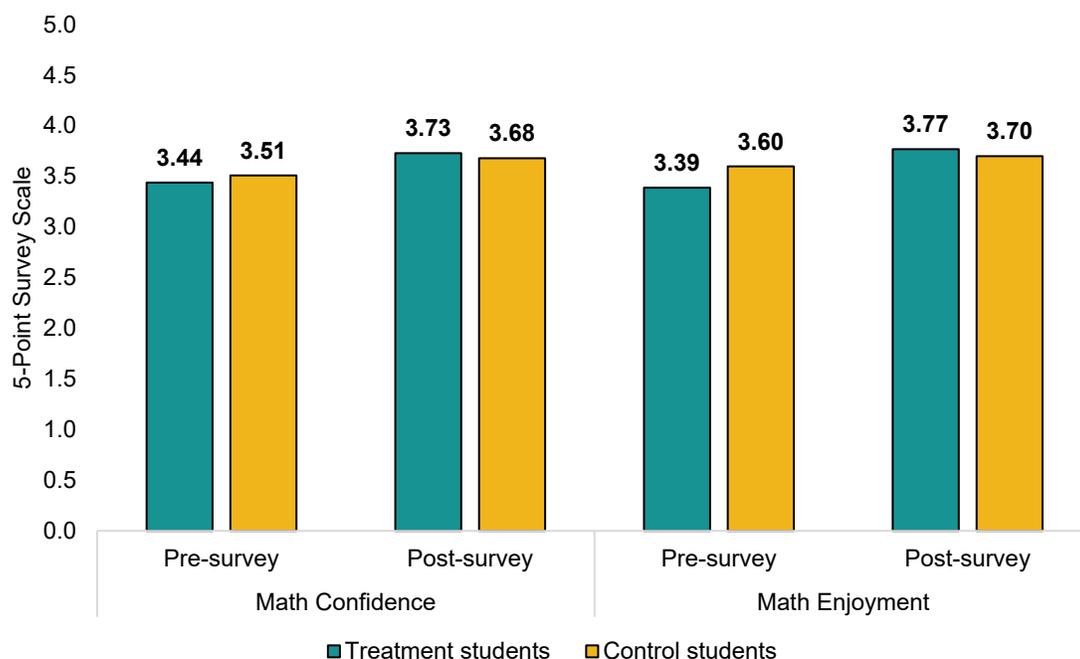
On both math confidence and math enjoyment survey constructs, students who were randomly selected to participate in Cognition group tutoring reported, on average, more growth in ratings from the pre-survey to the post-survey than similar students who did not participate in tutoring (Figure 2).

At the end of the study, students who were randomly selected to participate in Cognition group tutoring reported higher levels of math confidence than students who did not participate in tutoring. When asked to rate the extent to which they agreed with several statements about their math confidence on a 5-point Likert scale, on average, and controlling for baseline responses, confidence in math among students who were randomly selected to participate in Cognition group tutoring exceeded that of students in the control group by 0.05 points. This means that, on average, students in the treatment group were slightly more likely to agree or strongly agree with a variety of statements such as “How confident are you that you can do all the work in math class, if you don’t give up?”

Students who were randomly selected to participate in Cognition group tutoring also reported slightly higher levels of math enjoyment than students who did not participate in tutoring. On average, enjoyment in math among students who were randomly selected to participate in Cognition group tutoring exceeded that of students in the control group by 0.07 points. This means that students who participated in Cognition group tutoring were slightly more likely to agree with statements such as “I am really good at math” and “I can solve difficult math problems.” It is important to note that despite the groups being randomly assigned, responses about math enjoyment among the treatment and

control groups were not equivalent at baseline, with the control group's responses 0.21 points higher than those of the students in the treatment group. We included baseline responses as a control in analysis, which accounts for this discrepancy. See Table B.1 in Appendix B for additional baseline characteristics of the evaluation sample.

Figure 2. Change in math confidence and enjoyment scores (scale units)



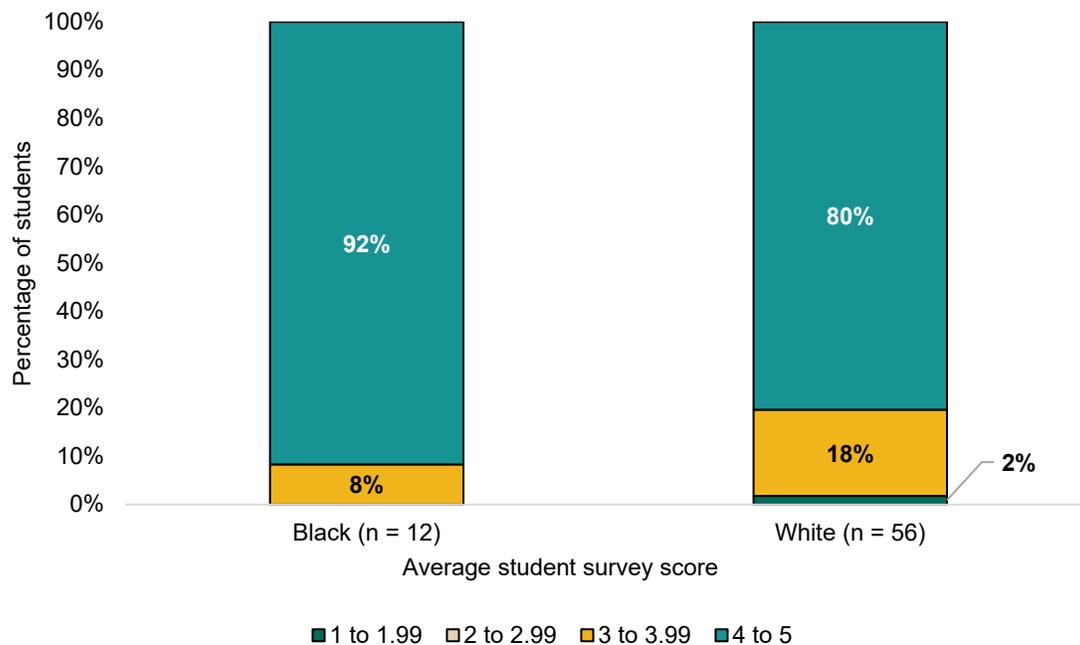
Source: Survey administered by Cognition in program weeks 1 and 10.

Note: This figure includes students who completed the math confidence ($n = 145$) or math enjoyment subscales ($n = 139$).

Students who participated in Cognition group tutoring reported positive relationships with their tutors, with little variation by tutor.

On average, students who were randomly selected to participate in Cognition group tutoring rated questions about their relationship with their tutor a 4.25 on a 5-point scale. This means that, on average, students agreed or strongly agreed with a variety of statements suggesting a positive relationship with their tutors at week 7 of the Cognition program.

A higher proportion of Black students rated the relationship with their tutors very positively (average of 4 to 5 on a 5-point scale) than White students. The proportion of Black students who strongly agreed with the three statements suggesting a positive relationship with their tutors was 11.3 percentage points higher than the proportion of White students reporting the same (Figure 3). Notably, this is based on a relatively small sample of 12 Black students, compared to 56 White students. The racial composition of the Cognition tutors was similar to that of the participating students, with 26 percent Black or mixed race tutors, 66 percent White tutors, and 6 percent Asian tutors.

Figure 3. Distribution of student-reported relationship with tutor, by student race

Source: Survey administered by Cognition in program week 7.

Note: This figure includes Black and White students who completed the student–tutor relationship survey ($n = 68$). The response rate for students in other racial subgroups was below the threshold for reporting. For the above analysis, 1 to 1.99 corresponds with “very negative” and 4 to 5 corresponds with “very positive.”

Students’ ratings of their relationship with their tutor varied little across tutors. The average student rating of each tutor ranged from 3.6 to 4.6 on a 5-point scale. On average, the students of 12 of the 15 tutors (80 percent) rated the relationship with their tutor very positively (4 to 5). The average student responses for the remaining three tutors (20 percent) indicated they somewhat agreed with statements indicating a strong relationship with their tutor (3 to 4).

Overarching Conclusion and Next Steps

The findings from this study provide encouraging evidence that the 4:1 math tutoring increases students’ math knowledge. Cognition’s group tutoring had a large impact on students’ performance on a post-test of fractions knowledge, which suggests that 4:1 tutoring is similarly as effective as Cognition’s 1:1 offering (Roschelle et al., 2020). The estimated effect on fractions knowledge, 0.44 standard deviations, compares favorably to recent estimates in an emerging body of evidence documenting the promise of individual and 2:1 online tutoring (see, for example, Carlana and La Ferrara [2021] and Gortazar et al. [2022] for early evidence on individual and 2:1 online tutoring, respectively).

Although the results are encouraging, there are limitations to the study to consider. The sample of students was relatively small, which limits the study’s generalizability. The fractions assessment was created by Cognition and includes content covered in tutoring. Using a fractions assessment that is externally validated could grant Cognition additional insight into the effectiveness of its tutoring offering relative to other similar programs. Similarly, providing some form of math support to the control group (though not the complete tutoring offering) might allow for additional insight into what

aspects of the 4:1 tutoring offering support the growth in math knowledge among participating students. Next steps, based on the findings of this study, include the following:

- **Expand 4:1 tutoring offerings.** Cognition currently provides group tutoring, of varying group size, to several districts nationally. Based on the current study's findings, Cognition plans to expand its offering of 4:1 group tutoring by recommending this group size to interested districts.
- **Help tutors align their tutoring topics with the standards taught in the classroom and review prerequisite skills as needed.** For this project, the participating district requested that Cognition provide its fractions-focused tutoring to students who were likely to benefit most from the tutoring program because they were six months to one year behind grade level at the start of the study. As a result, the content covered in tutoring sessions did not align with the content students encountered in their daily math class during the study. Cognition believes that its tutoring would be even more effective if the content in tutoring groups and math classes were better aligned; tutors would still review the prerequisite skills that students need to master their current grade level's content as needed. Cognition has updated its virtual platform so (1) teachers can tell tutors which standards students need to focus on based on classroom assessment results and (2) tutors can adjust and align their tutorial content accordingly. Cognition plans to monitor whether this change ultimately leads to an even greater impact on student math knowledge or confidence in math.
- **Plan for additional research into efficacy of group tutoring.** The findings from this study have inspired several new research priorities for Cognition. Cognition is interested in studying the relationship between the number of tutoring sessions attended and confidence in math, as well as the effectiveness of larger group tutoring (more than four students) and practices that enable effective student-to-student collaboration. In the year before this study, Cognition engaged in design research to identify pedagogical approaches tutors could use to promote students' collaborative learning. This research led Cognition to create an instructional support tool for tutors, which tutors used during the current study. Additional research will improve Cognition's understanding of how math confidence and student-tutor relationships relate to growth in student outcomes. See Appendix A for additional information on supports for collaboration.

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Appendix A. Detailed description of the group tutoring program

Cognition provides virtual math and ELA tutoring led by high-quality tutors. Cognition developed a fractions tutoring program for small groups of students, with a focus on fostering student collaboration. Cognition's theory is that expert tutors and collaborative learning will result in high-quality student-tutor relationships, improved peer collaboration skills, high engagement in tutoring sessions, and improvement in students' math knowledge, confidence in math, and enjoyment of math. Cognition aims to increase students' math knowledge, confidence, and enjoyment and, by offering a 4:1 student-tutor ratio, to reduce the per-student tutoring cost to districts, so that a broader range of students have access to affordable, high-quality tutoring at scale and can get to and stay on grade level or above grade level. The following are Cognition's three key features for the program included in this study:

- 1. Live virtual group tutoring.** Tutors provide instruction on fractions, including fractions on a number line, comparing and ordering fractions, mixed numbers and fractions greater than 1, and equivalent fractions. Students receive tutoring in groups of four by the same tutor every week for the length of the tutoring program.
- 2. High-quality and experienced tutors.** Experienced math educators lead tutoring sessions using fraction lessons with open-ended and inquiry tasks developed by Cognition. Tutors receive training on the group tutoring platform, professional development on instructional strategies and activities, and access to Cognition's library of instructional materials, collaboration menu, and activities to use during tutoring.
- 3. Collaborative learning.** The design of open-ended and inquiry math tasks and the use of collaborative learning norms support peer collaboration during group problem solving. Software tools, guidelines, and tutor training help tutors monitor student participation and promote peer collaboration.

Fifteen tutors provided tutoring to 80 5th-grade students in 11 elementary schools in a suburban, rural district in the southeastern United States. Teachers identified students who were likely to benefit most from the tutoring program because they were six months to one year behind grade level at the start of the study; all students included in the study met this criterion. Of the 80 students who participated in tutoring as part of this study, students attended 92 percent of sessions, on average. This relatively high attendance rate is attributed to tutoring occurring both during the school day (rather than afterwards), and during an intervention period (rather than during an elective). Cognition also notes that student attendance in school was relatively high compared to recent periods. Tutoring occurred over 10 weeks (February 23 through May 3) and comprised eight weeks of instruction. Four 30-minute tutoring sessions took place every week (Monday through Thursday). Data collection occurred three days before the start of tutoring and three days after the end of tutoring, and no tutoring occurred over the spring recess. The number of sessions offered varied from 28 to 30, with discrepancies due to field trips and professional development days for district or schools.

For the first three sessions of online group tutoring, tutors led activities to help students create the math norms used to build cooperative and collaborative virtual learning environments between students and between students and tutor. These math norms included explaining one's thinking,

actively listening, and reflecting on one's learning (comparing, critiquing, and summarizing). Tutors discussed and used the norms in every session, and tutors identified the norms when used (either by praising students or prompting for more).

Instructional supports for collaborative learning, provided by Cognition, are critical to its group tutoring model. Cognition engaged in design research activities in the year preceding this study to better understand which technology norms, collaborative learning norms, and training and learning materials facilitate online peer collaboration and group learning and improve students' understanding of mathematics. Recommended technology norms include keeping cameras and microphones on, using tools such as manipulatives to model one's thinking, and using the chat feature only if necessary. Recommended collaboration norms include explaining one's answers, actively listening, and reflecting on learning. This research also informed the creation of a menu of collaboration techniques and protocols to facilitate student-to-student collaboration for tutors to choose from when leading the virtual tutoring sessions.

The combination of tutors' extensive instructional experience, Cognition's tutor training, small-group interactions with students, and collaboration norms were expected to lead to strong student-tutor and student-student relationships during tutoring. These positive relationships, as well as increases in math knowledge, were expected to improve students' confidence and feelings of belonging in math in the short and long term. With increased short-term math knowledge, confidence, and enjoyment, students have the potential to reach and stay on grade level or above grade level, an outcome that has the potential to support longer-term math knowledge gains.

Appendix B. Methods

Experimental design. We used a randomized controlled trial to estimate the impact of receiving Cognition group tutoring on student math knowledge and math confidence and enjoyment. We analyzed survey data to understand Cognition students' confidence in math and enjoyment of math, relative to similar peers who did not participate in tutoring. We also analyzed survey data from tutoring participants to understand students' relationships with their tutors. The participating district requested that Cognition provide its fractions-focused tutoring to students who were likely to benefit most from the tutoring program because they were six months to one year behind grade level at the start of the study. One hundred sixty students across 11 elementary schools were recruited to participate in the study; groups of 8 or 16 students were randomly assigned in each of 11 schools to either participate in Cognition group tutoring or else not participate in math tutoring. Students were offered four 30-minute sessions a week for eight weeks (28 to 30 sessions total, due to holidays and field trips). During tutoring time, students in the control group either worked independently on an adaptive platform, collaborated with a peer, or worked with the classroom teacher 1:1 or in a small group on academic work the teacher chose for them. The goal of this study design was to learn about the impact of Cognition group tutoring by comparing outcomes between treatment group and control group students.

Measures. The study collected survey and math assessment data before and after the study period to measure outcomes of the group tutoring: a Cognition fractions assessment to measure math knowledge, the Patterns of Adaptive Learning Scale (PALS) to measure confidence in math, the Math and Me survey to measure enjoyment of math, and the Copilot-Elevate survey to measure the student-tutor relationship. Details on each of these survey measures are available in Mathematica's menu of high-quality middle years math student outcome measures, which were selected in consultation with external measurement experts (Bruch et al 2022). We examined the impact of participation in Cognition's group tutoring using a Bayesian linear regression model, which controlled for students' scores on the baseline fractions assessment, school, and student race and ethnicity. The sample included 157 students with complete math achievement data and 139 students with complete survey data measuring math confidence and enjoyment. Students in the treatment group completed a midpoint survey, based on the Copilot-Elevate tutor caring subscale. To assess the reliability of survey measures, we calculated the Cronbach's alpha for each survey measure, and all measures exhibited relatively high values substantially above the U.S. Department of Education's What Works Clearinghouse (2022) acceptable threshold of 0.60, except the student-tutor relationship measure (alpha = 0.49). The reliability coefficient (alpha) for PALS was 0.78 at post-study, and the reliability coefficient (alpha) for the math enjoyment post-study was 0.89.

Analysis. To analyze students' scores on the fractions assessment and beliefs about math, we used a Bayesian linear regression model facilitated by [Mathematica's e2i Coach tool](#). In this model, we controlled for students' baseline fractions assessment scores, their school, and student race. One hundred sixty students agreed to participate in the study. Of those 160 students, 157 completed both the pre- and post-tutoring fractions assessment. The three students who departed were in the treatment group. The baseline fractions assessment data for eight students (four in the treatment group and four in the control group) were misplaced by their tutor. Baseline scores for these students were imputed as mean of the scores of the other students in the treatment and control groups, respectively. For eight students (four in the treatment group and four in the control group), the baseline assessment was administered with the answers populated on six questions. These questions were considered unanswered and therefore assigned "incorrect."

The study's overall and differential attrition in the analysis sample for math knowledge (approximately 2 percent and 4 percent, respectively) met What Works Clearinghouse standards for low attrition using the more conservative "cautious" boundary. The analysis was an intent-to-treat analysis that included all randomly assigned students who had outcome data, regardless of their level of attendance in tutoring. Because it retains the full sample of students who were randomly assigned to study condition (as long as they had a test score), this analysis approach best draws on the study's experimental design to obtain a rigorous estimate of Cognition's effect on students' fractions knowledge. The regression model used to estimate Cognition's impact included indicators for the school-level randomization blocks to account for the study's design.

Baseline equivalence was checked for all key measures. The standardized difference between treatment and control groups was balanced or well-balanced across measures, except for math enjoyment, which was not balanced at baseline, with a standardized difference of 0.25 between the treatment and control groups. Table B.1 lists the characteristics of the evaluation sample at baseline and the measures of balance.

Table B.1. Baseline characteristics of the evaluation sample

Characteristic	Overall	Treatment	Control	Difference	Standardized difference ²
Baseline math assessment (percentage correct)	29%	28%	29%	-0.01	-0.06
Baseline math confidence survey (score on 5-point scale)	3.47	3.44	3.51	-0.07	-0.08
Baseline math enjoyment survey (score on 5-point scale)	3.5	3.39	3.6	-0.21	-0.25
Black (percentage of students)	18%	17%	20%	-0.03	-0.08
Hispanic (percentage of students)	8%	8%	9%	-0.01	-0.03
White (percentage of students)	79%	82%	76%	0.06	0.14

² Standardized difference is the difference between the treatment and control group divided by the within-sample standard deviation of the characteristic. Differences below 0.05 are considered well balanced, differences between 0.05 and 0.25 are considered balanced, and differences larger than 0.25 are considered problematic.