

# Minnesota Math Corps 2012-2013 State-Wide Evaluation

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## BACKGROUND OF THE MINNESOTA MATH CORPS

Minnesota Math Corps (MMC) is an AmeriCorps program that provides schools with tutors to support math development for students in grades 4 through 8. Math Corps tutors are trained to provide research-based math support and to administer formative assessment protocols. Tutors are also supported by a multi-level coaching model that includes site-based (“Internal”) and external (“Master”) coaches.

### Effective Service-Delivery

The Math Corps model aligns with response-to-intervention (RTI), which is a framework for delivering educational services effectively and efficiently (Burns, Deno, & Jimerson, 2007<sup>1</sup>). The key aspects of that alignment include the following:

- Data-driven screening decisions identify students who are at-risk for poor math outcomes.
- Evidence-based interventions
- Formative assessment
- High quality training in program procedures, coaching, and observations to support fidelity of implementation

In the RTI framework, data play the key roles of screening student eligibility for additional services and monitoring student progress toward achieving academic goals. Eligible students (defined as students below state proficiency expectations) are determined potential candidates to receive supplemental Math Corps support, which is often referred to as Tier 2 within an RTI framework.

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<sup>1</sup> Burns, K.M., Deno, S.L., & Jimerson, S.R. (2007). Toward a unified Response-to-Intervention model. In S.R. Jimerson, M.K. Burns, & A. VanDerHeyden (Eds.), *Handbook of Response to Intervention* (pp. 428-440). New York: Springer.

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The Math Corps program is focused on improving student skills in four math strands that were identified as critical within state standards. They include: number and operation, algebra, data analysis, and geometry and measurement. Full-time tutors work with approximately 25 at-risk students for 90 minutes each week. The tutoring interventions are provided through research-based supplemental math curricula and are complementary to the core Math instruction provided at each school. The ultimate goal of tutoring is to raise individual students' math skills so that they are on track to meet or exceed state math proficiency standards.

## Coaching and Support

As mentioned above, the Math Corps provides multiple layers of supervision to ensure integrity of program implementation. Site-specific Internal Coaches, who are typically staff math specialists, teachers, or curriculum directors, serve as immediate on-site supervisors, mentors, and advocates for members. The Internal Coach's role is to monitor members and provide guidance in the implementation of Math Corps' assessments and interventions. As the front-line supervisor, the Internal Coach is a critical component of the supervisory structure. The external, or Master Coach, is a contracted math expert who provides site staff (i.e., Internal Coaches and AmeriCorps members) with expert consultation on math instruction and ensures implementation integrity of Math Corps program elements. In addition to these two coaching layers, a third layer consisting of AmeriCorps program staff support helps ensure a successful year of AmeriCorps service. Program staff includes Math Corps employees who provide administrative oversight for program implementation to sites.

## Training

Prior to each school year, Math Corps hosts a three and a half day Summer Institute to train returning and new Master Coaches, Internal Coaches, and AmeriCorps members. This intensive, information-filled conference provides foundational training in the research-based math curricula used by Math Corps. During several sessions at the Summer Institute, members learn the skills, knowledge, and tools needed to serve as math interventionists. Members are provided with detailed *Math Handbooks* as well as additional resources. These resources are intended to provide members with just-in-time support and opportunities for continued professional development and skill refinement. Additional training and coaching sessions are provided throughout the tutors' year of service.

## INTRODUCTION TO THE EVALUATION

The Minnesota Math Corps evaluation addresses three broad questions with data collected during the 2012-2013 school year. The evaluation report is organized around each of these questions. Prior to presenting the results, a brief description of the data sources and collection methods is included. Following the results is an interpretation.

- 1. What is the scope of the Math Corps program in the state of Minnesota?**
- 2. What are the primary Math outcomes of the Minnesota Math Corps?**
- 3. What do key stakeholders and implementers report regarding how participation in Math Corps has affected their beliefs, opinions, and/or professional practices?**

## EVALUATION RESULTS

### 1. What is the scope of the Math Corps program in the state of Minnesota?

#### Data Source and Collection Methods

Data for evaluating the scope of the Math Corps program in Minnesota come from records kept and maintained by the Math Corps tutors, as well as administrative data maintained by the Math Corps program. Each tutor recorded basic student information and data on their tutoring activities.

Table 1: Number of sites, coaches, and tutors involved in Math Corps

Table 2: Summary of student participation

Table 3 Summary of student demographics

Table 4: Summary of intervention amounts

#### Results

TABLE 1: OVERALL NUMBER OF SITES, COACHES, AND TUTORS

Sites (Districts)	Internal Coaches	Master Coaches	Number of Tutors*
87 (25)	85	12	108

\*Defined as having entered at least one data point in the Math Corps data systems.

TABLE 2: STUDENT PARTICIPATION

Grade	Number	Percentage of Students
4th	630	25.67%
5th	612	24.94%
6th	408	16.63%
7th	351	14.30%
8th	453	18.46%
<b>Grand Total</b>	<b>2,454</b>	<b>100.00%</b>

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TABLE 3: STUDENT DEMOGRAPHICS

Gender	Ethnicity
53.42% Male	2.32% American Indian or Alaskan Native
	10.55% Asian or Pacific Islander
46.58% Female	13.57% Hispanic
	23.88% Black, Not of Hispanic Origin
	41.77% White, Not of Hispanic Origin
	7.33% Unknown/No Response

TABLE 4: AVERAGE INTERVENTION AMOUNTS FOR PARTICIPATING STUDENTS

Grade	Mean (SD) Weeks of Intervention	Mean (SD) Sessions of Intervention	Mean (SD) Sessions/Wk of Intervention	Mean (SD) Mins/Wk of Intervention
4th	26.0 (9.6)	58.8 (29.2)	2.2 (.07)	74.2 (13.6)
5th	26.9 (8.7)	57.2 (25.7)	2.1 (.06)	71.7 (12.1)
6th	28.1 (9.0)	58.0 (25.9)	2.0 (.06)	80.9 (15.9)
7th	26.5 (9.4)	49.8 (24.3)	1.8 (.04)	74.9 (15.8)
8th	23.6 (9.8)	40.8 (21.5)	1.7 (.04)	70.6 (13.9)
<b>Overall</b>	<b>26.2 (9.4)</b>	<b>53.7 (26.6)</b>	<b>2.0 (.06)</b>	<b>74.1 (14.4)</b>

## Interpretation

As shown in Table 1, over 100 Math Corps tutors worked with students in schools from 25 school districts across the state. Table 2 indicates that tutors were able to work with 2,454 at-risk students in grades 4 through 8, with somewhat more students receiving tutoring in grades 4 and 5 than at older grades.

Demographic information reported in Table 3 shows that more males than girls tended to receive Math Corps support, and that the majority of students were identified as White, but a notable percentage of students identified as Asian/Pacific Islander, Hispanic, or Black received tutoring. Finally, Table 4 reports relatively consistent amounts of intervention across each grade, with the exception that 8<sup>th</sup> graders tended to receive at least 2 weeks less and approximately 9 fewer sessions than other students. Overall, the Math Corps program provided approximately 54 sessions of intervention across roughly 26 weeks of tutoring, with over 70 minutes of tutoring provided on average each week.

## 2. What are the primary math outcomes of the Math Corps?

### Data Source and Collection Methods

Data for math outcomes are collected from the schools that have Math Corps tutors as well as by Math Corps tutors. Assessments that are used to produce math outcomes include the state accountability assessment (Minnesota Comprehensive Assessments for Math, 3<sup>rd</sup> edition; MCA-III), the Northwest Evaluation Association Measures of Academic Progress (MAP), and skill-specific math fact fluency data. Each assessment has evidence indicating that it is a valid and appropriate assessment for its particular purpose.

The MCA-III and MAP assessments were each administered by school personnel, and data were shared with Math Corps according to a data sharing agreement. Data for reporting MCA-III outcomes are based on two spring administrations. The first administration was each student's MCA-III score from the previous year, and the second was each student's MCA-III score from the end of the current year. Data for reporting MAP outcomes are also based on two administrations, but the first occurred during the fall of the current year and the second occurred during the spring of the current year. (\*Note: several school districts decided to stop one or both of the MAP administrations after starting the 2012-2013 school year, and therefore their data are not included in the reported results.) Finally, math fact fluency data were collected by Math Corps tutors at five time points throughout the school year.

[Table 5:](#) Summarizes student performance on the MCA-III

[Table 6:](#) Summarizes student performance on the MAP

[Table 7:](#) Summarizes student performance on the Math Fact Fluency Assessments

## Results

TABLE 5: RESULTS FROM MCA-III

Grade	Number with MCA Results	Number Proficient	Percent Proficient*	Number Partially Proficient	Percent Partially Proficient	Number Showing Improvement	Percent Showing Improvement
4	600	258	43.0%	209	34.8%	308	51.3%
5	578	139	24.0%	288	49.8%	199	34.4%
6	378	111	29.4%	180	47.6%	176	46.6%
7	347	154	44.4%	161	46.4%	220	63.4%
8	440	163	37.0%	199	45.2%	253	57.5%
<b>Overall</b>	<b>2,343</b>	<b>825</b>	<b>35.2%</b>	<b>1,037</b>	<b>44.3%</b>	<b>1,156</b>	<b>49.3%</b>

\*NOTE: Changes to testing procedures from the 11-12 to 12-13 school year may have influenced results. In particular, in 11-12 students took the MCA-III three times and the highest score was their final scores. Students also took the MCA-III three times in 12-13, but the final administration was recorded.

TABLE 6: RESULTS FROM MAP

Grade	Number with MAP Results*	Number Above Growth Expectations	Percent Above Growth Expectations	Expected Improvement	Average (SD) Improvement
4	415	303	73.0%	8.7	13.3 (8.7)
5	392	251	64.0%	8.1	11.5 (8.8)
6	322	191	59.3%	6.0	7.9 (7.9)
7	290	183	63.1%	4.9	7.2 (7.4)
8	349	195	55.9%	4.3	5.2 (8.6)
<b>Overall</b>	<b>1,768</b>	<b>1,123</b>	<b>63.5%</b>	-	<b>9.3 (8.9)</b>

\*NOTE: Several districts decided to discontinue one or both of the fall and spring MAP administrations after beginning the 12-13 school year.

TABLE 7: RESULTS FROM MATH FACT FLUENCY ASSESSMENTS

Grade	Number*	Average Probe 1	Average Probe 5	Average (SD) Improvement	Average (SD) Improvement Between Time Points (Slope)
4	444	14.9	24.7	9.0 (7.4)	2.3 (2.2)
5	448	19.6	27.0	6.6 (6.8)	1.9 (2.1)
6	306	24.4	30.1	6.6 (6.6)	2.0 (1.9)
7	251	23.4	28.9	6.2 (7.2)	1.9 (2.8)
8	277	25.9	29.9	6.6 (8.5)	1.5 (3.1)
<b>Overall</b>	<b>1726</b>	<b>20.9</b>	<b>27.6</b>	<b>7.2 (7.3)</b>	<b>2.0 (2.4)</b>

\*Number shown corresponds to the number of students with an assessment score entered for Probe 1 and for Probe 5; the number of students with data entered in one of the two time points (or for Probes 2-4) was higher.

## Interpretation

The tables in this section summarize student performance on several measures of math skill. Table 5 shows the results of students on the state math assessment (MCA-III), and indicates that over 35% of the students demonstrated proficiency. This is noteworthy because almost all students who receive Math Corps tutoring are selected because they were below proficiency levels on the MCA-III in the previous year. Students in 4<sup>th</sup> and 7<sup>th</sup> grade had the strongest MCA-III results, with proficiency levels at or above 43%, whereas students in 5<sup>th</sup> and 6<sup>th</sup> grade had relatively lower levels of proficiency. These results can be further illustrated with anecdotal reports of Math Corps' impact from individual sites. One site reported an internal analysis that showed only 20% of their students who did not receive Math Corps demonstrated proficiency on the MCA-III while almost 50% who received Math Corps did reach proficiency.

It is important to note that changes to the MCA-III administration procedures may have affected results as compared to previous years. One potential impact is that because the highest score of three administrations was recorded in 11-12, student scores were generally higher in the 11-12 school year, which could have led to biases in which students were selected to receive Math Corps

in 12-13. In particular, potentially inflated scores may have led Math Corps to select students whose skills were actually below the level of skill typically served by Math Corps (the program typically recommends the lowest students receive services directly from school personnel), which could have affected results.

Table 6 displays results from the MAP assessment, which includes within-year growth of math scores from fall-to-spring. The MAP assessment includes a grade-specific growth target that can be used as a reference to determine whether students met or exceeded grade-level growth expectations. Results indicate that over 63% of the students who received Math Corps met or exceeded those growth expectations. The final two columns of Table 6 also illustrate that average growth across each grade exceeded each grade's corresponding growth targets.

An important consideration for interpreting the MAP results is that the sample from which data were available may not fully reflect the performance of all students who received Math Corps. The smaller numbers of students with data (relative to the MCA-III) reflect the decision of districts to discontinue one or both of the fall and spring administrations of the MAP. Importantly, two districts in that group were located in the urban center of the Twin Cities metropolitan area. Moreover, there may be other shared characteristics of districts that decided to discontinue the MAP. Thus, results may be more representative of suburban or out-state performance, and should be interpreted with these considerations in mind.

Table 7 shows the performance of students on skill-specific math fact fluency probes. These probes measure student performance on important foundational math calculation skills. The average improvement results in the last two columns show how these skills developed during Math Corps tutoring. Students in 4<sup>th</sup> grade tended to improve the most relative to other grades. Students in each grade increased their math calculation skills by 1.5 to 2.0 units between each administration (a total of 5 administrations occurred).

## 3. What do key stakeholders and implementers report regarding how participation in Math Corps has affected their beliefs, opinions, and/or professional practices?

### Data Source and Collection Methods

Data for stakeholder and implementer beliefs, opinions, and professional practices come from participant surveys. Math Corps Internal Coaches and tutors completed surveys in the spring of the 2012-2013 school year. A total of 43 Internal Coaches and 80 tutors completed surveys.

Table 8: Presents survey results from Internal Coaches

Table 9: Presents survey results from tutors

### Results

TABLE 8: RESULTS FROM INTERNAL COACH SURVEYS

The following statements were designed to capture Internal Coach perceptions regarding the Math Corps program. For each item, they were asked to select the degree to which they agreed.				
Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
Generally speaking, Math Corps is a good fit with your school	90.5%	9.5%	0.0%	0.0%
The Math Corps model and approach to mathematics interventions complements our program.	66.7%	28.6%	4.8%	0.0%
Our school and Minnesota Math Corps measure student progress in the same way.	35.7%	45.2%	16.7%	2.4%
Math Corps is an integrated part of our building's pre-referral, or other problem solving or targeted intervention system.	42.9%	35.7%	11.9%	9.5%
Minnesota Math Corps roles are clearly defined at our site.	73.8%	23.8%	2.4%	0.0%
Our school staff is receptive to including Minnesota Math Corps in our instructional program.	83.3%	9.5%	7.1%	0.0%

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TABLE 9: RESULTS FROM TUTORS

The following statements were designed to capture Member perceptions regarding the Math Corps program. For each item, they were asked to select the degree to which they agreed.				
Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
Participation in Math Corps had a positive impact on me this school year.	50.00%	39.74%	10.26%	0.00%
Participation in Math Corps had a positive impact on the site I served this school year.	42.31%	53.85%	2.56%	0.00%
Participation in Math Corps had a positive impact on the students I served this year.	46.15%	53.85%	0.00%	0.00%
As a result of my participation in Math Corps, I am considering a career involving children	32.47%	36.36%	27.27%	2.60%
As a result of my participation in Math Corps, I am considering a career in teaching or education	31.17%	35.06%	27.27%	5.19%
As a result of my participation in Math Corps, I am committed to continued volunteering in schools	24.68%	55.84%	18.18%	1.30%
As a result of my participation in Math Corps, I am committed to ongoing promotion of mathematics.	40.26%	48.05%	11.69%	0.00%
As a result of my participation in Math Corps, I am committed to continued community service.	33.77%	49.35%	14.29%	2.60%
As a result of my participation in Math Corps, if a job I hold in the future does not have community service as part of its mission, I will encourage the organization to include opportunities for community service.	15.58%	58.44%	23.38%	2.60%

## Interpretation

Results from surveys of Math Corps coaches and tutors indicate that the key stakeholders who implement Math Corps believe the program was generally positive for both students and schools. Table 8 shows that 100% of Internal Coaches felt Math Corps was a good fit with their school and over 95% felt it complemented their existing math programming. Similarly, Table 9 shows that

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100% of tutors felt Math Corps had a positive impact on students and over 97% felt it had a positive impact on the school.

Results from Table 8 also suggest that Math Corps is typically well-integrated within schools; however, there appears to be potential in some sites to more closely align Math Corps activities with related school-based procedures (e.g., pre-referral practices for special education; problem-solving teams within RTI models). Approximately 20% of coaches reported disagreeing with the statement that Math Corps aligns with these practices.

Results from Table 9 also provide information about how Math Corps affected tutors. Overall, the Math Corps experience appears to have had a positive impact in terms of influencing tutors toward considering both service and the education of at-risk students. For example, approximately 85% of the tutors reported that Math Corps has positively impacted their likelihood to engage in community service, and approximately 65% - 70% are considering future careers involving children or their education.