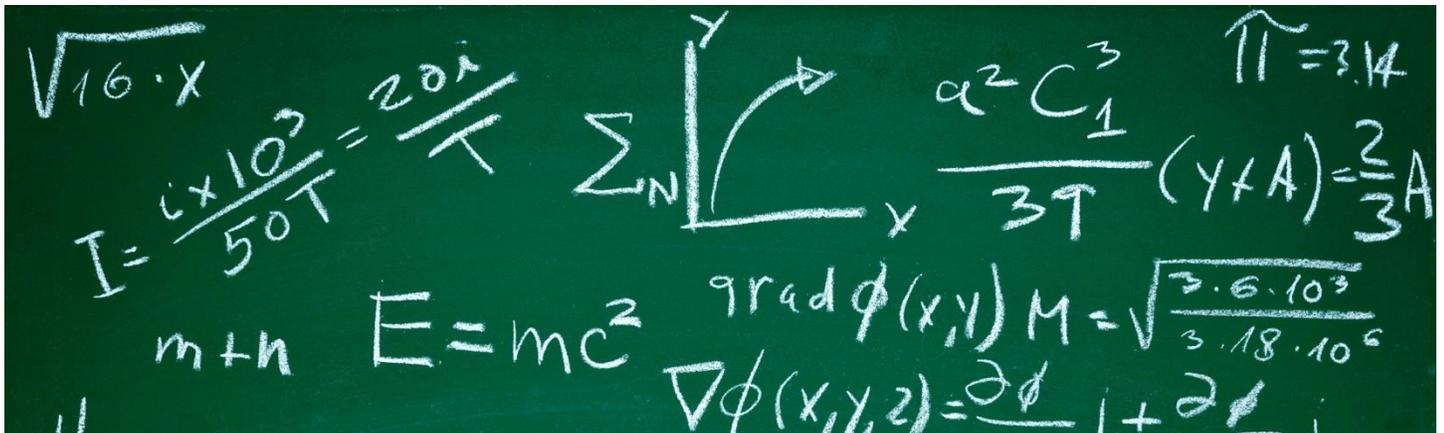


The MATHCOUNTS Foundation Competition Series Evaluation: 2017 Coach and Student Survey Report

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Summary and Indications



The MATHCOUNTS Foundation is a non-profit organization that offers middle school students the ability to gain skills and confidence in math through fun and challenging programs. These programs include the MATHCOUNTS Competition Series (students compete face-to-face solving math problems), the National Math Club (students meet and engage in math in a non-competitive way), and the Math Video Challenge (a national program that challenges students to refine their math, communication, and technology skills through a video project).

The MATHCOUNTS Foundation sought to gain a greater understanding of how the Competition Series aligns with the organization's overall mission and goals, as well as the satisfaction of students and coaches with the series. To this end, the MATHCOUNTS Foundation contracted with Westat to administer a survey of student and coach participation in the MATHCOUNTS Competition Series.

The outcome of this part of the evaluation provides:

- An overview of program characteristic including characteristics of students and coaches
- An assessment of students' perception of math and STEM overall,
- A snapshot of students future plans as they relate to math and STEM,
- A measurement of student and coach satisfaction with the Competition Series
- A review of the helpfulness of the program for coaches teaching math and STEM concepts and general skills as well as students learning math and STEM concepts and general skills.

The coach and student surveys were administered at chapter level MATHCOUNTS competitions throughout February 2017. A total of 80 chapter competitions were selected for survey administration. The survey sought to obtain feedback from team coaches and students at the competition. Both coach and student surveys consisted of self-administered, paper surveys.

A total of 63 chapters responded to the survey resulting in 667 completed coach surveys and 5,299 completed student surveys.

The following sections present a summary of the key findings of the evaluation as well as potential implications of the research.

I.A Summary of Results

I.A.1 Survey Response

- Overall, 79 percent of sampled chapters participated in the survey resulting in 667 completed coach surveys and 5,299 completed student surveys.

I.A.2 Coach Characteristics

- MATHCOUNTS Competition Series coaches were predominantly white (79%) and female (64%).
- The majority of coaches (52%) had over 12 years of teaching experience. Eighty-nine percent of coaches had taught at some point.
- Sixty-three percent of coaches have been coaching MATHCOUNTS for five years or less.
- The majority of coaches initially heard about the Competition Series from their principal or another teacher (54%). Coaches typically hear about new math/STEM programs through email (87%).
- Coaches were most likely to coach a Competition Series team to increase students' interest in and excitement about math/STEM (36%), or to help students learn and increase students' confidence in math/STEM (32%).

I.A.3 Student Characteristics

- Sixty-one percent of students were male and 39 percent were female.
- Minority representation in the Competition Series for Black or African American (3.4%) and Hispanic or Latino (7.2%) students was at a lower percentage than the equivalent percentages of minorities in the nation. Representation for Asian (34%), American

Indian/Alaskan Native (3.3%) and Hawaiian/Pacific Islander (1.5%) students exceeded the equivalent percentages of minorities in the nation based on KIDS COUNT data¹.

- Forty-eight percent of competing students were in 8th grade, 33 percent of students were in 7th grade, and 19 percent of students were in 6th grade.
- Sixty percent of students were participating in the MATHCOUNTS Competition Series for the first time, and 65 percent were attending their first MATHCOUNTS competition.
- Nineteen percent of competing students reported participating in the National Math Club and six percent reported participating in the Math Video Challenge.
- Students were most likely to enroll in the MATHCOUNTS Competition Series because math/STEM was their favorite subject (39%) or because they wanted to improve their math/STEM skills (22%).
- Half of students (50%) first heard about the Competition Series from a teacher or school staff.

I.A.4 Program Characteristics

- The majority of MATHCOUNTS Competition Series teams are from public schools (72%). Private schools host 21 percent of competing teams and Charter schools host 6 percent.
- Thirty-two percent of programs reported having a club size of 20 students or greater.
- Roughly a quarter of participating programs also reported participating in the National Math Club program (27%), and eight percent participated in the Math Video Challenge program.

I.A.5 Student and Coach Perception and Preference of Math and STEM

- Coaches had a higher perception of the industry than students. Overall, coaches reported an average industry perception score of 7 on a possible range of -8 (negative perception) to 8 (positive perception). Students reported an average industry perception score of 8 on a possible range of -12 to 12.
- Male and female participants reported highly positive perceptions of math/STEM overall, the math/STEM industry, and their own math/STEM abilities.

¹ <http://datacenter.kidscount.org/data/tables/8446-child-population-by-race-and-age-group#detailed/1/any/false/573,869,36,868,867/68,69,67,12,70,66,71,13|/17077,17078>

- Students who were participating in the MATHCOUNTS Competition Series for the first year reported significantly lower levels of perception of math/STEM than students who were competing for their second or third year.
- Students from public schools reported a significantly more positive perception of math and STEM than students from charter schools or private schools.

I.A.6 Future Plans of MATHCOUNTS Competitors

- More than 80 percent of competing students reported plans to take more math classes in high school than was necessary.
- Eighty-six percent of competing students reported plans to pursue postsecondary education.
- Of those students planning to pursue postsecondary education, 60 percent have plans to pursue a degree in a math or STEM subject.
- Almost 50 percent of competing students have an interest in a career in Engineering. Thirty-seven percent reported an interest in a career as a computer programmer or technician, and 37 percent reported an interest in a career in science.
- Twenty-four percent of competing students reported that participating in MATHCOUNTS influenced their future plans.
- Male students were less likely to report plans to pursue postsecondary education, but were more likely to report plans to pursue a degree in math/STEM than their female counterparts.
- Students who participated in the MATHCOUNTS Competition Series for three years were significantly more likely to plan to take additional math classes in high school, attend postsecondary education, and pursue a degree in math or STEM.
- Students with the most positive perception of math and STEM are significantly more likely to plan to take additional math classes in high school, attend postsecondary education, and pursue a degree in math or STEM.
- Students with the most positive perception of the industry are significantly more likely to report that MATHCOUNTS influenced their future plans.

I.A.7 Student Satisfaction with the MATHCOUNTS Competition Series

- Over 80 percent of student competitors agreed that their confidence in math/STEM and their excitement for math/STEM have grown since participating in the MATHCOUNTS Competition Series.

- Approximately 95 percent of students reported being satisfied with the Competition Series.
- While student satisfaction was high, students were not likely to promote the program to their peers. The net promoter score for students was -1.9 on a scale of -100 to 100.
- Over 30 percent of students reported that they did not know what they would change to improve their MATHCOUNTS experience. Eighteen percent of students suggested additional time in meetings and competitions, and an additional 10 percent suggested more challenges.
- Students who participated in MATHCOUNTS for multiple years did not report increased levels of satisfaction, but they did perceive a greater influence of the program on their confidence in and excitement for math/STEM.
- Students who participated in the Competition Series for multiple years were also more likely to recommend the program to other students.
- Students satisfied with the MATHCOUNTS Competition Series were significantly more likely to have a positive perception of math/STEM.
- Students who reported that MATHCOUNTS had increased their confidence in and excitement for math and STEM also reported a greater propensity to plan to take additional math classes in high school, attend postsecondary education, and pursue a degree in math or STEM.
- Students competing on teams from public schools reported a significantly higher perception of the influence of MATHCOUNTS than competitors from private schools.
- Students were more likely to perceive the influence of MATHCOUNTS, and be satisfied with the program, if their coach had 21 or more years of teaching, or if their coach had coached a MATHCOUNTS team in the past.

I.A.8 Coach Satisfaction with the MATHCOUNTS Competition Series

- Nearly all coaches surveyed agreed that after participating in the MATHCOUNTS Competition Series students were better able to approach new math problems. Almost 90 percent of coaches also reported that their confidence in teaching math/STEM has grown due to their participation in the program.
- Over 95 percent of coaches are satisfied with the MATHCOUNTS Competition Series overall.
- Coaches using MATHCOUNTS elements and resources were overwhelmingly satisfied with them. However, a majority of coaches reported that they did not use, or were unaware of resources such as the MATHCOUNTS Trainer APP, MATHCOUNTS Minis, and the OPLET database of problems and solutions.

- With a Net Promoter Score of 60, coaches are much more likely to recommend the Competition Series to another educator than students are to recommend the program to their peers.
- Almost 30 percent of coaches reported that no changes were needed to the Competition Series. Just over 25 percent of coaches asked for more or improved materials and better communications from the MATHCOUNTS Foundation.
- The data suggests that experienced coaches are most likely to value the Competition Series as a whole. One interpretation of this analysis is that coaches gain a deeper appreciation for the MATHCOUNTS competitions series as they participate over multiple years. Another possibility is that coaches who have less appreciation for the Competition Series tend to drop out of the program.

I.A.9 Math Concepts Taught

- Roughly 90 percent of coaches reported a positive perception of the MATHCOUNTS Competition Series' ability to help them teach specific math/STEM concepts, and almost 95 percent of coaches reported a positive perception of the program's ability to help them enhance students' general skills and abilities.
 - Coaches reported that the Competition Series was most helpful in introducing or exploring probability and counting, geometry, and logic, and least helpful in introducing or exploring statistics and data and measurement.
- Coaches with the main goal of 'giving students with an interest in math an opportunity to engage in a social setting' perceived the Competition Series to be slightly less helpful than coaches who reported other goals for participation.
- Around 75 percent of students reported a positive perception of the MATHCOUNTS Competition Series' ability to help them learn specific math/STEM concepts and general skills.
 - Students reported that the Competition Series was most helpful for learning probability and counting, logic, and sequences, series, and patterns. Agreeing with their coaches, students reported that the program was least helpful in learning statistics as well as data and measurement.
 - Students were more likely than coaches to report that a concept was not covered in their MATHCOUNTS club, primarily measurement (16.5% of students report as not covered) and statistics and data (14.2% of students reported as not covered).
- Female competitors were significantly more likely to report that MATHCOUNTS helped them learn general skills and abilities.

- Students in 8th grade reported the lowest levels of perceived helpfulness of the Competition Series to learn math/STEM concepts, while students who had participated in the program for multiple years reported a significantly more positive perception of the same.
- Students in public school perceived a greater helpfulness of the program than students from private schools.
- Students' perceived helpfulness of the MATHCOUNTS program appears to correlate with their overall perception of math/STEM.
- Higher perceived helpfulness of the Competition Series was reported by students planning to take additional math classes in high school, pursue postsecondary education, and pursue a degree in a math or STEM field.
- Coaches with the highest perception of the helpfulness of the MATHCOUNTS Competition Series to teach math/STEM concepts and general skills appear to have students with a higher propensity to plan to take additional math classes in high school or to pursue a degree in a math/STEM field.

I.B Indications

1. The MATHCOUNTS Competition Series works; keep going.

Roughly 95 percent of students and coaches reported being satisfied with the Competition Series. That statement alone speaks to the quality of the program, but the evaluation revealed the origins and associations of satisfaction. Over 80 percent of students reported that participating in the Competition Series helped to grow their confidence in and excitement for math and STEM. Nearly all coaches (97%) agreed that after participating in the program students were better able to tackle math problems they had not seen before. Seventy-five percent of students reported that participation in MATHCOUNTS helped them learn specific math/STEM concepts and general skills, while at least 90 percent of coaches reported that the program helped them teach their students these math/STEM concepts and general skills.

Another measurement of the success of the program is to examine student outcomes. Over 95 percent of students reported a positive perception of math and STEM overall. Over 90 percent of students reported a positive perception of their own math and STEM abilities, and 90 percent reported a positive perception of the importance of math and STEM in their future education and careers. Over 80 percent of students participating in the Competition Series plan to take additional math classes in high school, 86 percent of students plan to pursue postsecondary education, and, of

those, 60 percent plan to pursue a degree in a math or STEM field. Students reporting future plans, from taking math classes in high school to pursuing a degree in a math or STEM field, were also more likely to perceive a greater influence from participation in the Competitions Series, or that the Competition Series had helped them learn math or STEM concepts or general skills.

As well, students who reported the highest levels of satisfaction with the MATHCOUNTS Competition Series also reported the most positive perception of math and STEM as a whole. While the directionality of this relationship cannot be confirmed through this research, every outcome speaks well for the success of the Competition Series. In one direction, students who have a positive perception of math and STEM fields report high levels of satisfaction with the MATHCOUNTS program. In the other direction, students who have a high level of satisfaction with the MATHCOUNTS program report the most positive perceptions of math and STEM fields.

2. Engagement of minorities

The ethnic makeup of the MATHCOUNTS Competition Series appears to skew towards White/Caucasian (48%) and Asian (34%) students. While the proportion of white/Caucasian students is roughly representative of the child population aged 5-17 in the U.S. (ages 5-11 = 51% and ages 12-17 = 54% in 2015), the proportion of Asian students far exceeds population estimates (ages 5-11 = 5% and ages 12-17 = 5% in 2015). The proportion of Hispanic students (7.2% of participating students) is less than population estimates (ages 5-11 = 25% and ages 12-17 = 23% in 2015) as is the proportion of Black or African American students (3.4% of participating students) (ages 5-11 = 14% and ages 12-17 = 14% in 2015²), indicating these minorities are potentially underrepresented in the program.

3. Bolstering the confidence of female participants

Overall, female competitors reported positive perceptions of math and STEM, though slightly less positive than their male counterparts. Breaking this perception down, male and female competitors reported equally positive perceptions of the influence of math and STEM on their future, but female competitors were less likely to agree that math was their best subject, that they were confident in

² <http://datacenter.kidscount.org/data/tables/8446-child-population-by-race-and-age-group#detailed/1/any/false/573,869,36,868,867/68,69,67,12,70,66,71,13|/17077,17078>

their math and STEM skills, or that they could work through new math/STEM problems. This finding is consistent with national education studies (Corell (2001)³, Sax (1994)⁴)

There are early indications, however, that female competitors in the MATHCOUNTS Competition Series are being given the support they need to build their confidence in math and STEM subjects. Female students reported a greater change in their perception of math and STEM over their years participating in the MATHCOUNTS Competition series than male competitors. Female students also reported a higher perceived influence of the Competition Series when it comes to helping them learn math and STEM concepts and general skills.

4. Coaches are the key to spreading MATHCOUNTS

Students reported high levels of satisfaction with the Competition Series, but this satisfaction did not translate to a propensity to promote the program to their peers. Students reported a Net Promoter Score of -1.9, indicating that they were more likely to not recommend the program. On the other hand, coaches also reported high levels of satisfaction with the program, but their satisfaction did align with their propensity to promote the program to their peers. Coaches reported a Net Promoter Score of 60.1 indicating that they are much more likely to promote the program than not. Coaches' propensity to recommend the Competition Series to other educators is important for recruiting additional students to the program as half (50%) of students reported that they first heard about the Competition Series from a teacher or other school staff.

There may also be an opportunity to leverage the most experienced coaches to promote the Competition Series to other educators. Coaches with the most teaching experience (21 or more years) report the highest levels of satisfaction with the Competition Series, as well as the most positive perception of the helpfulness of the program to teach math/STEM concepts and general skills. These same teachers also reported a higher Net Promoter Score (71). One possible strategy based on this information would be to leverage the goodwill of the senior teachers in the MATHCOUNTS Competition Series as promoters of the programs and potentially to reach out to these experienced teachers to capture their perspectives on the program.

³ Correll, S. J. (2001). Gender and the career choice process: the role of biased self-assessments. *Am. J. Sociol.* 106, 1691–1730. doi: 10.1086/321299

⁴ Sax, L. (1994). Mathematical self-concept: how college reinforces the gender gap. *Res. High. Educ.* 35, 141–166. doi: 10.1007/BF02496699

5. Coaches are satisfied with the program overall but suggest enhancements in communication

Overall, coach satisfaction with the MATHCOUNTS Competition Series is high; 95 percent of coaches reported satisfaction with the program. When asked what, if anything, they would like to change about the program, almost 30 percent of coaches reported no need for changes. However, slightly over a quarter of coaches reported that the program could be improved with additional or more accessible materials and better communication. This coincided with the finding that some of the MATHCOUNTS elements/resources were relatively unknown to coaches. For example, 23 percent of coaches reported being unaware of the MATHCOUNTS Trainer App, and 17 percent reported being unaware of the MATHCOUNTS Minis monthly video series.

6. Coaches and Students from public schools reported the greatest benefit from MATHCOUNTS participation

While teams competing from public schools were just as likely to be satisfied with the program overall as teams competing from private schools, students and coaches from public schools perceived a greater level of helpfulness from MATHCOUNTS participation. Both students and coaches from public schools were more likely to report MATHCOUNTS as helpful in introducing or exploring math/STEM concepts and general skills and abilities than those from private schools. Additionally, students from public schools were more likely than students from private schools to feel that MATHCOUNTS influenced their perception of math/STEM in terms of their confidence and excitement in the subjects.

While this research cannot speak to underlying differences in environments at public schools vs. private schools, it does support the finding that students and coaches from public schools report being influenced and helped by the MATHCOUNTS Competition Series at a higher rate than those from private schools. The program is making a difference in public school students' exposure to and perception of math/STEM. This information could be useful in the recruitment and retention of team from public schools, as well as guide the foundation's outreach to Private Schools.

Background and Purpose



The MATHCOUNTS Foundation is a non-profit organization that offers middle school students the ability to gain skills and confidence in math through fun and challenging programs. These programs include the MATHCOUNTS Competition Series (students compete face-to-face solving math problems), the National Math Club (students meet and engage in math in a non-competitive way), and the Math Video Challenge (a national program that challenges students to refine their math, communication, and technology skills through a video project).

The MATHCOUNTS Foundation sought to gain greater understanding of how the Competition Series aligns with the organization's overall mission and goals, as well as the satisfaction of students and coaches with the series. The MATHCOUNTS Competition Series is open to sixth, seventh, and eighth grade students and offers competitions at the school, chapter, state, and national levels. At each competition, students come together face-to-face and complete four different rounds that test speed and accuracy, problem-solving, mathematical reasoning, and collaboration.

This report summarizes the findings of one aspect of the Competition Series evaluation, the survey of student and coach participation. Using a self-administered survey of both coaches and students, distributed at the chapter competitions, The MATHCOUNTS Foundation sought to understand perceived value of and satisfaction with the Competition Series. The coach and student surveys also collected coach and student characteristics, students' perception of the math and Science, Technology, Engineering and Math (STEM) fields, and their plans to pursue further education and a career in those fields.

Questionnaire development and analysis addressed the following research questions:

- I. What are participating students' perceptions of math/STEM?
- II. What are participating students' education and career plans? Do they plan to pursue education (high school, postsecondary) and careers in math/STEM?
- III. What level of satisfaction do coaches and students have with the program?
- IV. What are coaches' perceptions of the support they receive from the program?

- V. Which math concepts are taught in each program? How much do the coaches feel the program has helped them teach these concepts, and how much do the students feel the program has helped them learn these concepts?



III.A Sampling Selection

The MATHCOUNTS Foundation provided an initial registration file for the chapter competitions. The file listed all schools participating in the chapter competitions and a count of students attending per school. The initial registration file detailed 479 chapter competitions encompassing 4,962 schools and 39,232 total students.

Westat reviewed the registration file and identified 163 schools that were ineligible for sampling and removed from the sampling frame. These schools were either Department of Defense schools (DoDEA) or schools not assigned to a chapter on the date of sampling.

Westat randomly selected 10 sample groups each consisting of 80 Chapter competitions. Each of these 10 random samples were examined to ensure a sufficient number of programs and students were present in the selected competitions to be representative of the MATHCOUNTS Competition Series population. The 10 random samples were presented to and approved by MATHCOUNTS who chose the final sample for the evaluation. The selected sample contained 80 chapters, 1,055 schools, and 8,557 students.

III.B Survey Mode and Programming

The coach and student surveys were self-administered, paper surveys. Both surveys were four pages in length and designed to take less than 10 minutes to complete.

III.C Survey Materials and Administration

Coordinators of competitions selected to participate in the survey were notified by email of the plan to administer the MATHCOUNTS Competition Series survey at their competition. The MATHCOUNTS Foundation sent the initial contact email three weeks before the start of the competitions. The email introduced Westat as the consulting firm responsible for the survey

administration, and included contact information for both Westat and the MATHCOUNTS foundation.

Coordinators from selected competitions were invited to participate in an hour-long training session hosted by Westat that covered the intent of the survey and instructions for administering the survey. A recording of the training was provided to all coordinators whose competition was selected.

Approximately one week before the start of the competitions, participating coaches received an email including directions for survey preparation as well as administration and technical support contact information for both the MATHCOUNTS Foundation and Westat. The email contained a copy of a parental opt-out form. Coaches were instructed by The MATHCOUNTS Foundation to print and send the form to parents of participating students. This form gave parents the option to opt their student out of the evaluation. Coaches collected any completed forms and delivered them to the chapter coordinator on or before the date of the competition. Additional forms were available at the competition.

One week before the start of competitions the chapter coordinators were mailed the MATHCOUNTS survey packets. The packets included the following items (copies of the material can be found in Appendix A):

- Letter of introduction with technical assistance contact information for Westat;
- FAQs;
- Instructions for the coordinators;
- Coach surveys; and
- Student surveys.

The letter to the chapter coordinator explained the goal and importance of the survey. Additionally, instructions were included outlining steps for coordinators to follow to administer the coach and student surveys.

Coordinators made sure students whose parents opted-out were not given a survey. Coordinators worked with coaches to plan a time to administer the student survey (with a suggested time allotment of 10 minutes for the survey itself and 15-20 minutes total to allow for passing out and collecting the surveys). Student participation in the survey was voluntary. Coaches were instructed

not to encourage or discourage survey participation and not to review surveys to determine completion. Coaches were told not to pass out surveys to students who returned the opt-out letter indicating they would not be participating in either the survey or provision of contact information. Contact information for MATHCOUNTS and Westat were provided to the coordinators for questions or concerns along with responses to frequently asked questions. The coordinators were instructed to collect all surveys and opt-out letters, seal them in the return envelope, and mail them to Westat.

All contact and survey materials included a clear statement that the survey is voluntary and that completion of the survey would not impact coach evaluation, student grades, or participation in the program. Statements were also included indicating that individual coach, student, or program data would not be shared.

III.D Data Capture

Surveys were developed using TeleForm, a commercial off-the-shelf (COTS) software system for intelligent data capture and image processing.

Competition coordinators mailed completed surveys via FedEx to Westat's headquarters for processing. All completed surveys with at least one question answered were scanned into the TeleForm database. Surveys were reviewed as the mail was opened to identify any surveys with unusual processing issues such as illegible marks across the page, damaged in the mail, etc. Those cases were flagged for special handling. Survey forms eligible for processing were batched for scanning. Data items identified by TeleForm for additional review were sent to verification. Staff trained in data verification rules for the project reviewed the data. Independent quality control was performed on a random sample of 10 percent of scanned surveys to verify data capture accuracy and completeness.

Survey Response and Analysis Plan

IV

IV.A Response Rates

A total of 63 MATHCOUNTS Chapters (79%) returned at least one completed coach or student survey (see Table IV-1).

The study team received 667 completed coach surveys and 5,299 completed student surveys. A survey was considered complete as long as at least one question on the survey was answered.

Table IV-1. 2017 MATHCOUNTS survey response rates

	n	%
Total Sampled Chapters	80	
Responding Chapters	63	78.7
Completed Coach Surveys	667	78.2
Completed Student Surveys	5,299	74.6
Non-Response ⁽¹⁾	17	21.2

(1) Non-Response calculation: $(\text{Total Eligible Chapters} - \text{Responding Chapters} - \text{Refusals}) / (\text{Total Eligible Chapters})$

IV.B Weighting of Data

Sampling weights were calculated to fulfill three purposes: (1) to reflect the likelihood of a coach and students being selected to participate in the MATHCOUNTS surveys; (2) to reduce bias by compensating for the fact that certain coaches and students are more likely to participate than others; and (3) to produce estimates that will be generalizable to the study population. Estimates are produced at the coach level, the student level, and combined coach-student level. Please refer to Appendix B for a detailed discussion of the weighting procedures.

IV.C Analysis Plan

Frequencies for all questions from both coach and student surveys were analyzed. Chi Square and t-test analyses were performed to address research questions related to program participation, program satisfaction and perceived value, program participant demographics, as well as perceptions of the math and STEM fields.

Open-ended responses were reviewed and coded based on identified categories of responses. Due to the large number of student and coach responses to open-ended survey questions, a sample of 10 percent of student and coach responses were randomly selected for coding and analysis. A second set of five percent were reviewed and coded to determine if any categories were missed during the initial coding and whether percentages by coded category were consistent. If coded categories and percentages in each category remained constant no additional cases were coded. If new coding categories were identified or percentages within each category changed across the three sets of coded data an additional set of responses was reviewed and coded. In total, 15 percent of open-ended response were used for analysis in this report.

Results of these analyses are detailed in the sections below. Results are presented using weighted percentages unless otherwise noted.

The survey results are organized to provide data on coaches, student, and program characteristics followed by coach and student satisfaction with and perception of the program, as well as how program implementation relates to the MATHCOUNTS Foundation’s desired outcomes of students pursuing STEM related education and careers as well as encouraging positive STEM perceptions. Results are presented using weighted percentages unless otherwise noted.

V.A Characteristics of Programs and Respondents

The following section describes the characteristics of the survey respondents, both the respondents themselves and the programs they are a part of. Both the coach and student surveys collected information on respondents’ characteristics related to age, race, and experience.

V.A.1 Coach Characteristics

Table V.A-1 presents demographic data for the responding coaches (n=667) related to sex, race, age, and teaching experience.

Table V.A-1. Coach characteristics

	Number	Weighted %
Sex		
Female	415	64.1
Male	232	35.9
Race		
White/Caucasian	524	78.6
Asian	95	14.2
Hispanic or Latino	25	3.7
Black or African American	5	0.7
American Indian/Alaskan Native	4	0.6
Middle Eastern or North African	3	0.4
Hawaiian/Pacific Islander	2	0.3

Table V.A-1. Coach characteristics (continued)

	Number	Weighted %
Age		
20 and under	16	2.5
21-30	98	15.1
31-40	154	23.8
41-50	204	31.5
51 and older	176	27.2
Former or current teacher	544	88.9
Years teaching		
1-5	121	20.9
6-12	159	27.4
13-20	146	25.17
21 years or more	154	26.6
Years in the MATHCOUNTS Competition Series		
First year participating	135	20.8
2-5	272	41.9
More than 5	242	37.3

Most of the coaches are female (64%), White (79%), and over 30 years old (82%). A significant portion are current or former teachers (89%). Of those currently or formerly teaching, years of teaching experience varied. The largest portion of coaches were participating in MATHCOUNTS for at least the second year (42%).

V.A.2 Coach Experience

Coaches were asked how they heard about MATHCOUNTS, the different components of the program and their goal and motivation for coaching.

As shown in Table V.A-2, coaches were most likely to learn about new math/STEM programs through email (87%). Additionally, 26 percent of coaches also reported learning of new programs through hard copy mail, and websites such as: Art of Problem Solving (AOPS); MATHCOUNTS; NCTM; or Google searches (23%).

Table V.A-2. How coaches typically hear about new programs and services related to math/STEM

	Number	Weighted %
Sources of math/STEM news		
Email	582	87.3
Hard copy mail	176	26.4
Website	152	22.8
Facebook	114	17.1
Twitter	58	8.7
Other source	44	6.6
Publications	31	4.7
Other social media	12	1.8

Coaches were specifically asked how they learned of the Competition Series. The majority of coaches initially heard about the MATHCOUNTS Competitions Series from their principal or another teacher (54%) (Table V.A-3). An additional 24 percent of coaches first heard about the Competition Series from another source. These additional sources included: a parent of a student; the coach participated as a child; a former coach; and the coaches child participates.

Table V.A-3. How coaches first heard about the MATHCOUNTS Competition Series

	Number	Weighted %
Sources of introduction to MATHCOUNTS		
From my principal/another teacher	343	54.3
Other source	153	24.2
I found it on my own through web search/other means	50	7.9
Email from MATHCOUNTS	33	5.2
Hard copy mail from MATHCOUNTS	16	2.5
A brochure/free materials	11	1.7
Conference	7	1.1
Twitter	1	0.2
Other social media (Not Facebook or Twitter)	1	0.2
Facebook	0	

Coaches were asked about their motivation and goals for coaching. The largest group of coaches reported deciding to coach a MATHCOUNTS competition team on their own (42%), followed by coaches who were asked to take over a MATHCOUNTS team by a former coach (21%) (Table V.A-4). Other reasons for coaching a team included: the coach has been doing it for many years and enjoys it; the coach participated in MATHCOUNTS when they were a student; the coach loves

math and the students; and the coach is a parent who wanted to help their child and other children excel in math.

Table V.A-4. Motivation for coaching

	Number	Weighted %
Top reason for coaching		
I decided to coach a team on my own	256	42.0
The former coach at my school asked me	130	21.3
My principal asked me	91	14.9
Other	74	12.1
Parents of my students asked me	28	4.6
My students asked me	24	3.9

The majority of coaches stated their main goal as a result of being involved in the MATHCOUNTS Competition Series was to help students learn confidence in math/STEM (32%) or increase students' interest in/excitement about math/STEM (36%) (Table V.A-5). Few coaches participate in the MATHCOUNTS Competitions Series with the goal of diversifying the types of students interested in math/STEM (2%). A small number of coaches reported other goals (2%). These included: developing and providing service to a community of students who love math; encouraging students to participate and get involved in math; challenging students to try new problems and push their limits; and fostering the passion inside students when it comes to math.

Table V.A-5. Main goal for coaching

	Number	Weighted %
Main goal for MATHCOUNTS participation		
Increasing students' interest in/excitement about math/STEM	198	35.8
Helping students learn/increasing students' confidence in math/STEM	175	31.6
Giving students with an interest in math an opportunity to engage in a social setting	98	17.7
Students advancing as far in MATHCOUNTS Competitions as possible	63	11.4
Other goals	10	1.8
Diversifying the types of students interested in math/STEM	9	1.6

V.A.3 Student Characteristics

Table V.A-6 outlines the characteristics of students who responded to the survey (n = 5,299). The majority of students were male (61%), between 12 and 13 years old (27% and 42% respectively), and most are in eighth grade (48%).

Almost 50 percent of students identified with the ethnic category of White/Caucasian (48%); 34 percent with Asian; 7 percent with Hispanic or Latino; about 6 percent with a racial category not listed; about 3 percent with each American Indian/Alaskan Native and Black or African American; about 1.5 percent with each Native Hawaiian or Pacific Islander and Middle Eastern/North African.

Table V.A-6. Student demographics

	Number	Weighted %
Sex		
Male	3028	60.7
Female	1940	39.3
Race		
White /Caucasian	2564	47.7
Asian	1839	34.3
Hispanic or Latino	388	7.2
Other	321	6.2
Black or African American	171	3.4
American Indian/Alaskan Native	164	3.3
Hawaiian/Pacific Islander	85	1.5
Middle Eastern or North African	84	1.6
Age		
10	19	0.4
11	505	10.3
12	1334	27.2
13	2099	41.6
14	1010	19.5
Other	48	1.0
Grade in School		
6th	983	19.4
7th	1710	32.8
8th	2533	47.8

Students reported participating in a wide variety of academic clubs and activities beyond MATHCOUNTS. As shown in Table V.A-7, 28 percent of students reported participating in AMC competitions, and 22 percent of students reported also participating in the Math Olympiad for Elementary and Middle Schools. 28 percent of students reported participating in other academic clubs including: Science Olympiad; Quiz Bowl; Academic Bowl; Science Bowl; Scholastic Bowl; Battle of the Books; National Junior Honors Society; Chess Club; Robotics, band; and debate team.

The majority of MATHCOUNTS competitors reported participating in sports (67%) and music (55%). Twelve percent of students reported participating in other extracurricular clubs or activities including: chess; dance; Science Olympiad; Boy Scouts; Girl Scouts; and National Junior Honors Society.

Table V.A-7. Other clubs in which students participate

	Number	Weighted %
Academic Clubs/Activities		
Other academic club	1464	27.6
AMC competitions	1460	27.5
Math Olympiads for Elementary and Middle Schools	1157	21.7
National Geography Bee	904	16.9
National Spelling Bee	837	15.7
FIRST Robotics	700	12.9
Other Extracurricular Clubs/Activities		
Sports	3582	67.4
Music	2899	54.8
Art	781	14.8
Theater/Drama	711	13.5
Government (debate, student council, model UN, etc.)	883	16.4
Other extracurricular club/activity	610	11.5
Media (A/V, newspaper, yearbook, etc.)	369	6.8

V.A.4 Student Experience

Students were asked about how they learned of MATHCOUNTS, as well as other extracurricular activity, their years of participation, and reasons for participation.

Half of students reported first hearing about MATHCOUNTS from a teacher or other school staff (50%) (Table V.A-8). Very few students reported first hearing about MATHCOUNTS from social media. Other sources of MATHCOUNTS discovery included: hearing about it from a sibling or family member (brother, sister or cousin); school math club; Art of Problem Solving (AOPS) or a similar book or publication; or an afterschool program of some kind.

Table V.A-8. How student first heard about the MATHCOUNTS Competition Series

	Number	Weighted %
Sources of introduction to MATHCOUNTS		
From a teacher/other school staff	2531	50.2
From my parents	740	14.7
Announcement at school	638	12.6
From a friend	537	10.8
Other source	232	4.6
Flyer at school	191	3.9
Other social media (Not Facebook or Twitter)	6	0.11
Facebook	4	0.08
Twitter	4	0.08

Table V.A-9 shows the reported ways students generally hear about new extracurricular activities. Knowledge of MATHCOUNTS is consistent with how students hear of extracurricular activities in general. The only noted difference is that students report hearing of other activities through school announcements (33%) more frequently than learning of MATHCOUNTS through this mode (13%).

Table V.A-9. How students typically hear about new extracurricular activities

	Number	Weighted %
Sources of new activities		
Announcement at school	1600	32.7
From a teacher/other school staff	1209	25.0
From a friend	666	13.6
From my parents	651	13.5
Other source	232	0.2
Flyer at school	370	7.8
Twitter	10	0.08
Facebook	3	0.06

The majority of students were participating in the MATHCOUNTS Competition Series for the first time (60%) and attending their first MATHCOUNTS competition (65%) (Table V.A-10). This is despite most MATHCOUNTS competition participants being in the highest grade of their middle school.

Table V.A-10. Time in MATHCOUNTS Competition Series

	Number	Weighted %
Years in any part of the MATHCOUNTS Competition Series		
First Year	2844	60.3
Second Year	1313	27.6
Third Year	594	12.1
Years in MATHCOUNTS Competition Series competitions		
First Year	2658	65.2
Second Year	1083	26.1
Third Year	365	8.7
Time Spent in MATHCOUNTS Competition Series Practice/Meetings		
1 hour per week	2182	72.8
2 hour per week	1144	21.6
3 hour per week	487	9.2
4 hours per week	321	6.0
5 or more hours per week	366	6.8
Don't know	699	13.7

Relatively few students reported participating in additional MATHCOUNTS programs (Table V.A-11). About 20 percent of students reported participating in the National Math Club between 6th and 8th grade, and roughly 6 percent of students reported participating in the Math Video Challenge.

Table V.A-11. Participation in other MATHCOUNTS programs

	Number	Weighted %
MATHCOUNTS Program		
The National Math Club, powered by MATHCOUNTS	998	19.1
The Math Video Challenge, produced by MATHCOUNTS	310	5.8

The top reason for participating in the MATHCOUNTS Competition Series was because math/STEM was their favorite subject (39%) or because they wanted to improve their math/STEM skills (22%) (Table V.A-12). Almost 20 percent of participants reported participating because a

parent, teacher, or guidance counselor encouraged them to do so (18%) Other reasons for participation included: enjoying the food or other benefits associated with participation; enjoying the competitive aspects of the program; a parent making them participate; it looks good on a college resume; or it's something fun to do to pass time.

Table V.A-12. Motivation for participation

	Number	Weighted %
Top reason for participation		
Math/STEM is my favorite subject	1801	39.3
I wanted to improve my math/STEM skills	994	21.6
My parents/teacher/guidance counselor encouraged me to participate	829	18.2
Other	317	6.8
My friends also participate	304	6.5
I needed an extracurricular activity, and it seemed interesting	160	3.4

V.A.5 Program Characteristics

This section provides information on the characteristics of programs that attend the chapter level Competition Series as reported by the coach. As shown in Table V.A-13, the vast majority of schools that participated in the survey were public (72%). Although program sizes ranged from 1 to more than 50 students in 6th, 7th, and 8th grades, the majority of programs had between 6 and 10 students competing (71%).

Table V.A-13. Program characteristics

	Number	Weighted %
School type		
Public school	472	71.8
Private school	137	20.9
Charter school	41	6.2
Home school	7	1.1
Virtual school	0	

Table V.A-13. Program characteristics (continued)

	Number	Weighted %
Size of program		
0-8	164	24.8
9-11	130	19.7
12-19	158	23.9
20 or greater	209	31.6
Grade levels in program		
6th	405	60.7
7th	560	73.8
8th	566	84.9
Number of students competing		
1-5	161	24.2
6-10	469	70.6
11 or greater	33	5.0
Additional MATHCOUNTS programs at school		
The National Math Club	177	26.5
The Math Video Challenge	50	7.5

V.B Perception and Preference of Math and STEM

The MATHCOUNTS Competition Series survey included questions designed to gauge coaches’ and students’ perception of math and STEM. Respondents were asked to what extent they agreed or disagreed with statements about math and STEM. A full list of the questions can be found in Appendix A. Survey items were a mix of positive and negative statements.

V.B.1 Student Perception of Math and STEM

Student perception of math and STEM are presented in Figures V.B-1 and V.B-2. Students showed the strongest agreement with statements pertaining to math and STEM’s potential for their future careers. Eighty-seven percent of students agreed with the statement ‘There are lots of jobs/careers where math/STEM is useful’, and 89 percent of students disagreed or somewhat disagreed with the statement ‘I don’t think that math/STEM education will help me with my future education or career’. More than 80 percent of students also agreed with the statement ‘math is one of my best subjects’. Students were mixed in their responses to statements about their math and STEM abilities, though responses to the statements ‘I am very confident working with math/STEM concepts’ and

‘When I am faced with a new math/STEM problem I’ve never seen before, I can usually figure it out’ both had a majority of positive responses.

Figure V.B-1

Student responses to 'positive' statements about math/STEM

number of responses and weighted %

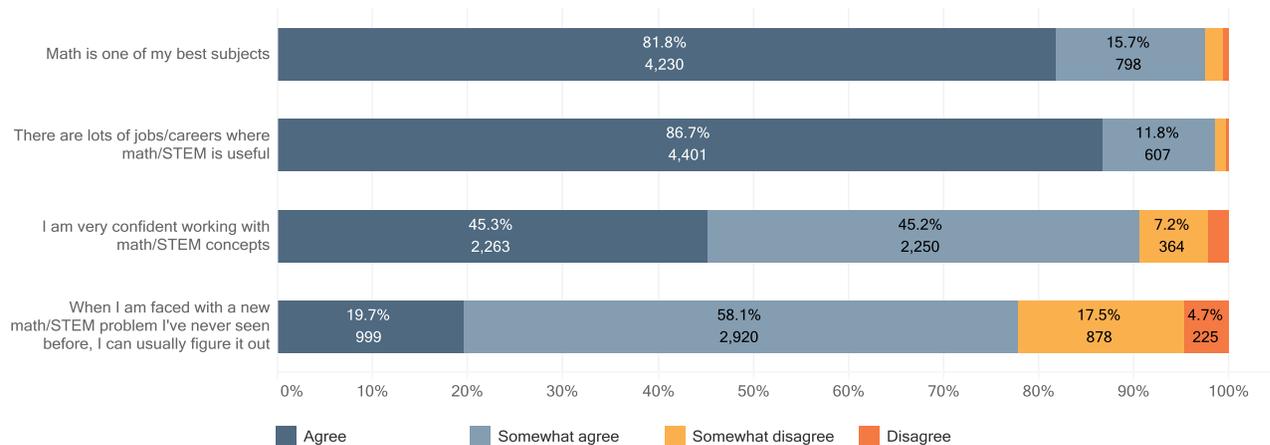
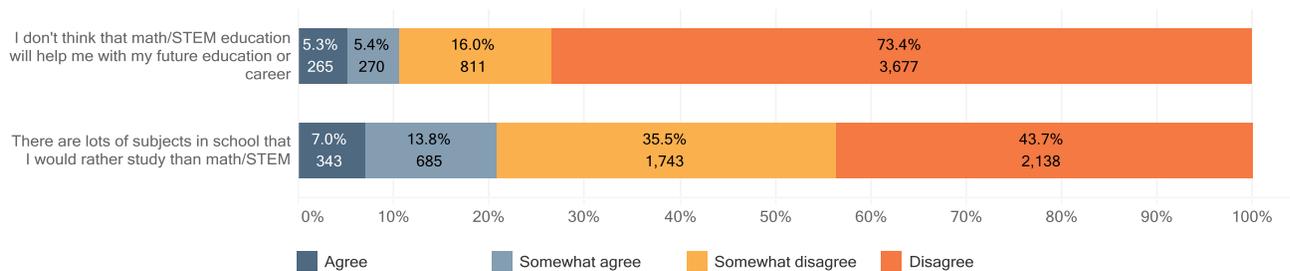


Figure V.B-2

Student responses to 'negative' statements about math/STEM

number of responses and weighted %



V.B.2 Students' Top Two Favorite Subjects

Students were asked to select their favorite class from a list of nine standard subjects. The majority of students reported Math as one of their two favorite subjects (74%) (Table V.B-1). Science was the second most selected subject, with 35 percent of students indicating that it was one of their top two subjects. Technology and engineering classes, another STEM subject, was selected by only 13.1 percent of participating students.

Table V.B-1. Student reported favorite subjects in school

	Number	Weighted %
Math	3936	74.0
Science	1853	35.1
P.E.	996	18.7
Technology/Engineering	698	13.1
Social Studies	692	13.3
Music	625	12.0
English	552	10.5
Foreign language	252	4.6
Other	182	3.4
Art	471	9.0

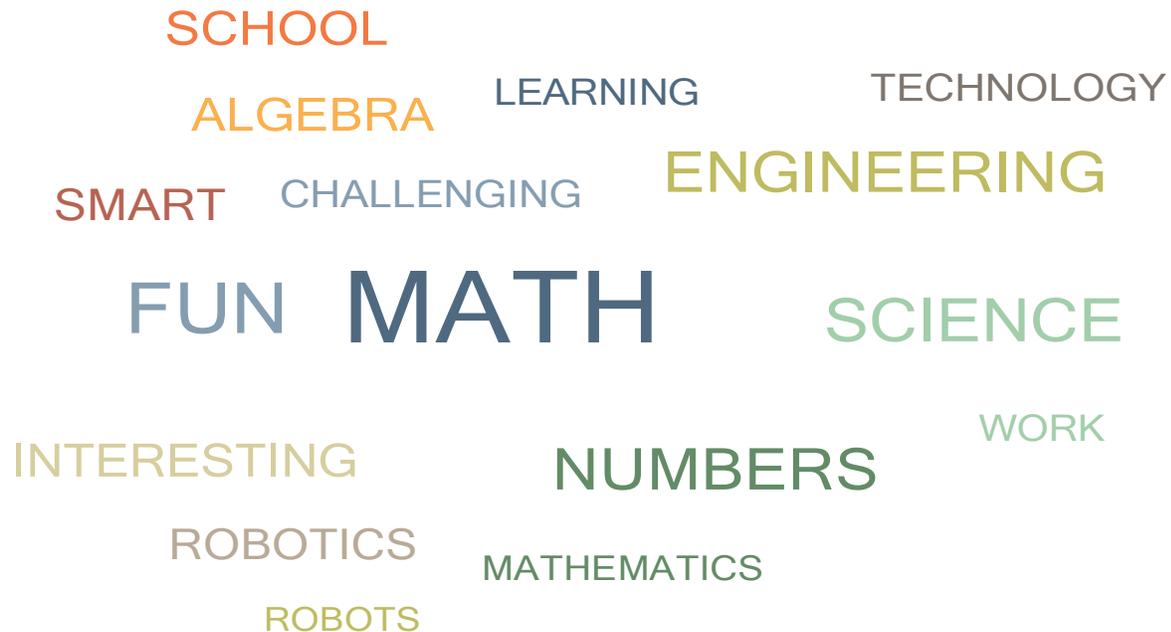
V.B.3 Students' Top-of-mind Thoughts on Math and STEM

Students also reported the first word that came to their minds when they thought about math/STEM. As shown in Figure V.B-3, the highest percentage of students reported that the first words they associate with math and STEM is 'math' (12.3%). Students reported 'fun' as the word second most commonly associated with math and STEM fields (5.9%). The remainder of the top five most reported words included 'science' (4.1%), 'numbers' (3.9%) and 'engineering' (3.7%).

Figure V.B-3

When you think about math/STEM (Science, Technology, Engineering or Mathematics), what is the first word that comes to mind?

response frequency (greater than 1%)



V.B.4 Coach Perception of Math and STEM

Similar to students, Coaches' perceptions of math and STEM were largely positive as shown in Figures V.B-4 and V.B-5. Coaches reported the strongest agreement with the statement 'There are lots of jobs/careers where math/STEM is useful', with 97 percent of coaches in agreement. Additionally, 88 percent of coaches answered 'agree' for the statement 'I would encourage children to pursue an education or career in math/STEM', with 99 percent of coaches selecting 'agree' or 'somewhat agree'. Coaches were most split in their agreement to the statement 'I think math/STEM is the most important part of a student's education', with 57 percent of coaches responding 'agree' and 35 percent of coaches responding 'somewhat agree'. Coaches overwhelmingly disagreed with the statement 'I don't think that math/STEM education is useful for a student's future education or career', with 97 percent of coaches responding 'disagree' and 100 percent of coaches responding 'disagree' or 'somewhat disagree'.

Figure V.B-4

Coach responses to 'positive' statements about math/STEM

number of responses and weighted %

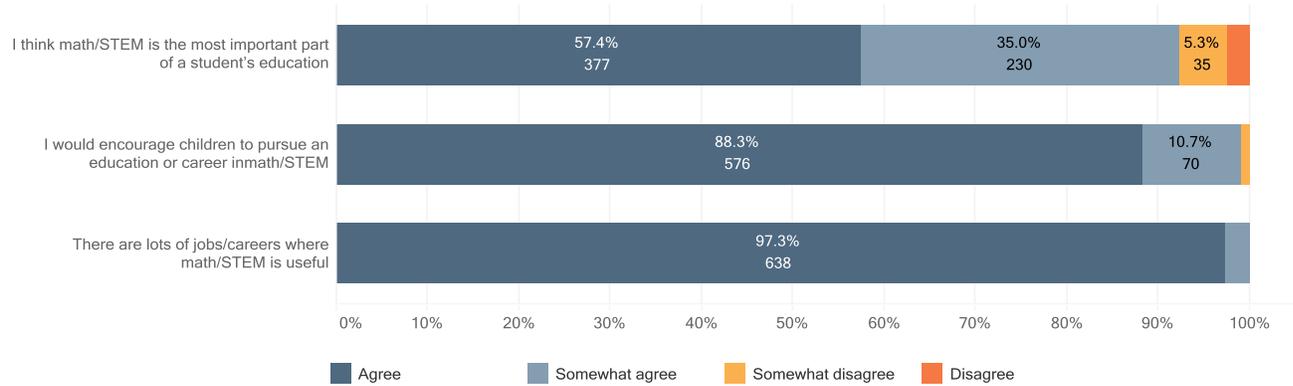
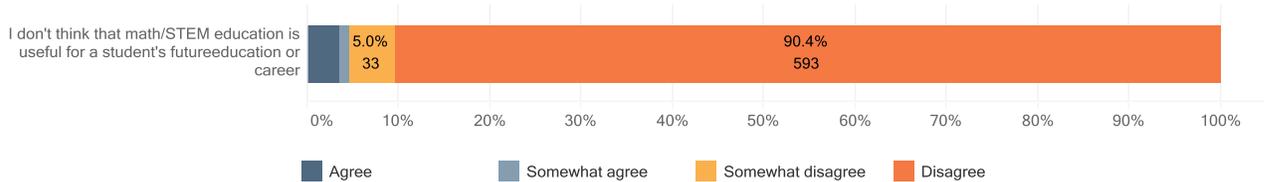


Figure V.B-5

Coach responses to 'negative' statements about math/STEM

number of responses and weighted %



V.B.5 Aggregate Perception Scoring

To more clearly assess students' and coaches' perceptions of math and STEM, an overall perception score was created. This perception score was calculated by combining the responses to each of the six student statements and each of the four coach statements about math and STEM found on the student and coach surveys respectively. Each of the scaled response options to the survey questions about math/STEM perception (disagree to agree) were assigned a value from negative two to two with the most positive response being assigned a two and the most negative response being assigned a negative two. Individual scores were then calculated for each student and coach summing the responses to the perception questions. Utilizing this method, the most positive math/STEM perception score for students is a 12, while -12 is the most negative. For coaches, the most positive perception score is an 8, while -8 is the most negative. Missing values and values of 'don't know' were replaced with the individuals average perception score, calculated from the completed

questions. Additionally, the context of the questions was taken into account when assigning positive and negative values (in some instances, ‘disagree’ would be considered the most positive response).

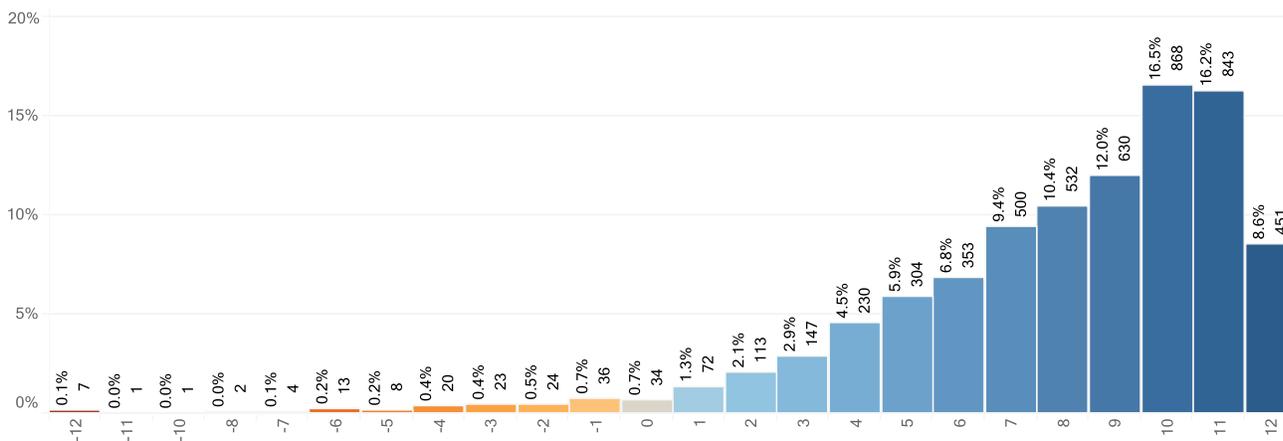
V.B.5.a Student Perception Scores

Overwhelmingly, students reported a positive perception of math and STEM with the majority of students reporting a perception score of nine or higher (53.3%) (Figure V.B-6). Less than 3 percent of students competing in the MATHCOUNTS Competition Series reported a negative view of math and STEM. On average, across all groups, student competitors reported a perception score of the math and STEM fields of 8.0. The average perception score was used throughout the following sections to look at difference in student perception across various groups.

Figure V.B-6

Distribution of student math/STEM perception scores

number of responses and weighted %



To further analyze student perception, the overall perception score was split into two distinct perception scores. The first quantified the student’s perception of their math and STEM ability and included responses to the questions:

- Math is one of my best subjects
- When I am faced with a new math/STEM problem I’ve never seen before, I can usually figure it out
- I am very confident working with math/STEM concepts

The second perception score quantified the student’s perception of the math and STEM industry and included responses to the questions:

- There are lots of jobs/careers where math/STEM is useful
- I don’t think that math/STEM education will help me with my future education or career

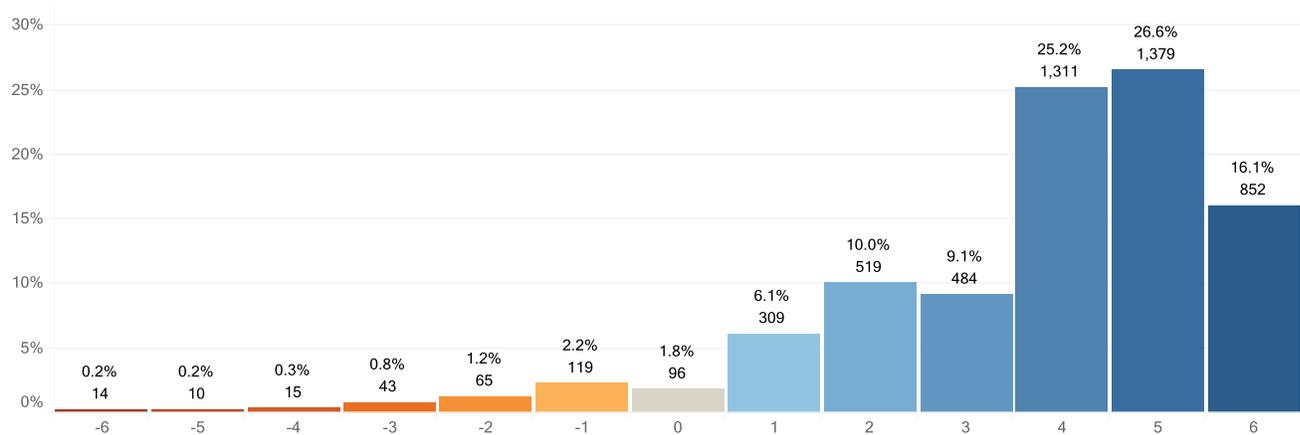
The same methodology used to create the overall score was applied to the sub-scores. The student’s perception of their math and stem ability is based on a score from -6 to 6, and the student’s perception of the math and STEM industry is based on a perception score of -4 to 4.

As with the overall perception score, most students reported a positive perception of their math and STEM abilities (Figure V.B-7). Sixty-eight percent of students reported a perception score of 4 or higher. Less than 5 percent of students surveyed reported a negative perception of their STEM or math abilities.

Figure V.B-7

Distribution of student math/STEM perception scores
Student perception of math/STEM ability

number of responses and weighted %

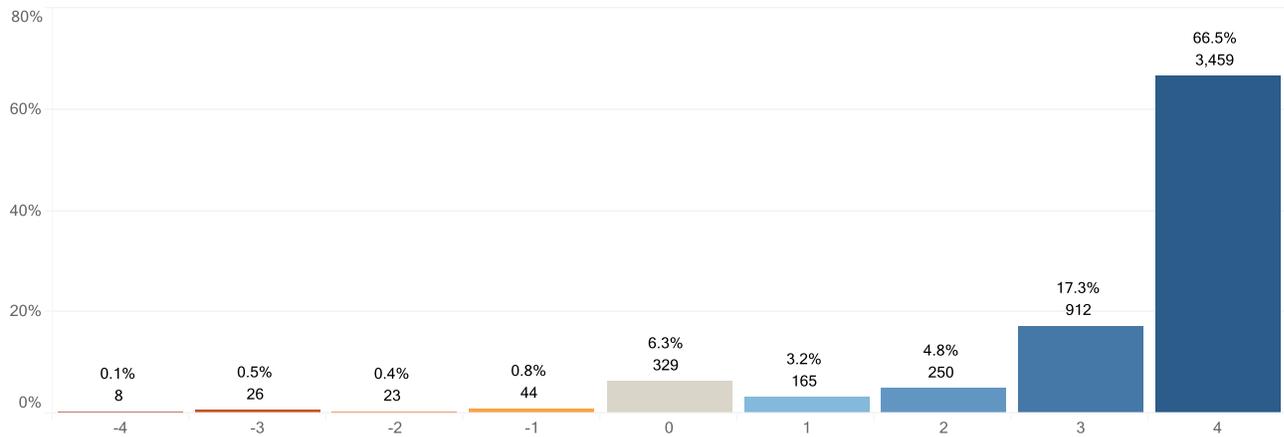


Continuing the trend in student perception, a large majority of students (67%) agreed with statements about the math and STEM industry’s potential for their future (Figure V.B-8), reporting the maximum possible score of four. Less than 2 percent of students reported a negative perception of the math and STEM industry.

Figure V.B-8

Distribution of student math/STEM perception scores
Student perception of math/STEM industry

number of responses and weighted %



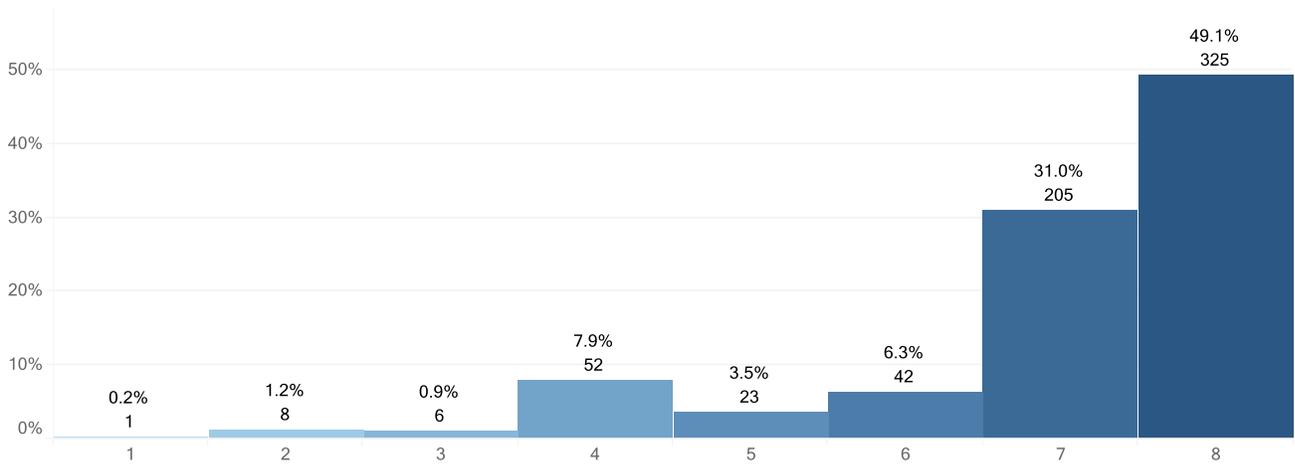
V.B.5.b Coach Perception Score

In line with students, coaches in the MATHCOUNTS Competition Series also reported an extremely positive view of math and STEM with almost half (49%) of coaches reporting the maximum positive perception score, 8 (Figure V.B-9). No coaches reported an overall negative perception of math and STEM. On average, coaches reported a perception score of 7.0. As with the student perception score, the average coach perception score was used in the following sections.

Figure V.B-9

Distribution of coach math/STEM perception scores

number of responses and weighted %



V.B.6 Influences on Student Perception of Math/STEM

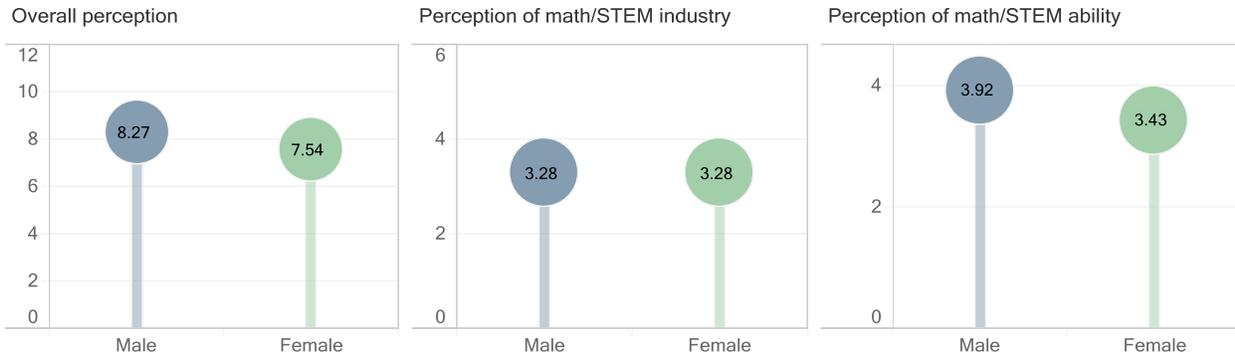
V.B.6.a Gender

Analysis was conducted to look at average perception of math/STEM by student gender. While overall perception of math/STEM was highly positive for both male and female competitors, minor variations in responses were observed.

As shown in Figure V.B-10, perception of math and STEM varied by gender with male students reporting a higher average perception score (8.27) compared to female students (7.54). This difference proved to be statistically significant ($p < .0001$). The difference in student perception score by gender was largely attributable to a student's perception of their own math and STEM abilities. Female students reported a lower perception of their math and STEM abilities than male students (3.92 and 3.43 respectively) ($p < .0001$). Comparatively, students of both genders held an equally positive perception of the math and STEM industry.

Figure V.B-10

Average student math/STEM perception scores
by gender



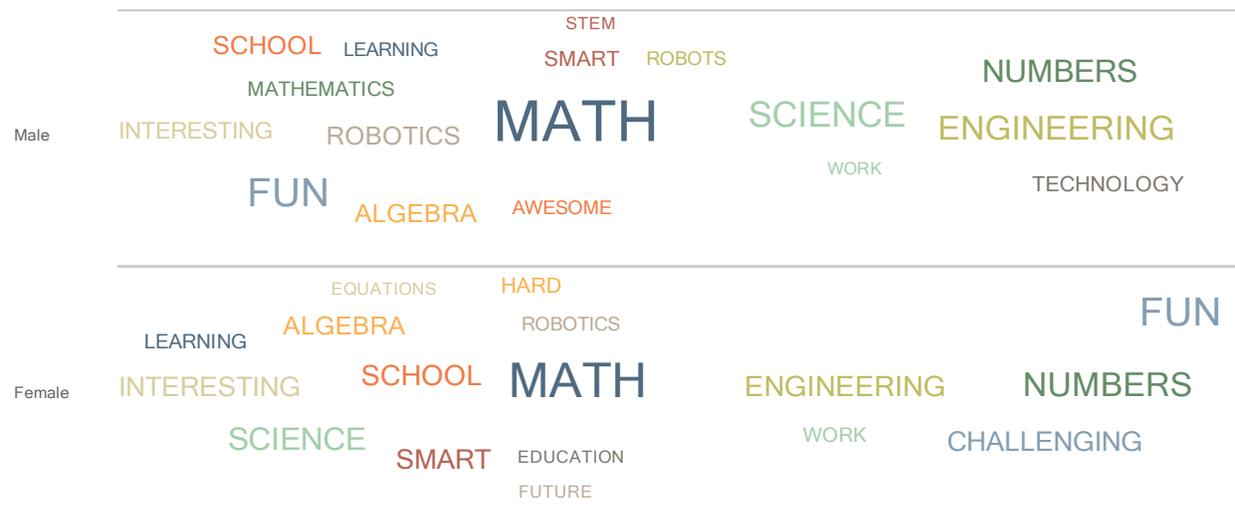
P<.0001 for overall perception and perception of math/STEM ability

Analysis of ‘top-of-mind’/’first word’ by gender showed similar patterns to aggregate first-word scores. Both male and female students reported the words ‘math’ and ‘fun’ with the most frequency (male = 14.1% and 5.9% respectively, female = 9.6% and 6.1% respectively) (Figure V.B-11). Though the majority of reported words between male and female students were consistent, female students also reported terms such as ‘challenging’ (2.7%) and ‘hard’ (1.7%) with a higher frequency than their male competitors.

Figure V.B-11

When you think about math/STEM (Science, Technology, Engineering or Mathematics), what is the first word that comes to mind?
by gender

response frequency (greater than 1%)

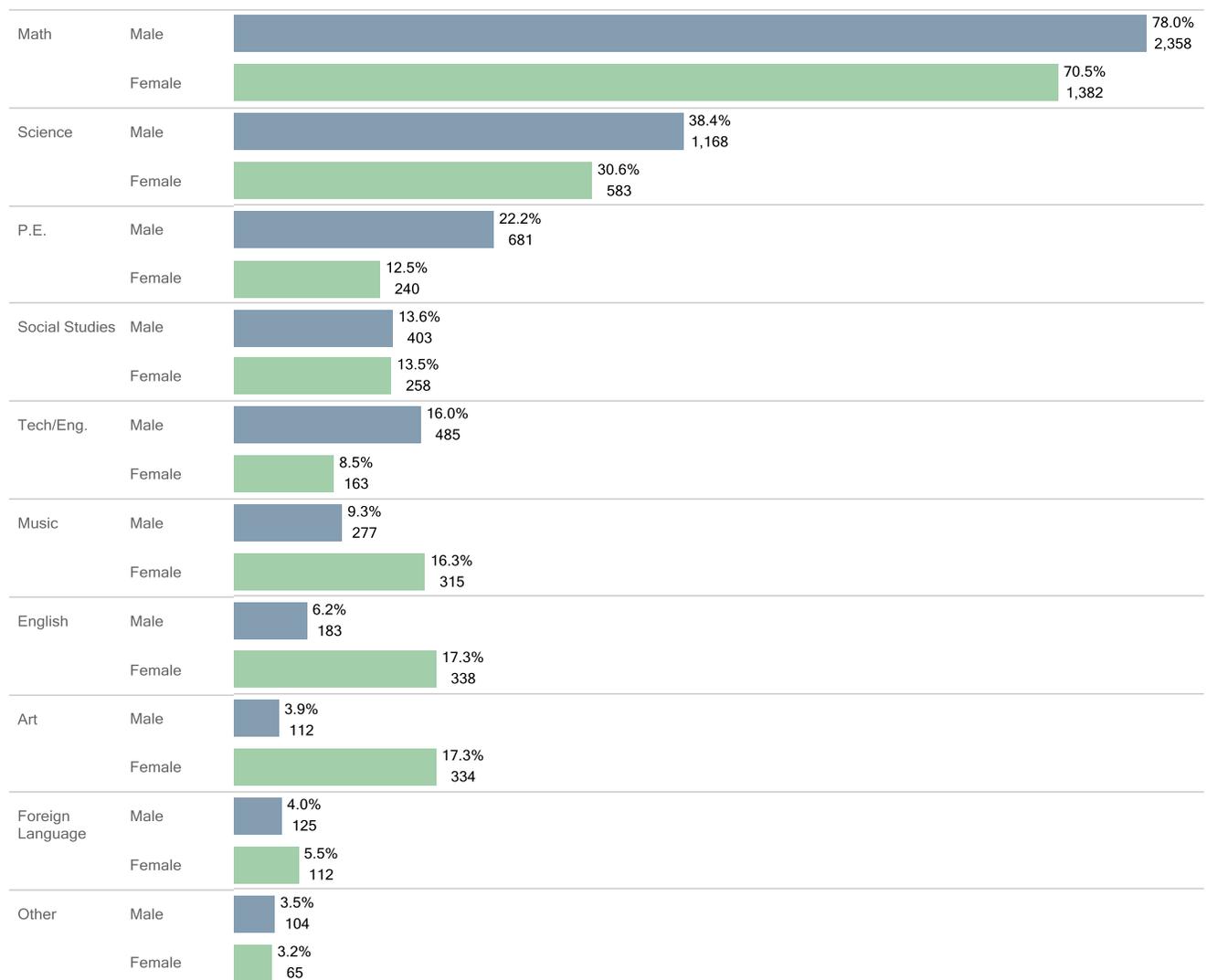


Seventy percent of female students selected math as one of their two favorite classes in school, as shown in Figure V.B-12. Compared to their male competitors, however, female students were eight percentage points less likely to select math, science, or technology/engineering in their list of favorite classes. Female students were, however, more likely to select music, English, and art amongst their favorites.

Figure V.B-12

Student reported favorite subject in school
by gender

number of responses and weighted %



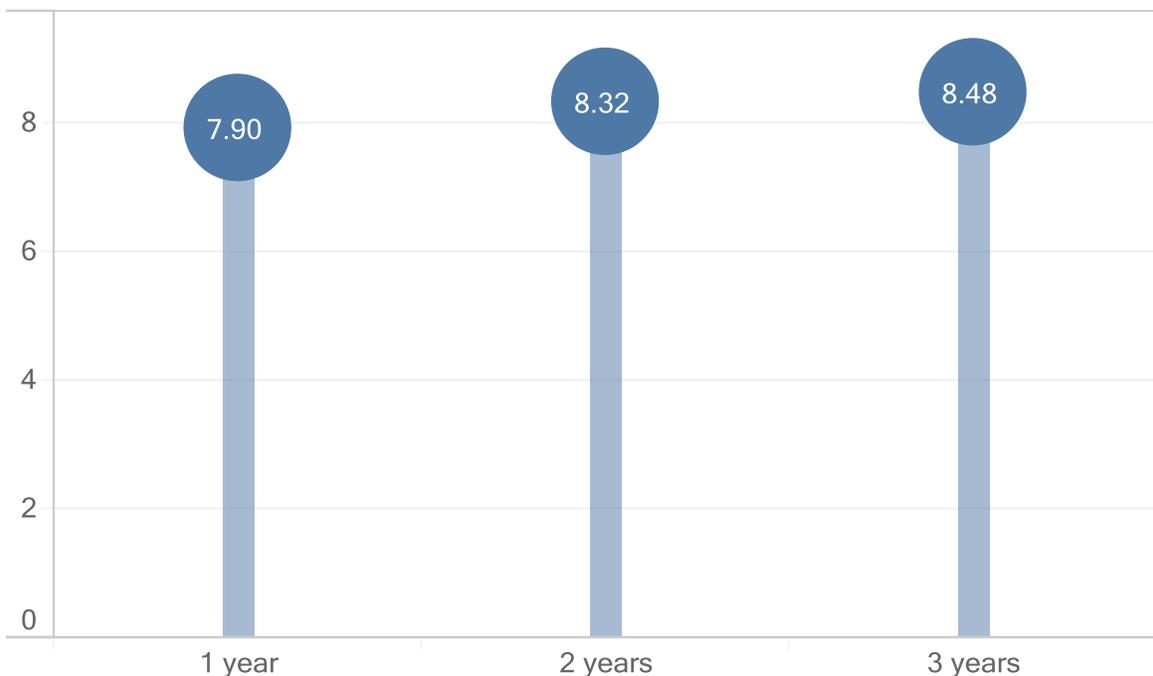
p<.03 for all except Social Studies

V.B.6.b Grade and Years in MATHCOUNTS

Years of participation in the MATHCOUNTS Competition Series proved to have a significant association with students' perceptions of math and STEM (Figure V.B-13). Students who were competing in the Competitions Series for the first year reported an average perception score of 7.9, significantly lower than students participating for the second or third year ($p < .0001$ and $p = .0002$ respectively). Students competing in the Competitions Series for the third year reported an average perception score of 8.5, significantly higher than students in their first year of competition ($p = .0002$). In interpreting this finding, it should be noted that the majority of student respondents also reported participating in MATHCOUNTS for the first time.

Figure V.B-13

Average student math/STEM perception score by years in MATHCOUNTS



Statistically significant difference between years one and two and one and three $p < .0002$

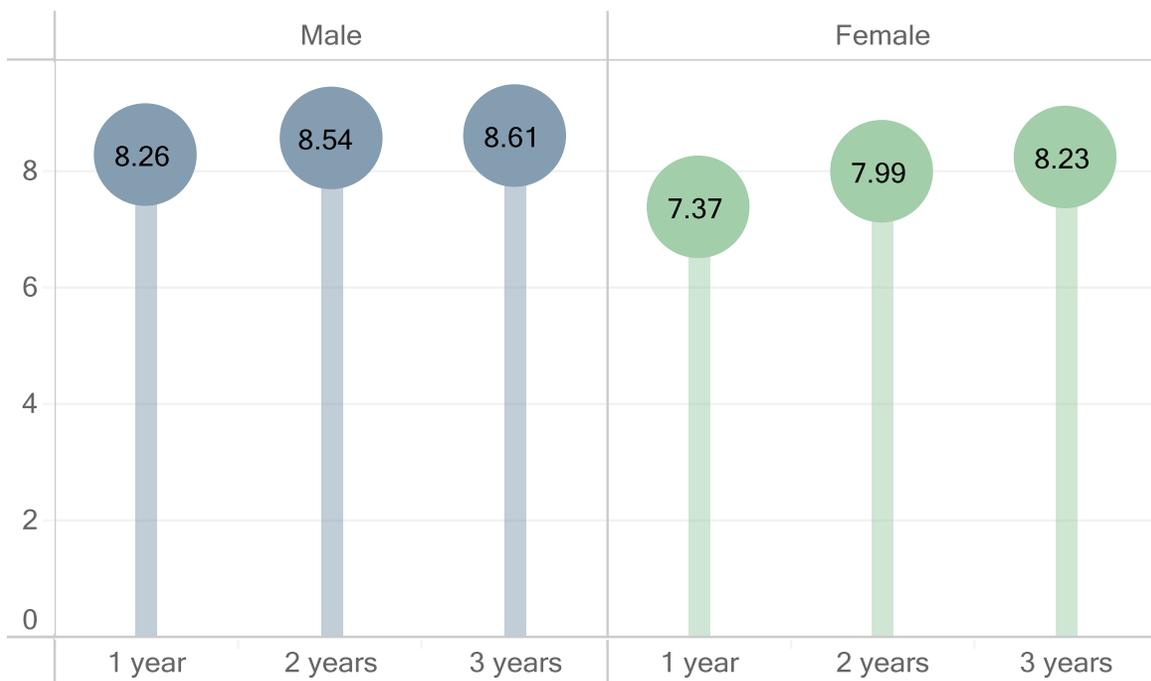
To isolate the influence of participation in MATHCOUNTS on the average perception score, self-reported perception by grade level was also examined, but no statistically significant differences were observed. Overall, student average perception remained flat based on their reported grade level, varying between 7.9 and 8.1. Note that most respondents were in 8th grade.

V.B.6.c Years of Participation and Gender

A secondary analysis was done to look at how perception was effected by both years of participation and gender. As shown in Figure V.B-14 years in MATHCOUNTS has a larger association with female student's perception of math and STEM in comparison to male competitors. Female students reported an 11.7 percent change in their perception of math and STEM between their first year of participation and their third (from 7.37 to 8.23). Comparatively, male students reported a smaller change in their average perception score (from 8.26 to 8.61).

Figure V.B-14

Average student math/STEM perception score by years in MATHCOUNTS and gender



Male: No statistically significant differences

Female: Statistically significant difference between years one and two and one and three $p \leq .002$

Comparatively, the number of years a student attended the MATHCOUNTS competitions had a slightly larger association with male competitors' perception of math and STEM. Male competitors who attended one MATHCOUNTS competition reported an average perception score of 8.3, and those who attended three competitions reported an average perception score of 8.9. Female competitors who attended one competition reported an average perception score of 7.5, and those who attended three competitions reported an average perception score of 8.2. This relationship also

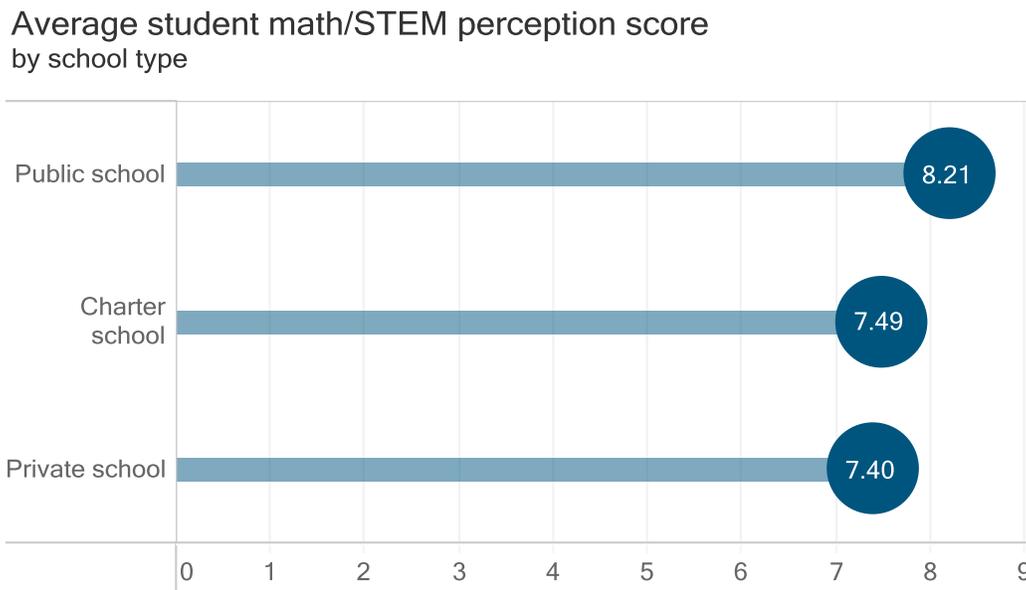
proved to be statistically significant (statistically significant differences between years one and two and years one and three $p < .05$).

V.B.6.d Program Characteristics

Analysis was conducted to look at perception by program characteristics.

Two elements of the MATHCOUNTS program type appear to have statistically significant associations with student's perception of math and STEM. Figure V.B-15 shows average student perception of math and STEM based on the type of school attended. For this analysis 'Home School' was omitted due to small cell sizes. Students competing from public schools reported a slightly higher perception of math and STEM (8.2) than students in charter schools (7.5) ($p < .004$) and students in private schools (7.4) ($p < .0001$).

Figure V.B-15

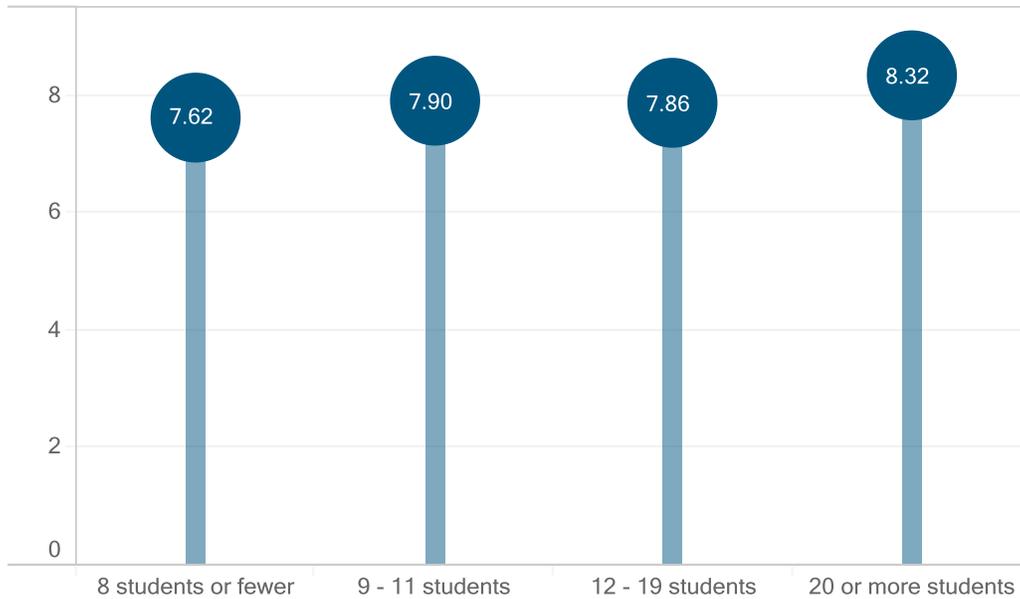


Statistically significant difference between Public school and Charter school ($p = .004$) and Private school ($p < .0001$)

Additionally, as shown in Figure V.B-16, students competing from large programs (25 students or more) reported a more positive perception of math and STEM than students competing from smaller programs (programs with fewer than eight students) (8.32 compared to 7.62 respectively) ($p = .0003$).

Figure V.B-16

Average student math/STEM perception score
by size of program



Statistically significant differences between '20 or more students' and all other categories $p < .03$

V.B.6.e Coach Influence on Student Perception

Analysis was conducted to look at coach's goal for participation and students' perception of STEM and math. A slight, but statistically significant variation in students' perception of the industry were identified based on their coach's main goal for participating in MATHCOUNTS. Students whose coach was focused on giving students with an interest in math an opportunity to engage in a social setting reported the highest average perception score (8.3 out of 12), while students whose coach was focused on advancing as far as possible in the Competition Series reported the lowest perception of math/STEM (7.8 out of 12) ($p < .04$).

Additionally, the influence of coach's years teaching and participating in the MATHCOUNTS program on student math and STEM perception was reviewed. A slight, and statistically significant, association between years of teaching experience and student perception of math and STEM was observed between students whose coach had 21 or more years of teaching (perception scores of 8.3) and students whose coach had between 6-12 years of teaching (perception score of 7.7) ($p = .002$).

Students whose coach was in their first five years of teaching or in the mid-range years of teaching (13-20 years) reported perception scores in the middle (8.0 for both groups).

Slight variations in student perception due to a coach's experience in the MATHCOUNTS program were also observed. Students whose coach reported coaching for a year or less reported an average perception score of 7.9 while students whose coach had participated in MATHCOUNTS for more than one year reported an average perception score of 8.0, this difference did not prove to be statistically significant.

V.C Student Education and Career Plans

An important MATHCOUNTS Competitions Series outcome is the increased amount of individuals enrolling in math classes, pursuing post-secondary education and a possible degree in a math or STEM field, and eventually pursuing a career in a math or STEM field. The student survey asked students about their plans for future math classes, and if they had plans to pursue both a degree and specifically a degree in a math or STEM field, and about their interest in an industry related career. The following section summarizes students' reported plans and examines the relationship between those plans and student and coach backgrounds and perceptions.

V.C.1 Student Plans to Pursue Math Classes in High School

Students were asked to pick from a range of options that described their plans for taking math classes in high school. Student's responses are detailed in Table V.C-1. More student competitors reported planning to take more math classes than they have to (33%) or taking all the math classes they can in high school (30%). An additional 18 percent of competitors indicated plans to seek out additional math classes beyond what would be offered by their high school.

Table V.C-1. Students' future Math plans

	Number	Weighted %
I will take only the math classes I have to in order to graduate	396	7.9
I like math enough that I will take some more math classes than I have to	1622	33.1
I really like math and will take as many math classes as I can in high school	1505	30.4
I like math so much that I will try to find more classes to take even if my high school doesn't offer them	900	18.2
Don't know	521	10.4

V.C.2 Student Plans to Pursue Postsecondary Education

Students were asked if they had plans to pursue any postsecondary education, and those who indicated they did have postsecondary plans were asked if they planned to pursue a degree in math or STEM.

The majority of MATHCOUNTS competitors (86%) indicated that they did have plans to pursue some form of postsecondary education (Table V.C-2). Less than one percent reported they did not plan to pursue additional education, and about 13 percent indicated they were undecided.

Table V.C-2. Students' plans for postsecondary education

	Number	Weighted %
Plan to attend a 2-year, 4-year, or other post-high school education	4329	86.2
Do not plan to attend a 2-year, 4-year, or other post-high school education	30	0.6
Do not know my plans	652	13.2

Students who indicated that they planned to pursue postsecondary education were asked if they were planning to pursue a degree in a math or STEM field. As shown in Table V.C-3, 60 percent of students participating in MATHCOUNTS who are planning to pursue postsecondary education indicated that they planned to pursue a degree in a math or STEM subject. About 9 percent of students planning to pursue a postsecondary degree indicated that they are not considering a degree in math or STEM.

Table V.C-3. Students' future degree plans

	Number	Weighted %
Plan to pursue a degree in a math or STEM subject	2560	60.0
Do not plan to pursue a degree in a math or STEM subject	387	8.9
Do not know my plans	1347	31.1

V.C.3 Student Career Interests

Students were asked to select all of the math and STEM related career paths that interested them. Students competing in the MATHCOUNTS Competition Series selected 'engineer' with the highest frequency (49%) followed by 'computer programmer/technician' (37%) (Table V.C-4). The indication that close to a majority of students want to pursue a career in engineering is contrary to the number of students who indicated that 'technology/engineering' was their favorite class in school (13%), potentially because the class is not offered at their school. Students were least likely to indicate that they wanted to be an 'economist' (11%) or a math/STEM educator (14%). Other reported math/STEM careers of interest included: physicist; accountant; chemist; teacher; statistician; veterinarian; astronaut; inventor; business professional; lawyer; forensic scientist; nurse; pilot; and astronomer.

Table V.C-4. Students' career interests

	Number	Weighted %
Engineer	2627	49.3
Computer programmer/technician	1968	37.3
Scientist	1933	36.6
Doctor	1757	33.0
Mathematician	1565	29.6
Architect	1137	21.4
Math/STEM educator	726	13.6
Economist	585	11.1
Don't know	492	9.2
Other	414	7.9
Not currently interested in a math/STEM career	232	4.3

V.C.4 MATHCOUNTS' Perceived Effect on Students' Education and Career Interests

The effect of the MATHCOUNTS Competition Series on students' reported future education or career interest was explored. Student responses to this question were mixed with 40 percent of students indicating that participation in MATHCOUNTS had not influenced their plans (Table V.C-5). An additional 36 percent of students indicated that they were unsure of MATHCOUNTS influence, while the remaining 24 percent of students agreed that MATHCOUNTS had an influence on their future plans.

Table V.C-5. MATHCOUNTS competition influence on future plans

	Number	Weighted %
MATHCOUNTS competition has influenced my future plans	1176	24.0
MATHCOUNTS competition has not influenced my future plans	1976	39.7
Don't know	1799	36.3

Students who indicated that MATHCOUNTS had influenced their future plans indicated that the program influenced them in the following ways: made them like or be more interested in math; made them change career plans to something in the STEM field; and boosted their confidence in their ability to achieve their future education and career goals.

V.C.5 Student Perceptions and Characteristics and Student Future Plans

While causation cannot be inferred from this analysis, possible correlations between student perceptions of math and STEM, their backgrounds, and the backgrounds of their coaches were examined.

V.C.5.a Gender

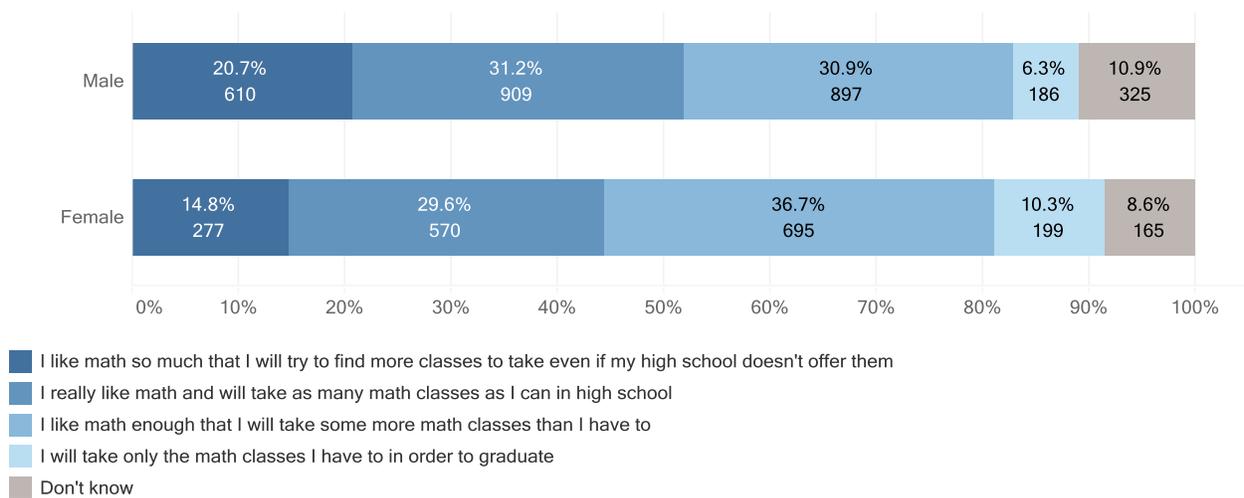
Students' plans for taking math classes in high school by gender were analyzed. Just 6 percent of male students reported that they would take only the math classes required to graduate, compared to 10 percent of female students who reported the same (Figure V.C-1). Just over half of male participants (51.9%) stated they like math so much that they would take as many math classes in

high school as possible. Among those, 21 percent stated they would seek out math classes even if their school did not offer them. Likewise, 44.4 percent of female students stated they really like math that they would take as many classes as possible in high school, and 15 percent of female competitors indicated they would seek our math classes even if their school did not offer the classes they wanted to take. This relationship proved to be statistically significant ($p < .0001$).

Figure V.C-1

Student plans for taking math classes in high school
by gender

number of responses and weighted %



P<.0001

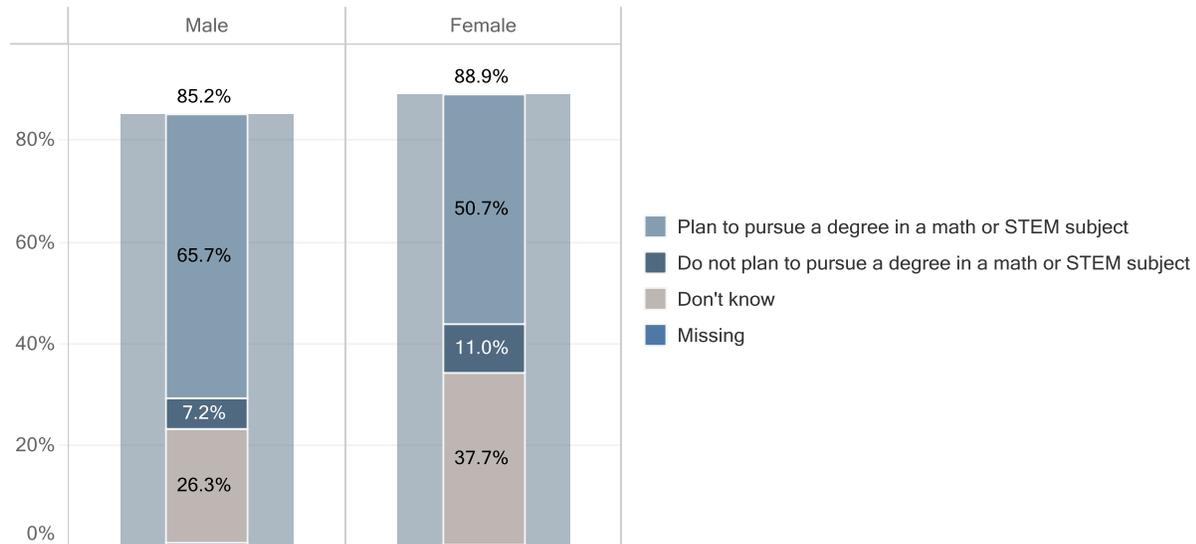
Students' future education plans by gender was analyzed. As shown in Figure V.C-2, more females indicated they were going to pursue higher education than males (88.9% versus 85.2% respectively) – a statistically significant difference ($p < .01$). However, just 51 percent of females planned to pursue a degree in math or STEM compared to 66 percent of males – another statistically significant difference ($p < .0001$). More females (38%) than males (26%) were undecided on their future plans.

Figure V.C-2

Student future education plans

% of students planning to pursue degree and % planning to pursue degree in math or STEM

by gender



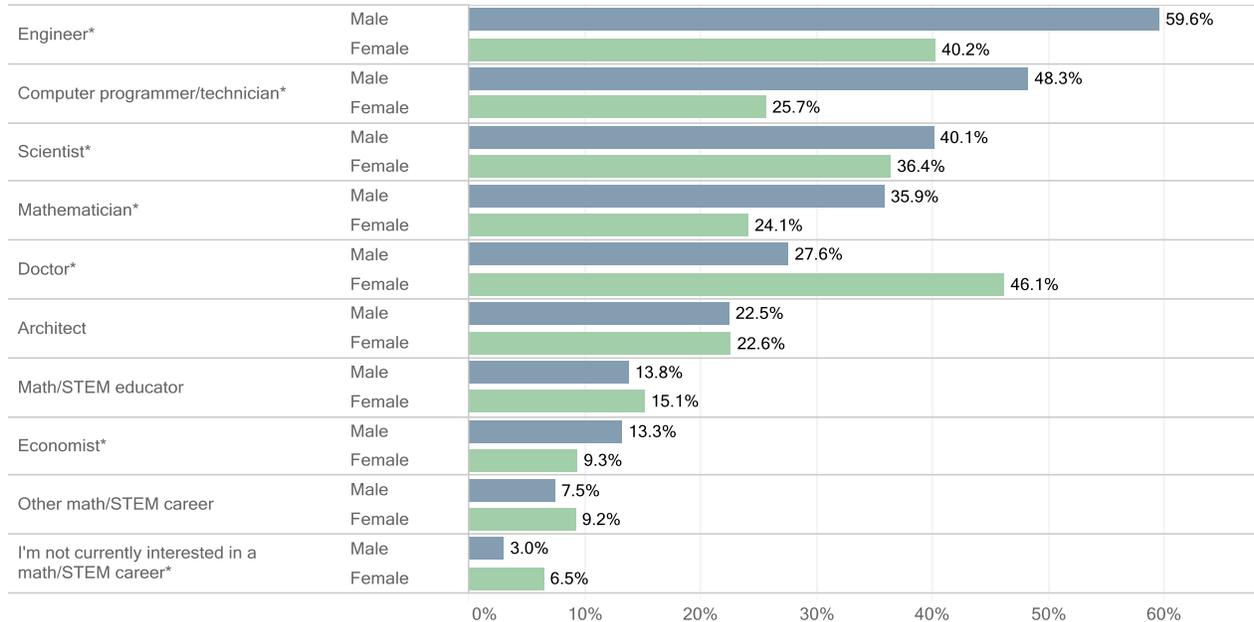
Postsecondary plans $p < .01$, math/STEM degree $< .0001$

Additional analysis looked at male and females' interest in careers related to math or STEM. Students could select any or all careers listed (engineer, computer programmer/technician, scientist, mathematician, doctor, architect, math/STEM educator, economist, and other math/STEM field not listed). 'Engineer' was most popular for males and 'doctor' was the most popular for females (Figure V.C-3). The least popular among those listed was 'economist' where just 13 percent males and 9 percent of females wanted to pursue a career in that field. More females than males wanted to seek a field in something other than math/STEM (7% versus 3%). The difference between males and females was significantly different for 'engineer,' 'computer programmer/technician,' 'scientist, mathematician,' 'doctor,' economist, and 'not currently interested in a math/STEM field.'

Figure V.C-3

Careers related to math or STEM of interest to students
by gender

weighted %



* P<.02

V.C.5.b Grade and Years in MATHCOUNTS

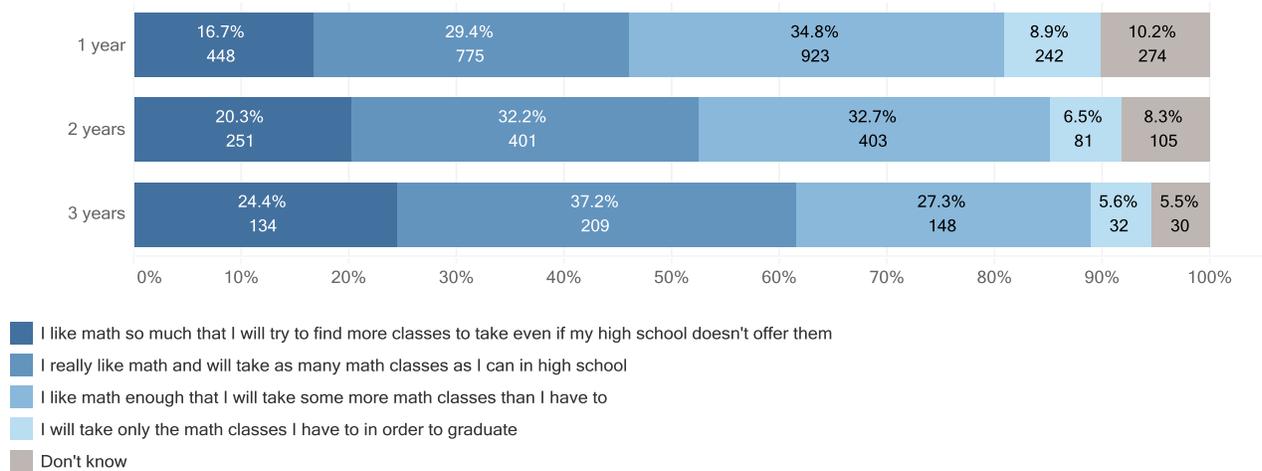
Analysis was conducted to look at the number of years a student participated in the MATHCOUNTS Competition Series and whether that was associated with their future plans. Students were asked for their grade level in school, how many years they participated in the MATHCOUNTS Competition Series program, and how many years they participated in MATHCOUNTS Competition Series competitions. Students were also asked to report the amount of time they had spent in MATHCOUNTS meetings and practices throughout the year. In interpreting these findings one should note most respondents were in the 8th grade and participating in MATHCOUNTS for the first time.

Students' plans for taking math classes in high school were influenced by the number of years they participated in MATHCOUNTS (Figure V.C-4). Results suggest that the more experience a student had in the MATHCOUNTS program, the higher propensity they had to take more than the required number of math classes. For example, 89 percent of students who participated in MATHCOUNTS for 3 years stated they would take more than the required number of math classes in high school. This compares to 85 percent of students with 2 years' experience and 81 percent of students with just 1 year of experience.

Figure V.C-4

Student plans for taking math classes in high school
by years in MATHCOUNTS

number of responses and weighted %



P<.0001

To add to these observations, the influence of having spent three years in MATHCOUNTS on eighth grade students was examined. Almost 90 percent of eighth grade students who reported three years of participation in MATHCOUNTS reported that they would take more math classes than they had to, and nearly 25 percent reported that they liked math so much that they would seek out additional classes even if not offered in their school. Of eighth grade students with one year of MATHCOUNTS experience, 82 percent reported a propensity to take additional math classes while 15 percent reported that they would seek out extra math classes ($p<.0001$).

Student's time spent in the MATHCOUNTS program had a slight, but significant association with future education plans. As shown in Figure V.C-5, 91 percent of students who participated in the MATHCOUNTS program for three years reported plans to obtain postsecondary education and 65

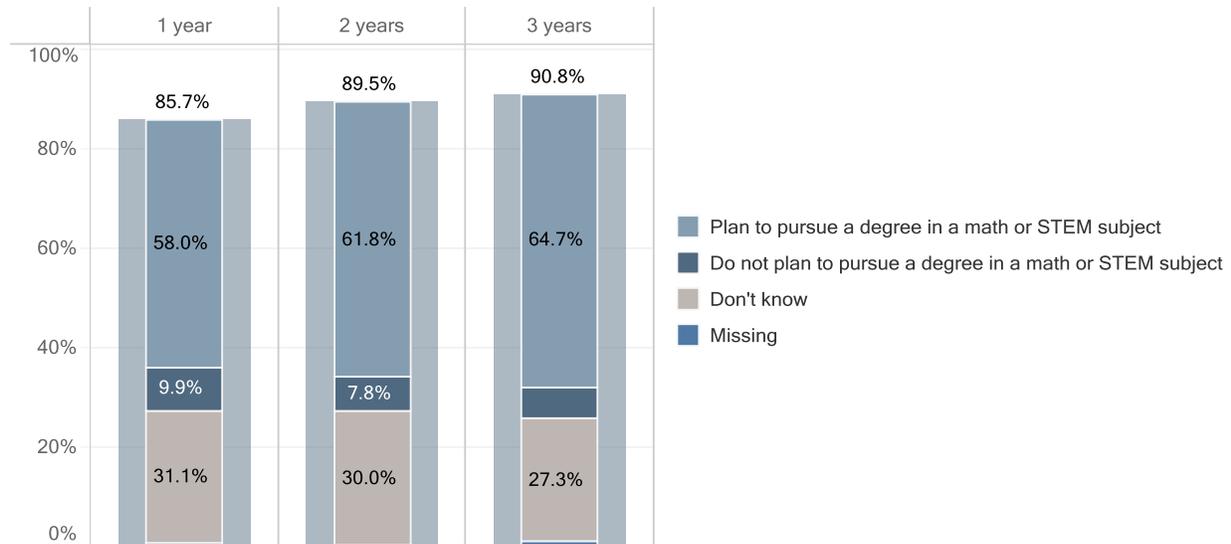
percent planned to pursue a degree in a math or STEM field. Comparatively, 86 percent of students who had participated for only one year planned to pursue postsecondary education and 58 percent in a math or STEM field. To examine the influence of MATHCOUNTS further, these outcomes against education plans of eighth graders were further compared. Eighty-nine percent of eighth grade students reported plans to pursue postsecondary education, and 58 percent planned to pursue a degree in a math or STEM field.

Figure V.C-5

Student future education plans

% of students planning to pursue degree and % planning to pursue degree in math or STEM

by years in MATHCOUNTS



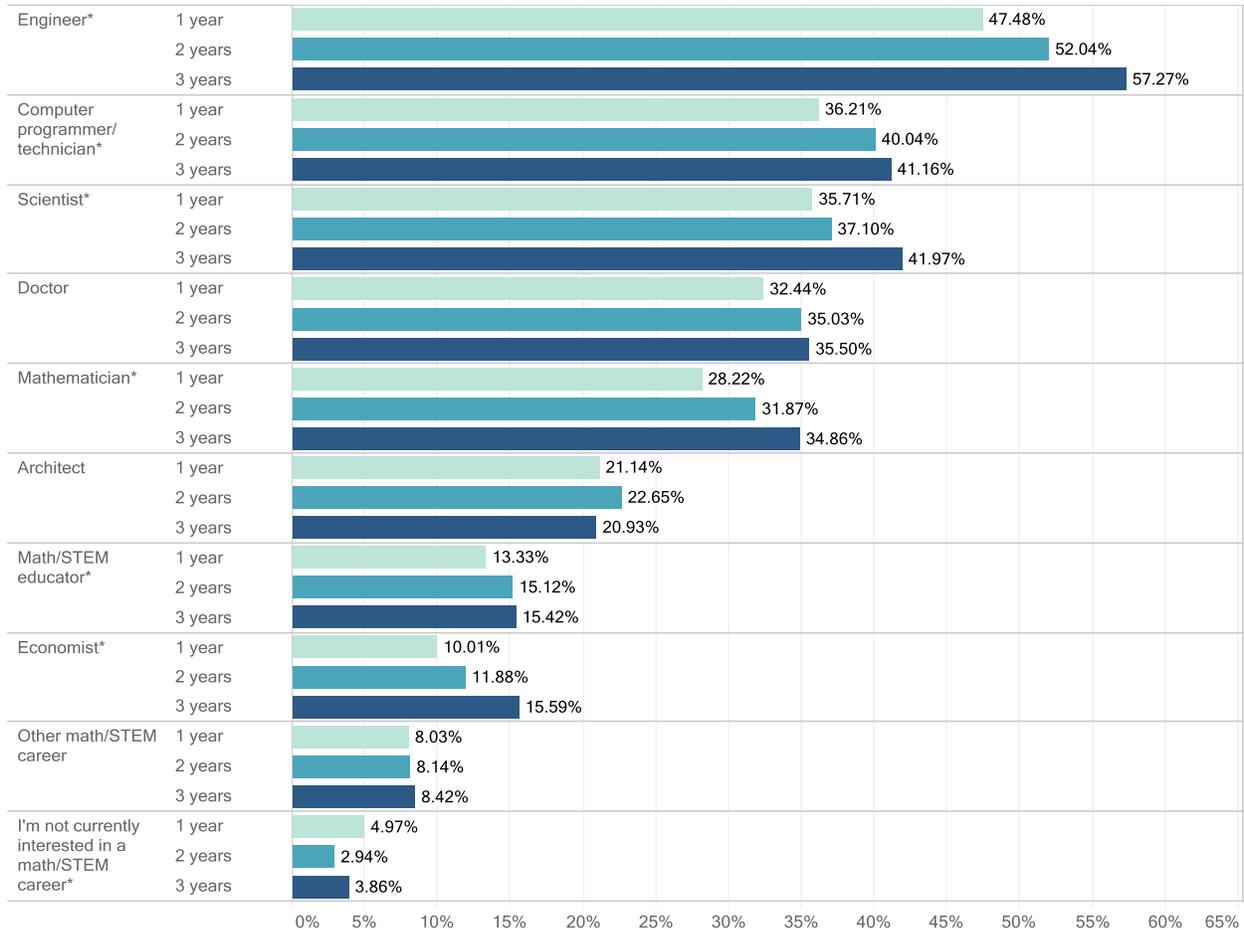
p<.0001

The number of years a student has participated in MATHCOUNTS also appeared to influence their career choice (Figure V.C-6). For example, 57 percent of students with 3 years' experience reported an interest in being an engineer where just 48 percent of students with 1-year experience expressed the same sentiment. Figure V.C-6 shows the comparison of years' experience in MATHCOUNTS among various math/STEM career paths. In most cases, students with 3 years' experience are more likely to choose a specific career than those with 1 or 2 years of experience.

Figure V.C-6

Careers related to math or STEM of interest to students
by years in MATHCOUNTS

weighted %



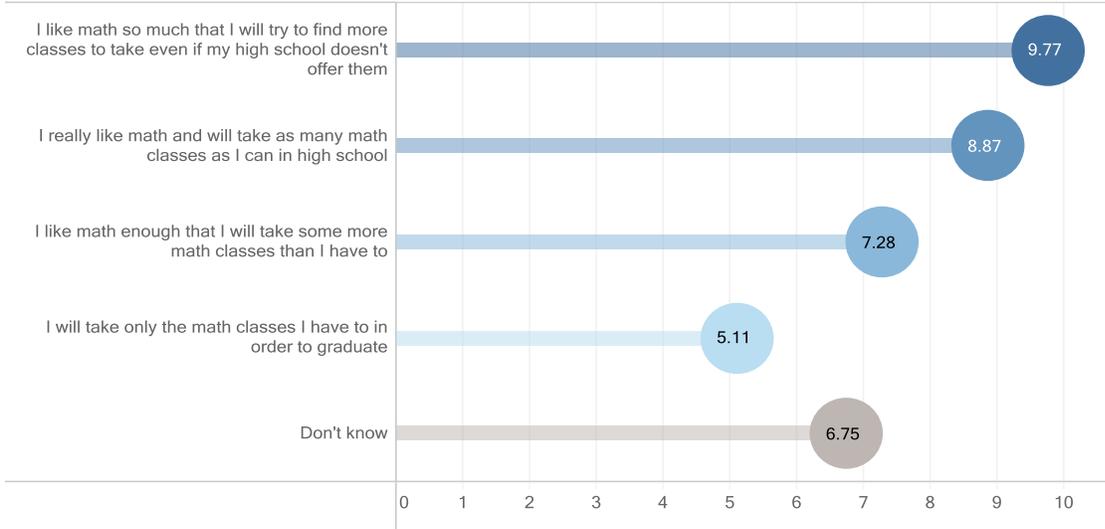
* p <.05

V.C.5.d Perception of Math and STEM

Analysis of student perception of math and STEM compared to future math class plans suggests a positive relationship between perception of math/STEM and plans to take more math classes (Figure V.C-7). Students who plan to take more than the required number of math classes in high school had an average perceptions score of 7.3. This increased to 8.9 for students who indicated they wanted to take as many math classes in high school as possible. Further, students who indicated they like math so much they will try to find more classes even if their school does not offer them had an average perception score of 9.8, all based on a scale of 12.

Figure V.C-7

Average student math/STEM perception score
by student plans for taking math classes in high school

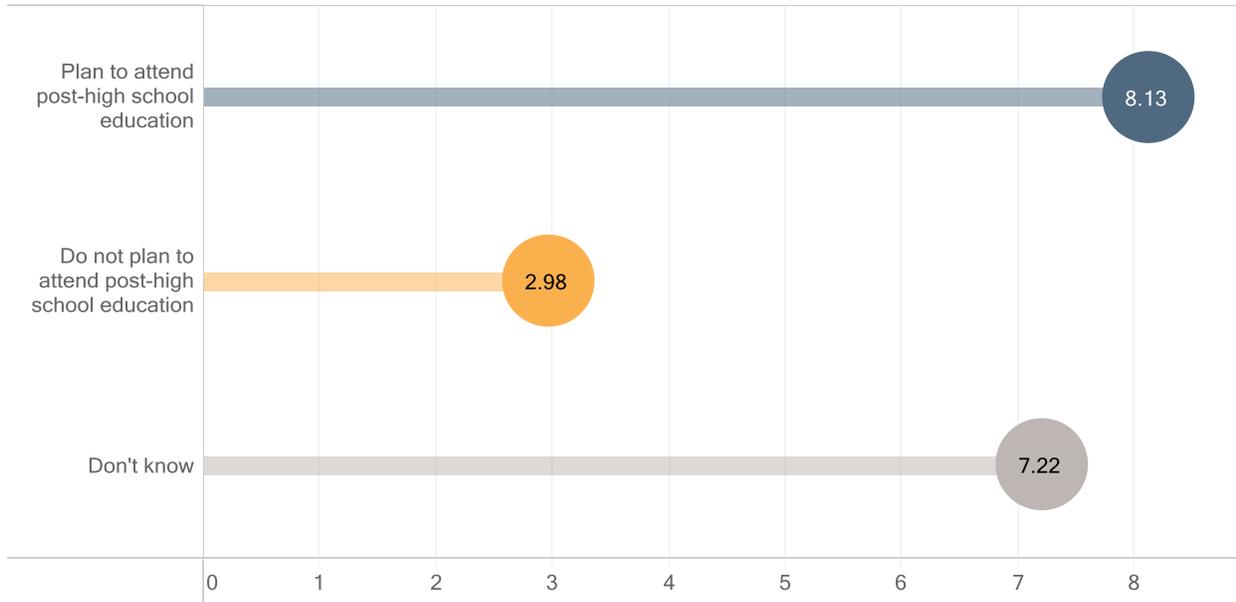


p<.02

As shown in Figure V.C-8, a positive association was noted between average perception score and plans to pursue higher education. Students who plan to continue their education beyond high school had an average perception score of 8.1 out of 12 compared to those who do not plan to continue their education with a perception score of 3.0 ($p<.0002$). Students who were undecided had an average perception score between those two at 7.2.

Figure V.C-8

Average student math/STEM perception score
by student plans to pursue postsecondary education

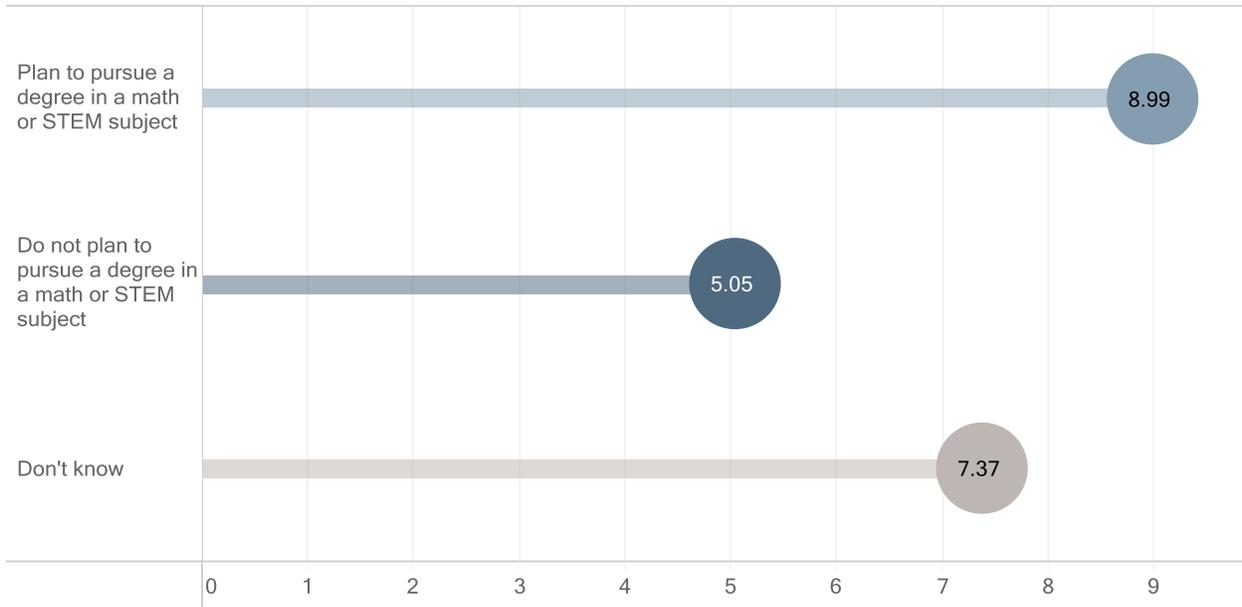


$p < .003$

Similar to plans to pursue higher education, students' perception is positively correlated with plans to pursue a degree in math/STEM field (Figure V.C-9). Students who plan to pursue a degree in math or STEM subject had an average perception score of 9.0 out of 12 compared to those who do not want to earn a degree in math/STEM with an average perception score of 5.1 ($p < .0001$). Those who were undecided fell within this range at 7.4.

Figure V.C-9

Average student math/STEM perception score
by student plans to pursue degree in math or STEM field



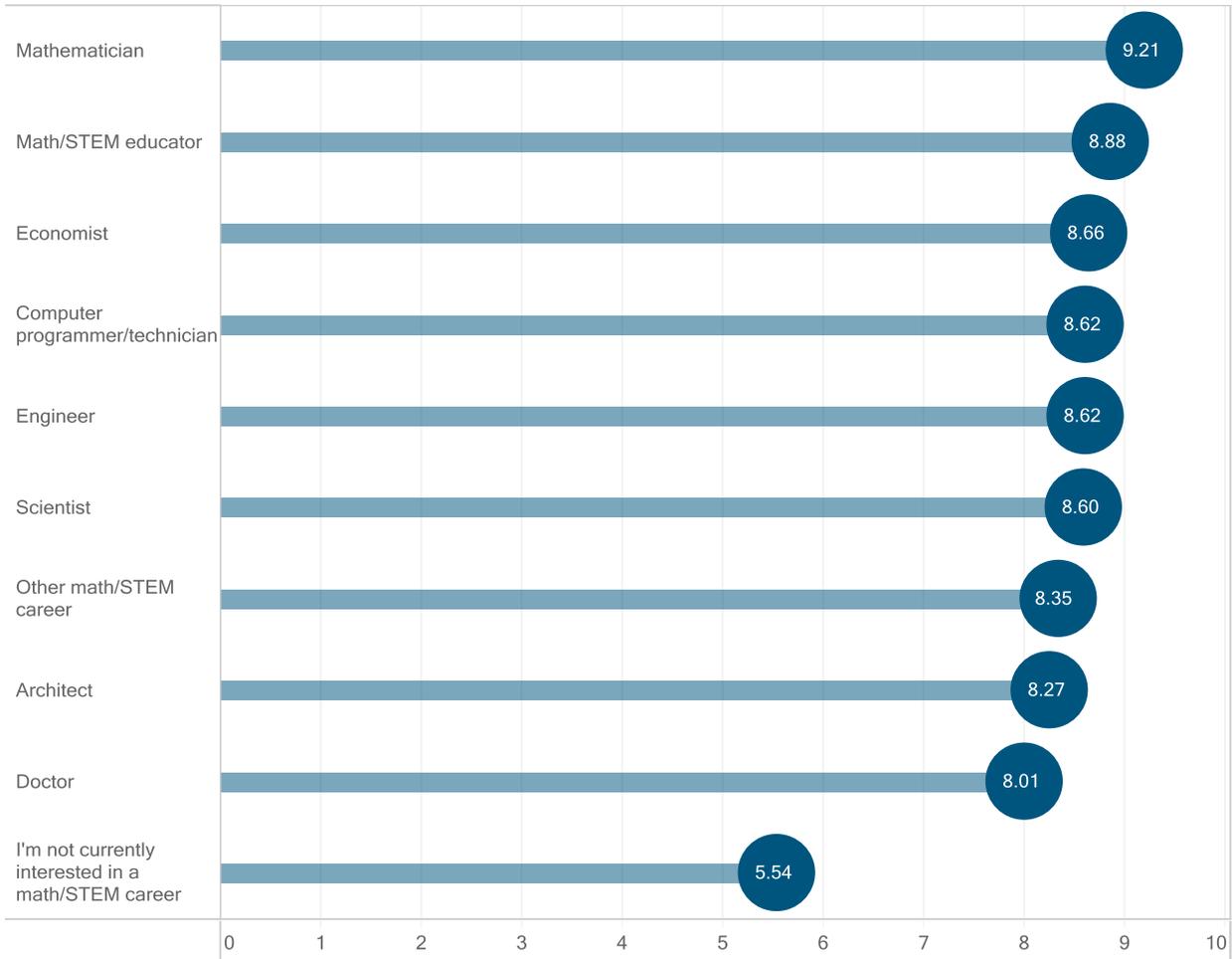
p<.0001

While the directionality of this relationship cannot be established through this analysis, it is clear that a higher perception of the math and STEM fields goes hand in hand with students' interest in pursuing a future in the field.

Students' perception of the math and STEM fields appears to influence their career aspirations (Figure V.C-10). For example, the average perception score ranged from 8.0 (doctor) to 9.2 (Mathematician). This compared to a perception score of just 5.5 for those not currently interested in a math/STEM career.

Figure V.C-10

Average student math/STEM perception score
by careers related to math or STEM of interest to students

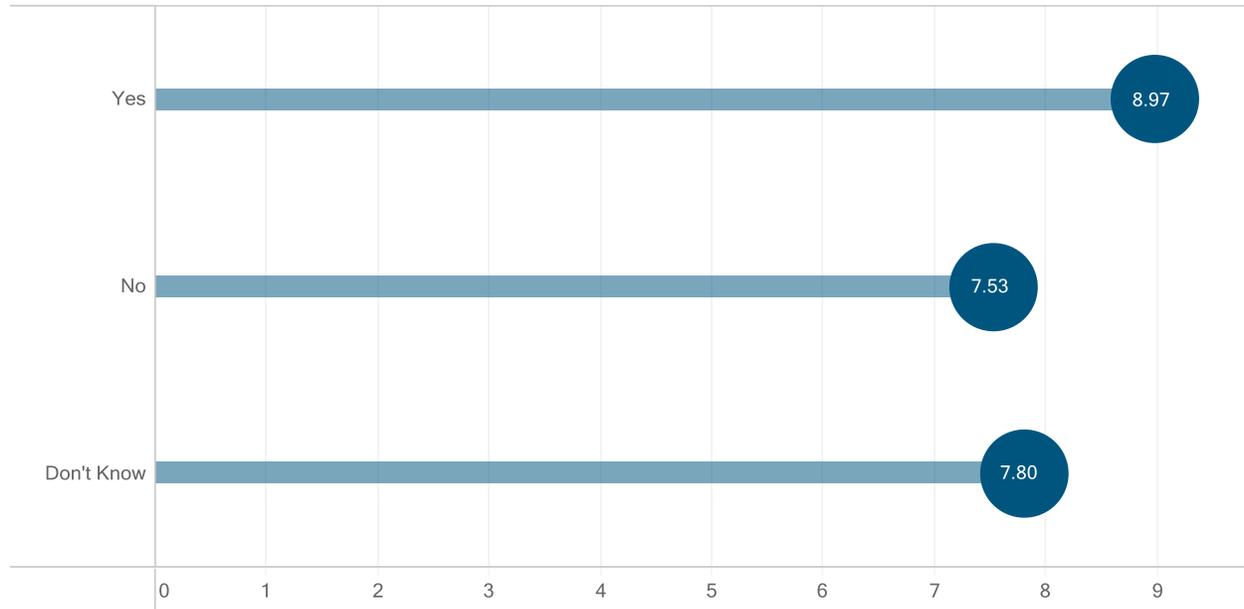


All except 'Doctor' $p < .001$

As shown in Figure V.C-11, students who believe MATHCOUNTS had influenced their future plans had a higher average perception score (9.0) compared to those who thought MATHCOUNTS did not influence their future plans (7.5) ($p < .0001$). Those who were unsure of the influence of MATHCOUNTS participation had an average perception score of 7.8.

Figure V.C-11

Average student math/STEM perception score
by student perceived influence of MATHCOUNTS on future plans



p<.03

V.D Student Satisfaction with the MATHCOUNTS Competition Series

Students were asked a variety of questions to capture their satisfaction with the MATHCOUNTS Competition Series. These included their perception of MATHCOUNTS influence on their confidence and interest in math and STEM, their overall satisfaction with their participation in the Competition Series, as well as how likely they were to recommend the MATHCOUNTS Competition Series to a friend. Overall, students reported high satisfaction with the Competitions series. The sections below examine these findings further.

V.D.1 Student Perception of MATHCOUNTS' Influence

Students were asked their level of agreement with the following statements about the MATHCOUNTS Competition Series:

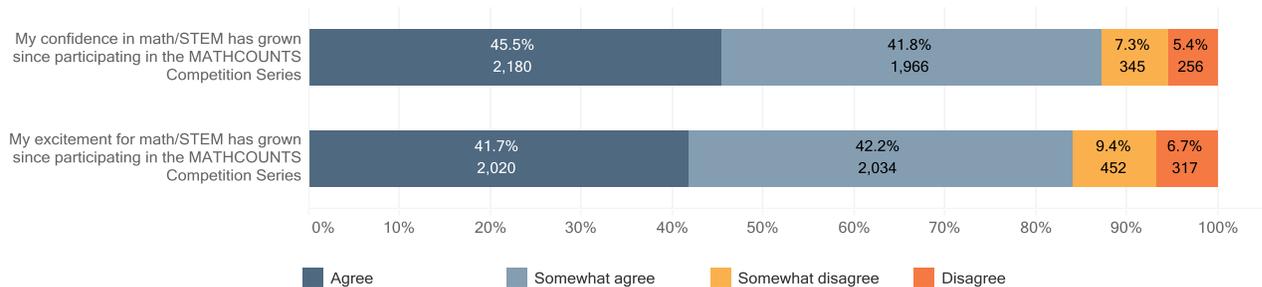
- My confidence in math/STEM has grown since participating in the MATHCOUNTS Competition Series
- My excitement for math/STEM has grown since participating in the MATHCOUNTS Competition Series.

The vast majority reported agreement with both statements (Figure V.D-1). Roughly 87 percent of students agreed or somewhat agreed that their confidence had grown through their participation. Almost 84 percent of responding students indicated that their excitement for the math/STEM field had grown since participating in MATHCOUNTS.

Figure V.D-1

Student perception of influence of MATHCOUNTS participation

number of responses and weighted %

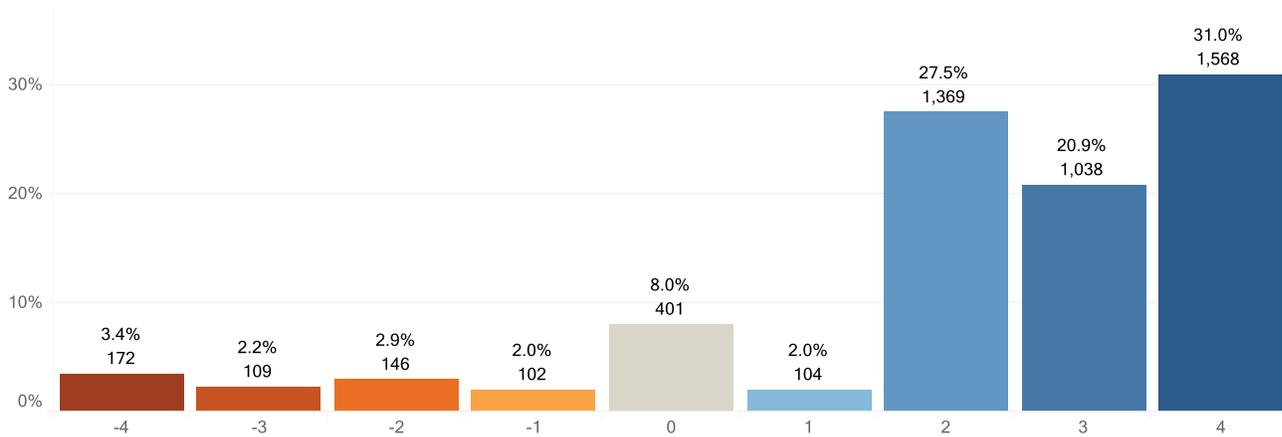


To more thoroughly examine students' perception of the program, a perception score based on the two questions above was created. Students' perception of the influence of MATHCOUNTS on their confidence in and perception of the math and STEM fields ranged between 4 and -4. For a discussion of how the perception score was created, see section V.B.5. Below (Figure V.D-2) you will find the distribution of students responses based on the perception score metric. Students' perception of the influence of MATHCOUNTS on their excitement for and confidence in math and STEM topics was mainly positive. Over half (52%) of students reported a perception score of 3 or 4.

Figure V.D-2

Distribution of student math/STEM perception scores
Student perception of influence of MATHCOUNTS participation

number of responses and weighted %



V.D.2 Student Satisfaction With the MATHCOUNTS Competition Series

Students were asked to rate their satisfaction with the MATHCOUNTS Competitions Series for the 2016 school year on a four point Likert-style scale ranging from ‘satisfied’ (1) to ‘unsatisfied’ (4).

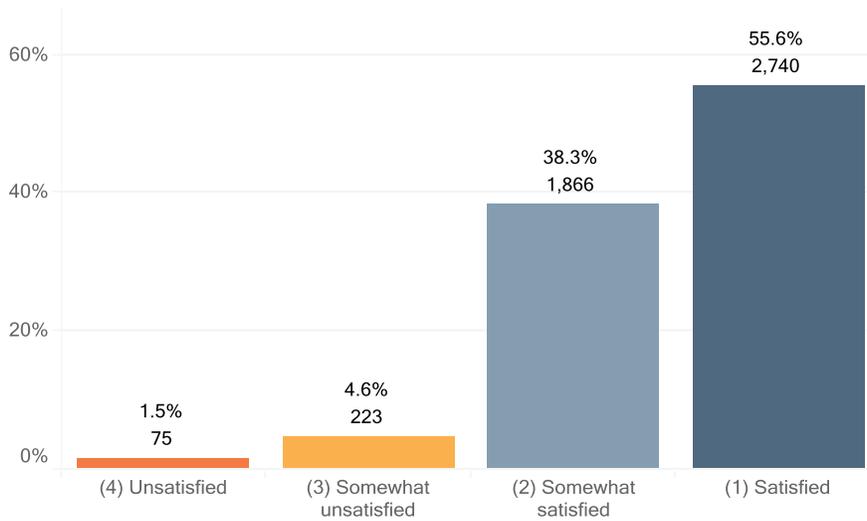
Figure V.D-3 below shows the students’ reported satisfaction with the program.

Overall, students reported high levels of satisfaction with the MATHCOUNTS Competition Series. The majority of students (56%) reported a score of ‘satisfied’ while only 6 percent of students reported being ‘unsatisfied’ or ‘somewhat unsatisfied’ with the program overall. Generally, students reported an average satisfaction score of 1.73.

Figure V.D-3

Student satisfaction with the MATHCOUNTS Competition Series overall

number of responses and weighted %



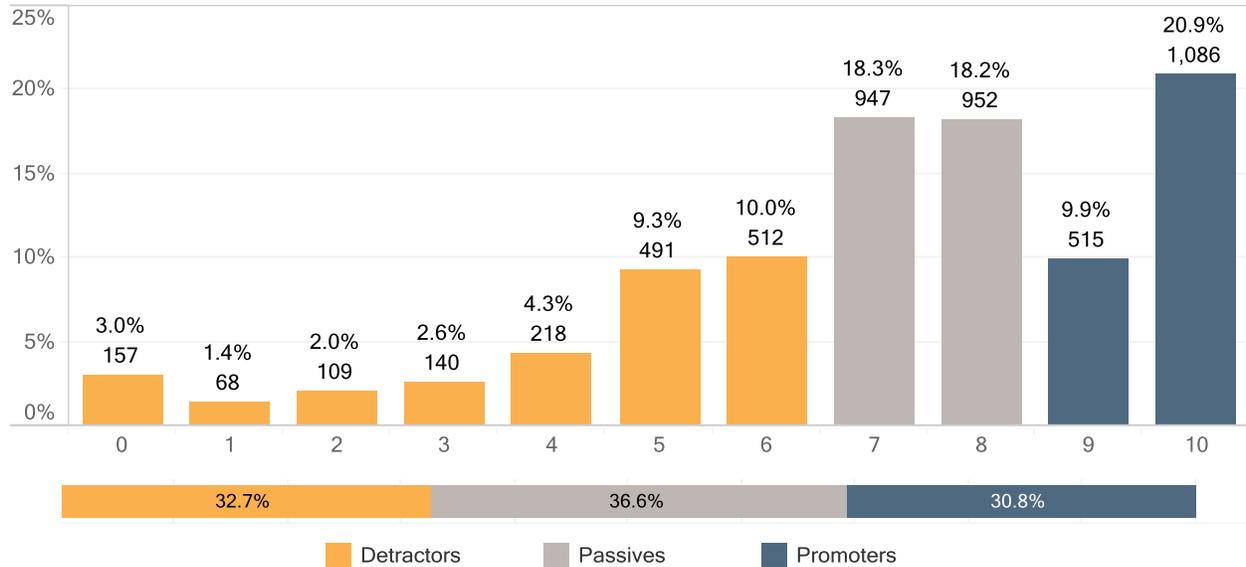
V.D.3 Student Net Promoter Score

Students were also asked about their propensity to recommend participation in the MATHCOUNTS Competition Series to a friend. This question used a net promoter scale with responses from ‘0-not at all likely’ to ‘10-extremely likely’. Responses to this question were coded into three groups: Detractors, with scores ranging from zero to six, Passives, with score between seven and eight, and Promoters, with scores ranging between nine and ten. Figure V.D-4 shows a breakdown of student responses.

Figure V.D-4

Student Net Promoter Score

number of responses and weighted %



To calculate the Net Promoter Score, the percentage of detractors is subtracted from the percentage of promoters. For the MATHCOUNTS Competition Series, students reported a Net Promoter Score of -1.9. A score of -1.9 indicates that roughly 2 percent more students are not likely to recommend participating in the MATHCOUNTS Competition Series to a friend than would recommend participation.

V.D.4 Students' Favorite Components of Meetings and Practices

Students were asked what they liked most about participating in practices and meetings for the Competition Series overall during the school year. The students provided open-ended responses and a sample of 15 percent of the total responses were randomly selected, reviewed and grouped into themes. The most popular themes are displayed below (Table V.D-1) along with the percentage of times they were mentioned. Table V.D-1 also briefly describes each theme to provide context. As the table illustrates, learning/extra practice/class credits; then comradery/time with friends/being part of a team; then competition/winning/challenging myself/problem solving/strategizing were the most popular themes.

Table V.D-1. Liked most about participating in practices and meetings for the Competition Series overall

	%
Themes	
Learning/extra practice/class credits	28.8
Comradery/time with friends/being part of a team	22.9
Competition/winning/challenging myself/problem solving/strategizing	20.9
It is cool/fun/I like math/something to do after school	14.9
Perks/food/prizes/missing school/visiting colleges	8.4
Do not know	3.1
We did not have meetings/Never attended meetings/first time	1.0

Learning/extra practice/class credits. Students liked the fact that participating in the Competition Series provided them with the opportunity to learn new concepts, to gain additional practice to sharpen their math skills, and to earn extra class credits.

Comradery/time with friends/being part of a team. Students greatly enjoyed spending time with their peers in the program as well as building new relationships and friendships along the way.

Competition/winning/challenging myself/problem solving/strategizing. Some student with a more competitive streak enjoyed the challenges and competitions that come with the program.

It is cool/fun/I like math/something to do after school. Other students just enjoy math and thought the program was a fun activity to fill up their spare time.

Perks/food/prizes/missing school/visiting colleges. The benefits and rewards of the program such as food, prizes, missing school and visiting potential colleges really drew in some students.

Do not know and **We did not have meetings/Never attended meetings/first time.** A small percentage of students stated they did not have an answer or that they did not participate with meetings in school.

V.D.5 Changes Students Think Would Improve the Competition Series

Students were asked what they would change about their experience in the MATHCOUNTS Competition Series practices and meetings. The students provided open-ended responses and a sample of 15 percent of the total responses were randomly selected, reviewed and grouped into themes. The most popular themes are displayed below (Table V.D-2) along with the percentage of times they were mentioned. Table V.D-2 also briefly describes each theme to provide context. As the table illustrates, do not know/everything is fine/nothing/haven't participated; then more meetings/more practice/more competition; then more learning opportunity/harder problems/better or more challenging questions/more explaining wrongly answered questions were the most popular themes.

Table V.D-2. Something you would change about your experience in the MATHCOUNTS Competition Series practices and meetings to improve it

	%
Themes	
Do not know/everything is fine/nothing/haven't participated yet	32.4
More meetings/more practice/more competition	17.6
More learning opportunity/harder problems/better or more challenging questions/more explaining wrongly answered questions	10.3
Make it more fun/allow more time with friends/more breaks/less meetings/easier questions/more calculator use/work more with other teams	9.5
More perks/better food/more interaction	8.5
More study time/make it after school/change time/more convenience	7.8
Be more active/take it more seriously	7.3
Expand rounds/more time to answer questions during rounds	4.6
Winning more/perform better in competitions/working with other teams	1.8

Do not know/everything is fine/nothing/haven't participated yet. More than 3 out of 10 students did not have any ideas regarding how to improve the program.

More meetings/more practice/more competition. Some students wanted the program to expand with more meetings, practices and competitions.

More learning opportunity/harder problems/better or more challenging questions/more explaining wrongly answered questions. Other students wanted the program geared more toward learning than competitions. With more challenging problem and more time to answer questions about problems that were not solved correctly.

Make it more fun/allow more time with friends/more breaks/less meetings/easier questions/more calculator use/work more with other teams. A segment of students wanted to make the program more fun and have more breaks, time to socialize with friends and easier math problems.

More perks/better food/more interaction. Students also thought more benefits and rewards for participating would improve the program.

More study time/make it after school/change time/more convenience. Some students did not like the time of day or week when the practices and competitions were and would like to see them changed.

Be more active/take it more seriously. A portion of students regretted not giving their all in the program. They wished they tried harder or were more committed.

Expand rounds/more time to answer questions during rounds. Some students would appreciate more time to deliberate when answering questions during the competitions.

Winning more/perform better in competitions/working with other teams. Finally, some students think they would have enjoyed the program more if their team performed better.

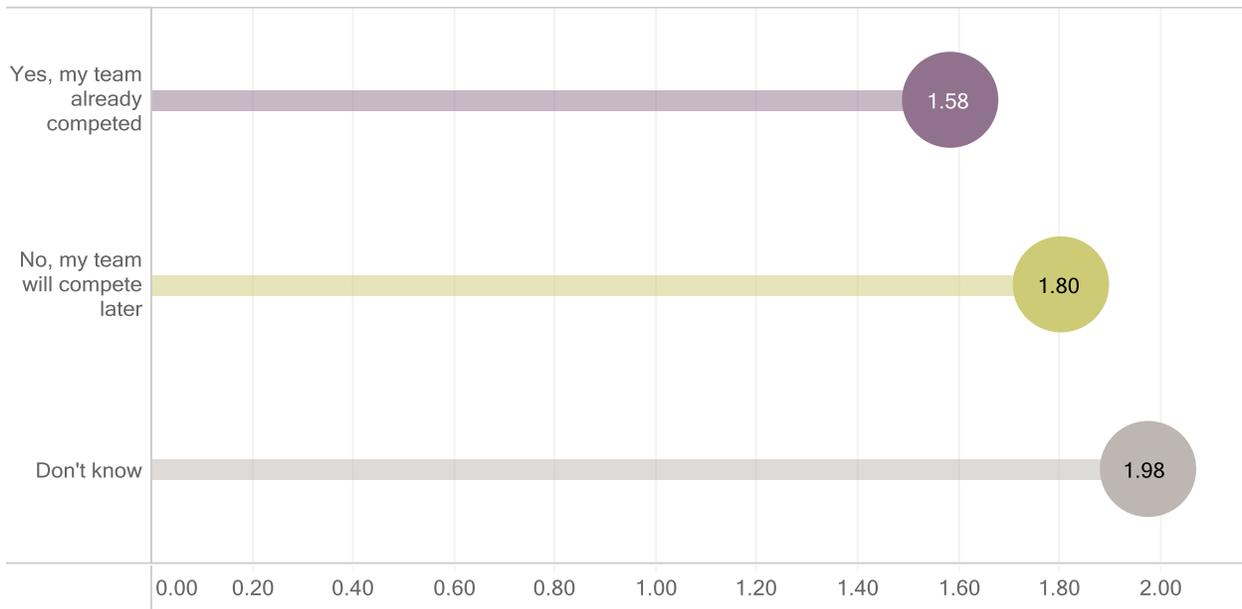
V.D.6 Influences on Satisfaction and Promotion

V.D.6.a Timing of the Survey

On the survey, students indicated if they were competing with a team, and if they had competed yet. While there was a statistically significant difference between student satisfaction with MATHCOUNTS if they competed on a team (average satisfaction = 1.66) or as an individual (average satisfaction = 1.75) ($p > .0001$) the magnitude of the difference was not great enough to be of analytical interest. Figure V.D-5 shows the breakdown of average student satisfaction dependent on whether the student had already finished competing. [Lower numbers indicate higher satisfaction.]

Figure V.D-5

Average student satisfaction with the MATHCOUNTS Competition Series overall
by whether student's team had competed



$p > .01$

Students who had already competed expressed a greater overall satisfaction with the MATHCOUNTS Competitions Series (average satisfaction = 1.6) compared to student who had finished participating (average satisfaction = 1.8). While important to note, it is unlikely that this difference was impactful enough to influence the outcome of the following analysis.

V.D.6.b Gender

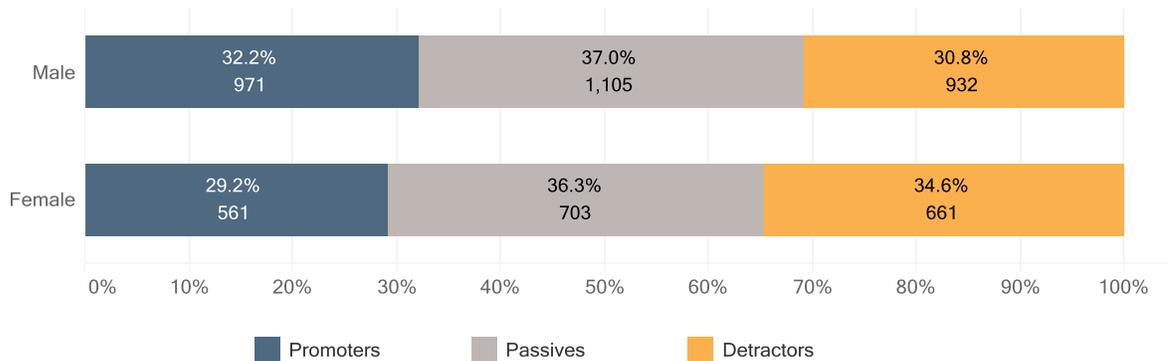
Female students reported slightly lower satisfaction with the Competitions Series with an average satisfaction score of 1.72 while male students reported an average satisfaction score of 1.70. Male students were more likely to report that MATHCOUNTS affected their confidence in and perception of the math/STEM, with an aggregate perception score of 2.18 compared to female student's aggregate perception score of 2.12 . Neither comparison proved to be statistically significant.

Male and female students also differ on their reported Net Promoter Scores (NPS), though the difference was not statistically significant. Male students reported a NPS of 1.4 while female students had a NPS of -5.4. This indicates that male students participating in the MATHCOUNTS Competitions Series were slightly more likely than their female counterparts to recommend participation to a friend. The breakdown of these scores is shown in Figure V.D-6.

Figure V.D-6

Student Net Promoter Score by gender

number of respondents and weighted %



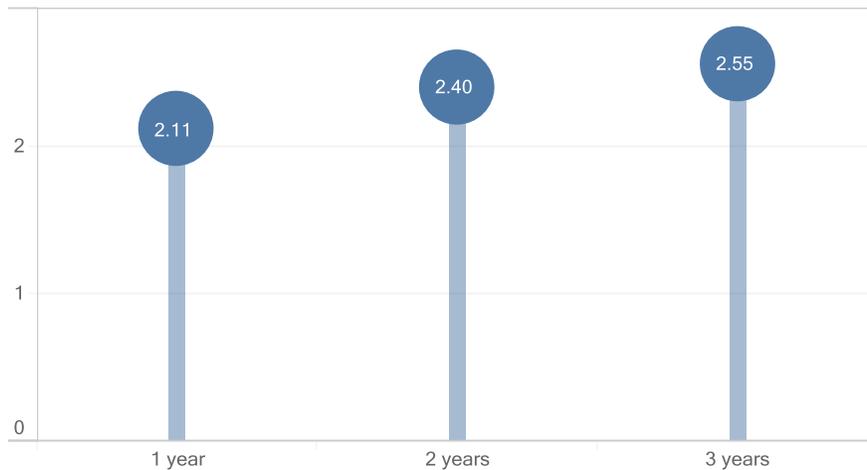
V.D.6.c Grade/Years in MATHCOUNTS

Figure V.D-7 below shows student perceived influence of MATHCOUNTS participation based on how many years they have participated in MATHCOUNTS competitions. Students in their first year of participation reported a lower perception of the Competition Series' influence on their excitement for and confidence in math and STEM than students in their second and third year ($p=.0002$ against

year two and $p=.0015$ against year three). This could be attributed to students perceiving more value the more they engage with the program, or it could be that the students who perceive less value in year one are less likely to continue with the program and remove themselves over the years. A similar trend was observed based on the years the student has participated in any portion of the Competition Series. Students with three years of participation reported average perceived influence scores of 2.39 compared to students in their first year of participation who reported average perception scores of 2.06 ($p<.0001$).

Figure V.D-7

Average student perceived influence of MATHCOUNTS participation by years in MATHCOUNTS competitions



Statistically significant difference between years one and two and one and three $p<=.002$

Students reported only minor changes in overall satisfaction based on their time in the MATHCOUNTS Competition Series. Students with three years of experience in the program reported average satisfaction scores of 1.7, the same as the average satisfaction score of a student participating in the program for the first time. This same pattern held true for student satisfaction based on grade level and years participating in MATHCOUNTS competitions.

As Figure V.D-8 illustrates below, students are more likely to be promoters of the MATHCOUNTS Competitions series the more years they are involved in MATHCOUNTS. This pattern is similar for both students who participate in competitions and those that do not participate in competitions. Students in their third year of MATHCOUNTS participation reported a NPS of 13.3 compared to an NPS of -4.6 reported by students in their first year. Students attending a MATHCOUNTS competition for the third year reported an even higher NPS of 17.7.

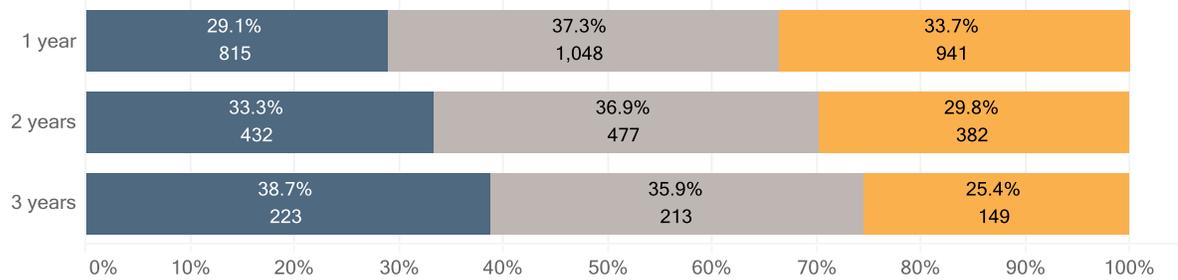
Figure V.D-8

Student Net Promoter Score

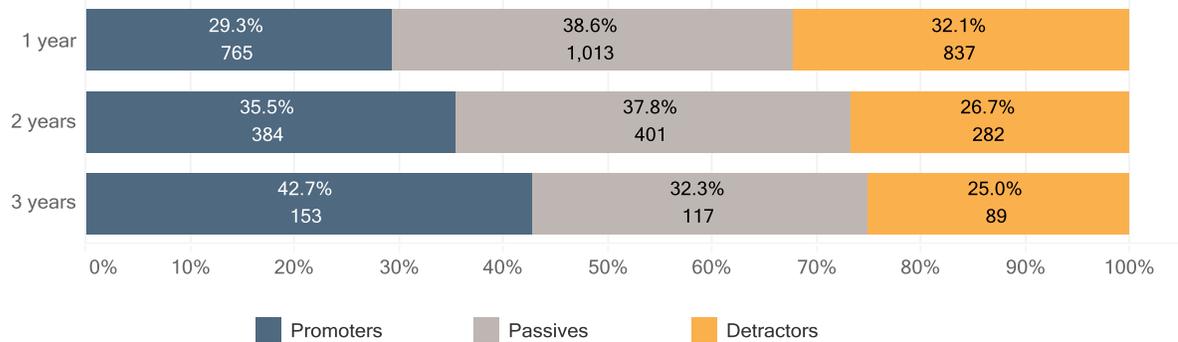
by years participating in MATHCOUNTS and MATHCOUNTS competitions

number of respondents and weighted %

Years participating in MATHCOUNTS



Years participating in MATHCOUNTS competitions



Participation in MATHCOUNTS: Statistically significant difference between years one and three $p=.0002$, and approaching significance between years one and two $p<=.06$

Participation in MATHCOUNTS Competitions: Statistically significant difference between years one and two and one and three $p<=.01$

Student who spend more than 5 hours per week participating in MATHCOUNTS perceive the program to have the greatest influence on them, with a perception score of 2.85 out of four, while students only participating for a hour a week perceive the program to have the least amount of influence on them, with an perception score of 2.03 (Figure V.D-9). Hours spent in MATHCOUNTS did not overtly affect student’s likelihood to promote the program, though students who spent five or more hours per week in MATHCOUNTS practices and meeting reported a significantly higher NPS of 27.2 ($p<.0001$).

Figure V.D-9

Average student perceived influence of MATHCOUNTS participation by hours spent in MATHCOUNTS per week



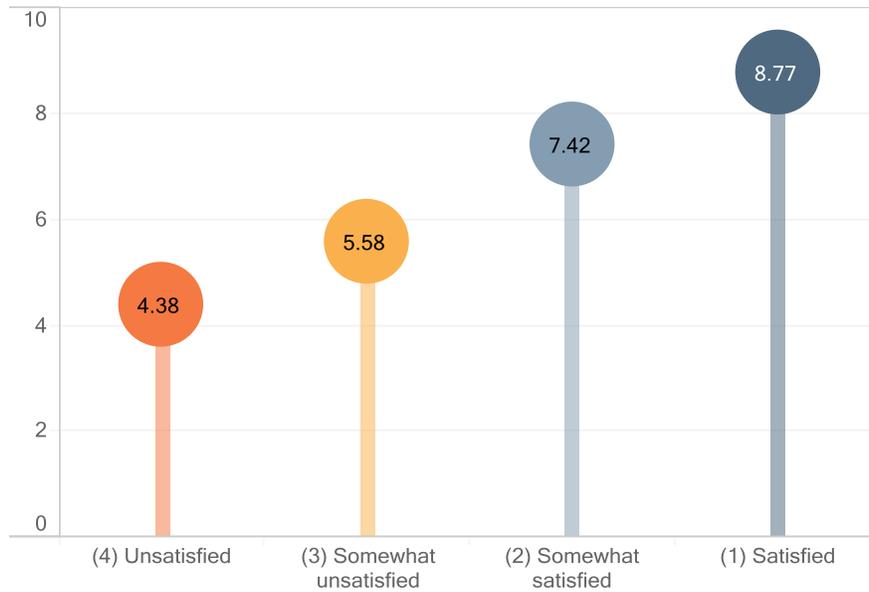
Inter group significance reported in Appendix Table V.D-9

V.D.6.d Perception of Math/STEM

Student satisfaction with the MATHCOUNTS Competition Series appears to correlate positively with students' perception of math and STEM (Figure V.D-10). Students who reported being 'satisfied' with MATHCOUNTS reported an average math/STEM perception score of 8.77 on a 12 point scale. Students who reported being unsatisfied reported an math/STEM perception score of 4.4 ($p < .0001$). This relationship is shown in Figure V.D-10.

Figure V.D-10

Average student math/STEM perception score
by satisfaction with MATHCOUNTS



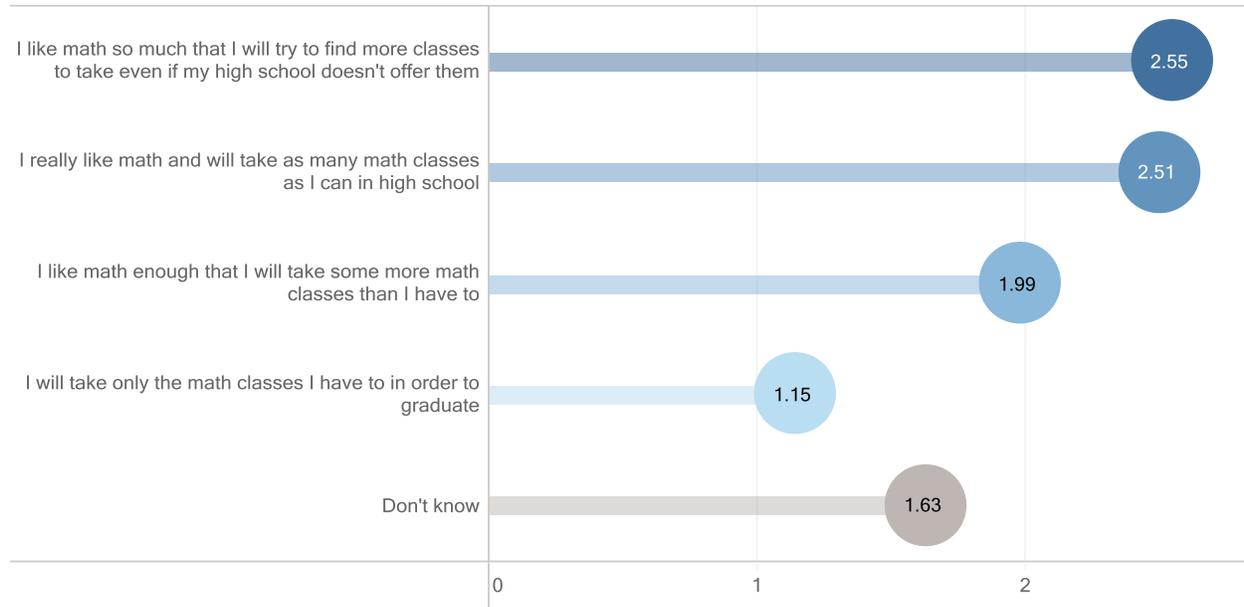
Statistically significant differences between all groups, $p < .0001$, except between 'Unsatisfied' and 'Somewhat unsatisfied'.

V.D.6.e Future Plans

Students who reported that they liked math to the point of seeking out additional math classes in high school, or taking as many classes as they could reported a more positive perception of the influence of MATHCOUNTS participation on their confidence and excitement for math/STEM. Average perceptions scores were 2.55 and 2.51 on a four point scale, respectively. Students who reported that they would only take the math classes they needed to in order to graduate reported lower perception scores of 1.15, shown in Figure V.D-11 below.

Figure V.D-11

Student plans for taking math classes in high school
by average student perceived influence of MATHCOUNTS participation



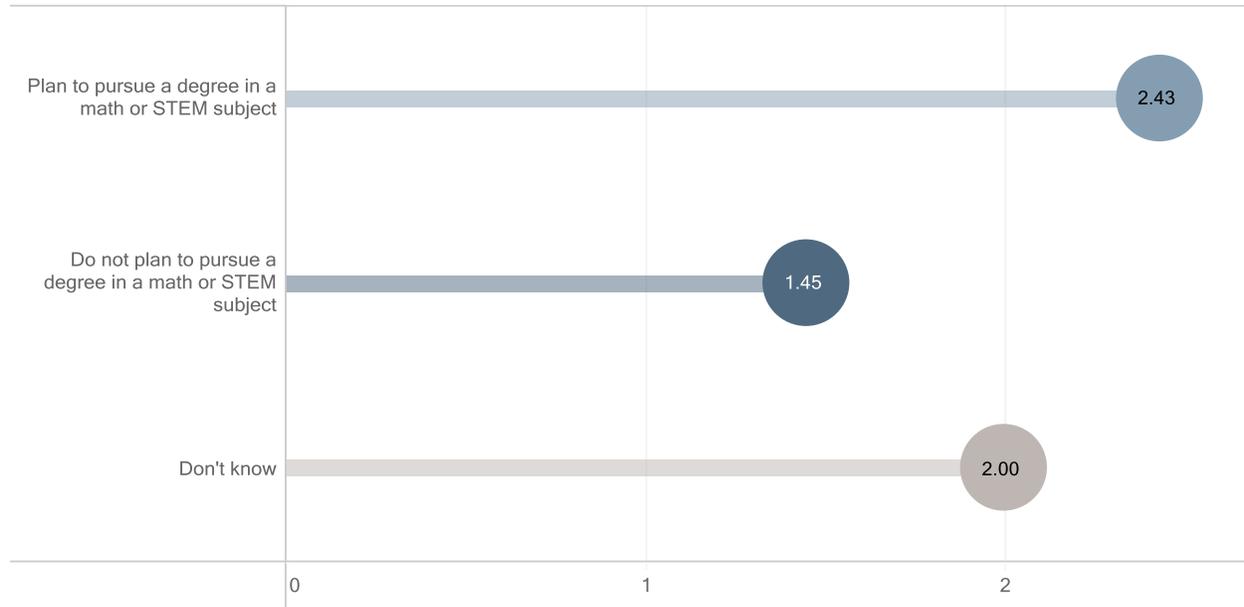
Statistically significant differences between all groups, $p < .0001$, except between students planning to take as many math classes and more classes than are offered.

A similar trend in overall student satisfaction was observed. Students who planned to take the most math classes as possible in high school reported the highest average satisfaction with the MATHCOUNTS Competition series, 1.5, where 1 is satisfied. Comparatively, students who were planning to take few classes in high school reported lower satisfaction with the program, a score of 1.9 ($p < .0001$).

Students' perceived influence of participation in the MATHCOUNTS program also interacted with their plans to pursue postsecondary education and a degree in a math or STEM field. Students who planned to obtain postsecondary education reported a higher score for the perception of the influence of MATHCOUNTS (2.20) than students who did not plan to obtain postsecondary education (1.67) though this difference did not prove to be statistically significant. As shown in Figure V.D-12, this difference grew based on students intending to pursue a degree in MATH or STEM. Students interested in a degree in a math or STEM field reported an average influence perception score of 2.4 on a four point scale, while students who did not plan to pursue a degree in a math or STEM subject reported an average perception score of 1.45.

Figure V.D-12

Student plans to pursue degree in math or STEM
by average student perceived influence of MATHCOUNTS participation



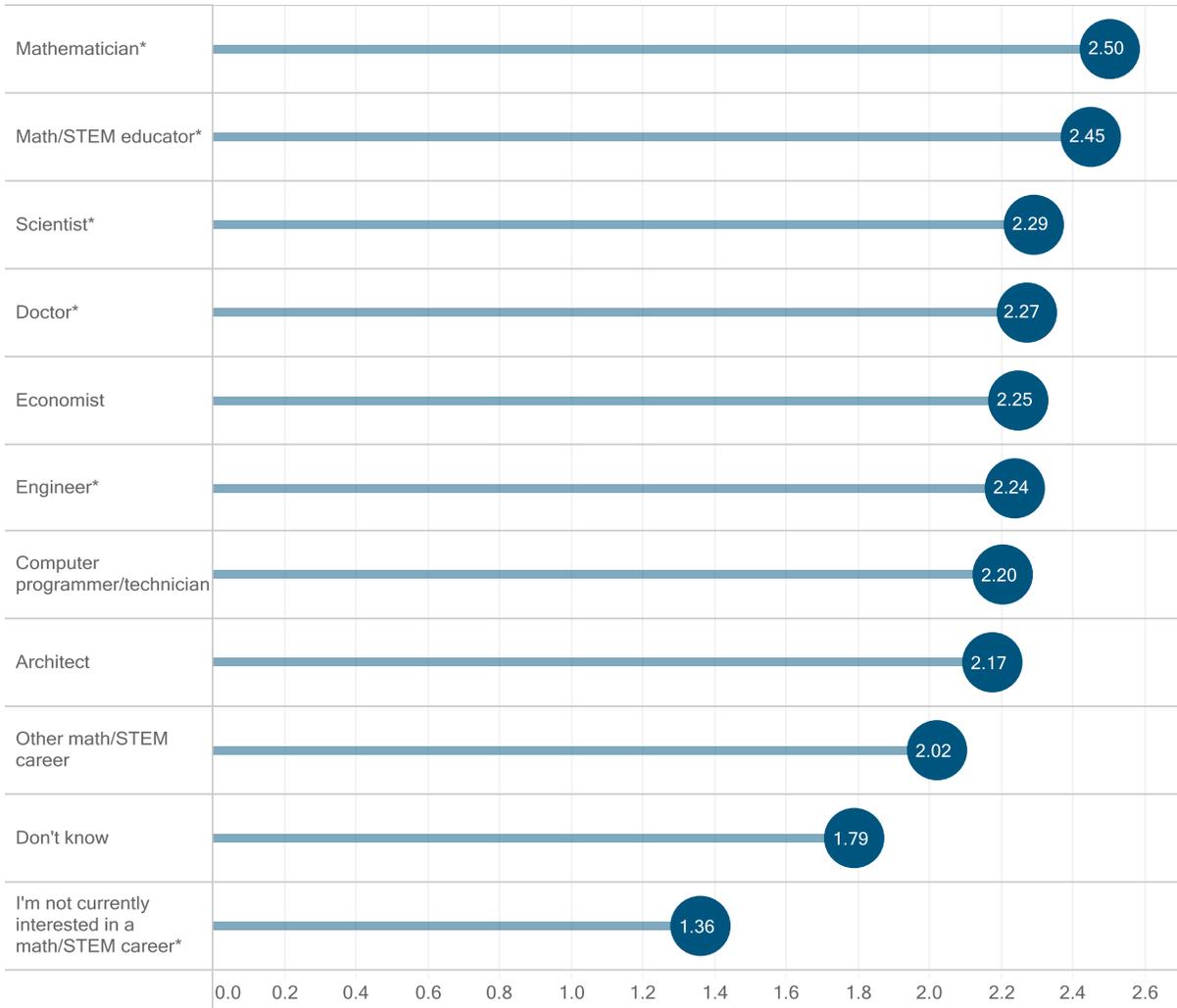
$p < .0001$

Similarly, reported satisfaction varied slightly based on students' plans to pursue postsecondary education or a degree in a math or STEM field. Students with plans to pursue further education reported average perception scores of 1.66 on a four-point scale where one is satisfied and students with no plans for further education reported average perception scores of 1.88 ($p < .0001$). Students interested in a degree in a math or STEM subject reported average satisfaction scores of 1.58 and students without an interest in a math or STEM subject degree reported satisfaction scores of 1.79 ($p < .0001$).

Student perception of the influence of MATHCOUNTS and their reported career fields of interest were analyzed. As shown in Figure V.D-13, students who most agreed that their confidence in and excitement for math and STEM had grown since participating in MATHCOUNTS reported interest in careers as mathematicians and math/STEM educators (perceived influence scores of 2.5 and 2.45 respectively) ($p < .0001$ and $p = .005$ respectively).

Figure V.D-13

Careers related to math or STEM of interest to students
by average student perceived influence of MATHCOUNTS participation



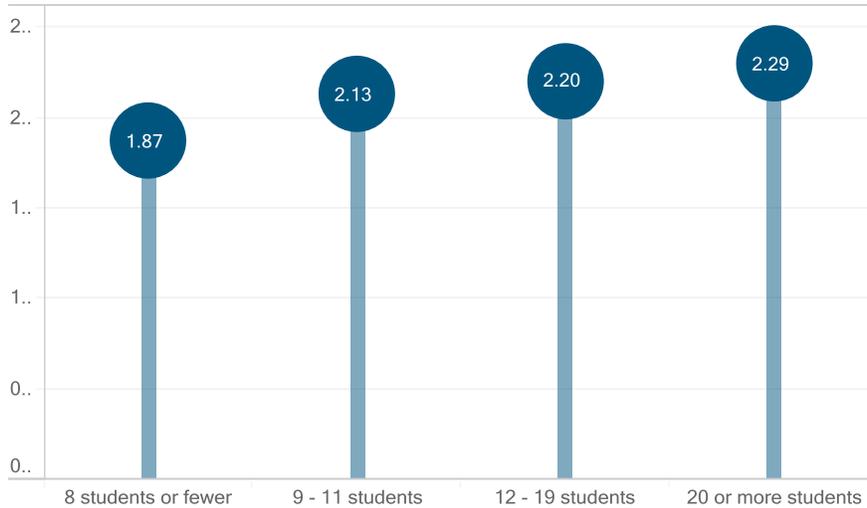
* $p < .01$

V.D.6.f Program Characteristics

On average, students reported higher perceived influence of the MATHCOUNTS Competition Series when participating in larger programs (Figure V.D-14). Students from programs of 20 or more students reported average influence perception scores of 2.3 on a scale of 4 compared to students from smaller programs who reported average scores of 1.9 ($p = .0011$). Student satisfaction based on program size was also analyzed, but very little variation in reported scores was found.

Figure V.D-14

Average perceived influence of MATHCOUNTS participation
by size of program

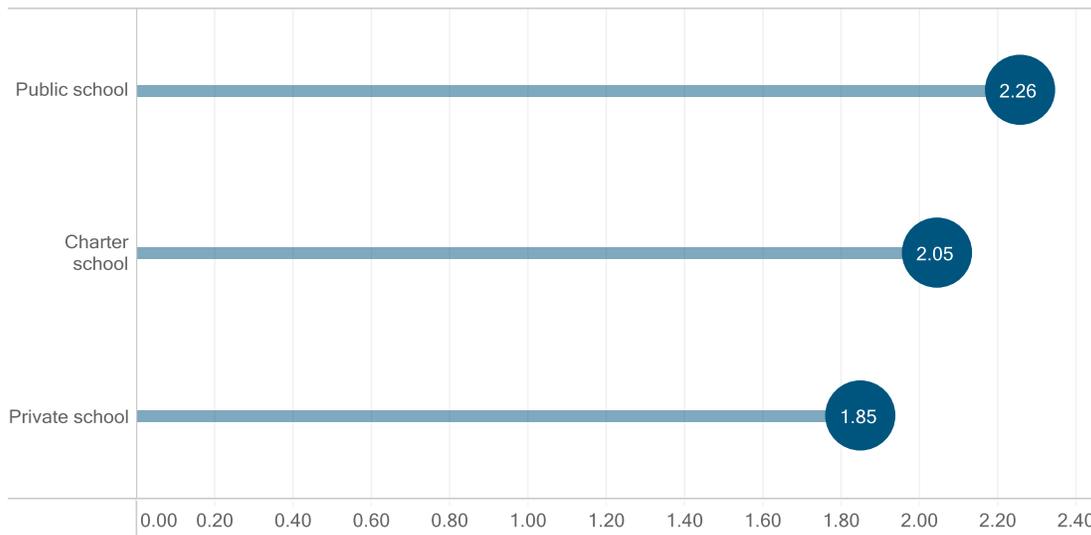


Statistically significant differences between '8 students or fewer' and '12-19 students' and '8 students or fewer' and '20 or more students' $p < .02$

Students from public schools also reported a slightly higher perceived influence of MATHCOUNTS participation. As shown in Figure V.D-15, students from public schools reported average scores of 2.26 while students from private schools reported average perception scores of 1.85.

Figure V.D-15

Average perceived influence of MATHCOUNTS participation
by type of school

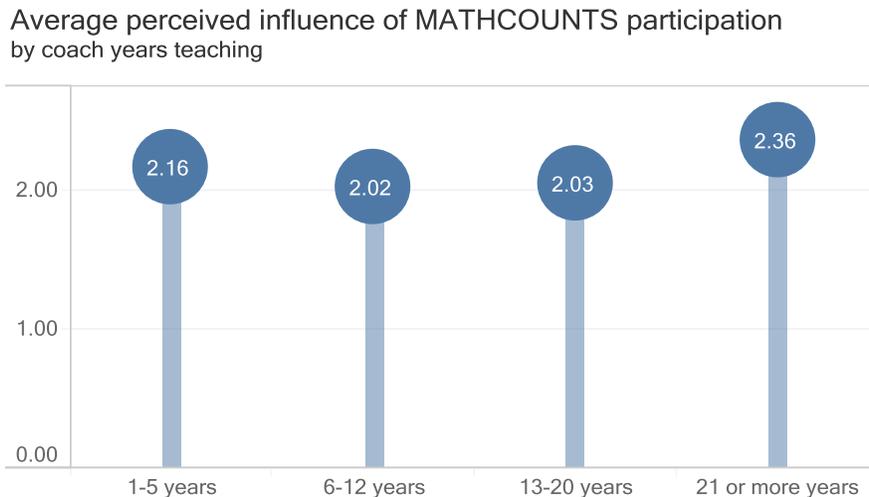


Statistically significant differences between 'public school' and 'private school' $p = .0006$

V.D.6.g Coach Influences

Slight differences in student responses to the perceived influence of and satisfaction with MATHCOUNTS based on the characteristics of their coaches were observed. Students with coaches with 21 or more years of teaching experience reported the highest perceived influence of participation with a score of 2.36 on a four-point scale (Figure V.D-16). Students whose teachers were in their first five years of teaching reported average perception scores of 2.16, while students whose teachers had six to twenty years of experience reported perception scores around 2.0.

Figure V.D-16

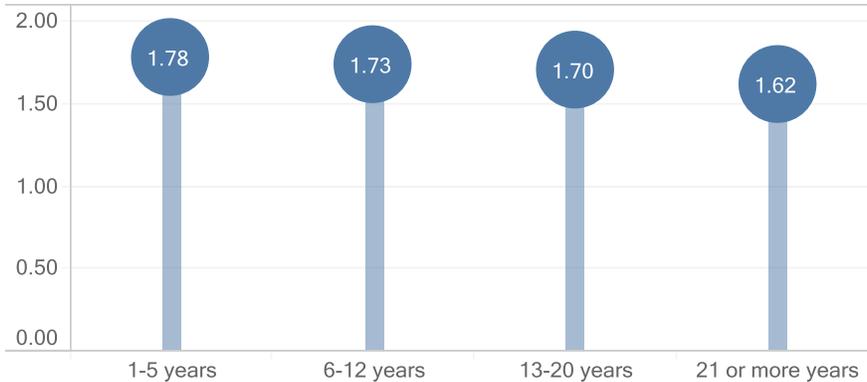


Statistically significant differences between '21 or more years' and all other categories $p=.01$

Similarly, student satisfaction with the MATHCOUNTS program overall increased slightly with their coach's experience level (Figure V.D-17). Students whose coach had 21 or more years of experience reported average satisfaction scores of 1.6 on a four point scale where one is 'satisfied'. Comparatively, Students whose coaches were in the beginning of their teaching career reported average satisfaction scores of 1.8 ($p=.0065$).

Figure V.D-17

Average student satisfaction with MATHCOUNTS Competition
Series overall
by coach years teaching

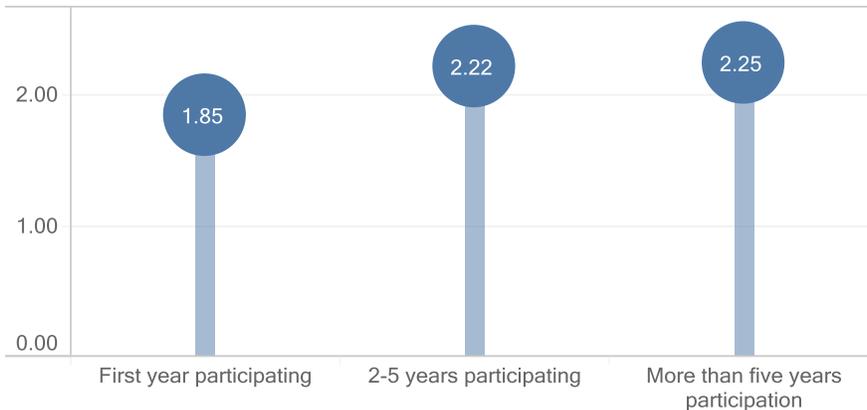


Statistically significant differences between '1-5 years' and '21 or more years' $p=.0065$

Students also reported minor increases in the perceived influence of MATHCOUNTS based on the number of years their coach had participated in the program (Figure V.D-18). Students whose coach was new to the program reported a perceived influence score of 1.9 while students whose coach had participated in MATHCOUNTS in previous years reported influence scores of 2.2-2.3 ($p<.003$). Student satisfaction also varied slightly based on coach's MATHCOUNTS experience. Students with a coach new to the program reported an average satisfaction score of 1.78 while students with coaches with experience in the program reported average satisfaction scores of 1.65 ($p=.0213$). [Lower numbers indicated higher satisfaction.]

Figure V.D-18

Average perceived influence of MATHCOUNTS participation
by coach years in MATHCOUNTS



Statistically significant differences between 'first year participating' and all other categories $p=.003$

Limited changes to student satisfaction based on coach satisfaction with the Competition Series were observed. The overall positivity of coach and student satisfaction made differences difficult to detect. Students whose coaches reported being satisfied with the program reported average satisfaction scores of 1.7 compared to students whose coaches reported being unsatisfied with the program who reported average satisfaction scores of 1.8. This comparison did not prove to be statistically significant.

V.E Coach Satisfaction

The coach survey included a variety of items that sought to measure coaches' perceived influence of the MATHCOUNTS Competitions Series on participating students, coaches' satisfaction with Competition Series overall, and coaches' satisfaction with specific elements of the MATHCOUNTS program. Overall, coaches reported high levels of satisfaction with the MATHCOUNTS program and program elements, and a positive perception of the program. The following sections examine these findings in greater detail.

V.E.1 Perception of Influence of MATHCOUNTS Participation

Coaches were asked their level of agreement with the following statements about the MATHCOUNTS Competition Series:

- After participating in the MATHCOUNTS Competition Series, students are able to successfully tackle and answer math problems they have never seen before
- My confidence in teaching math/STEM has grown since participating in the MATHCOUNTS Competition Series
- I would be disappointed if I could not coach for the MATHCOUNTS Competition Series anymore

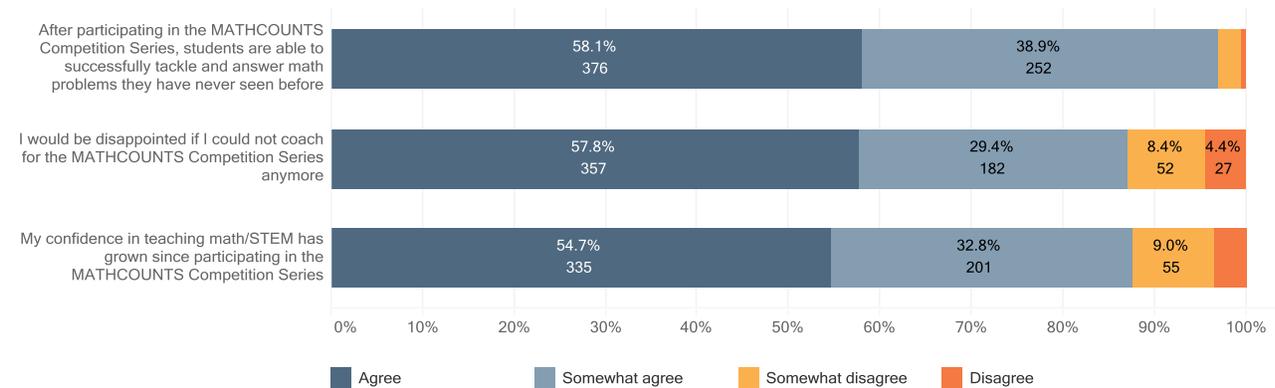
The majority of coaches reported agreement with all three statements (Figure V.E-1). Roughly 97 percent of coaches agreed or somewhat agreed that students were more equipped to answer math problems after participation in MATHCOUNTS. Almost 86 percent of responding coaches indicated that they would be disappointed if they could no longer participate in the

MATHCOUNTS Competitions Series. Finally, 88 percent of coaches indicated that their confidence in teaching math/STEM topics had increased since participating in the Competition Series.

Figure V.E-1

Coach perception of influence of MATHCOUNTS participation

number of responses and weighted %

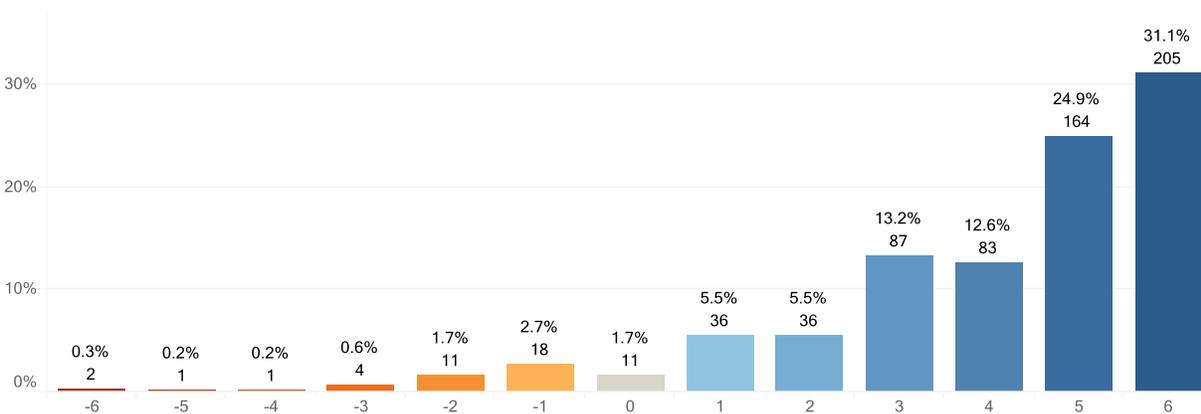


To more thoroughly examine coaches' perception of the program, a perception score based on the three questions above was created. Coaches' perception of the influence of MATHCOUNTS ranged between 6 and -6, with a score of 6 being very positive and a score of -6 being very negative. Figure V.E-2 below shows the distribution of coaches' responses based on the perception score metric. Coaches' perception of the influence of MATHCOUNTS skewed toward the positive, with 56 percent of coaches reporting a score of five or six.

Figure V.E-2

Distribution of coach math/STEM perception scores
Coach perception of influence of MATHCOUNTS participation

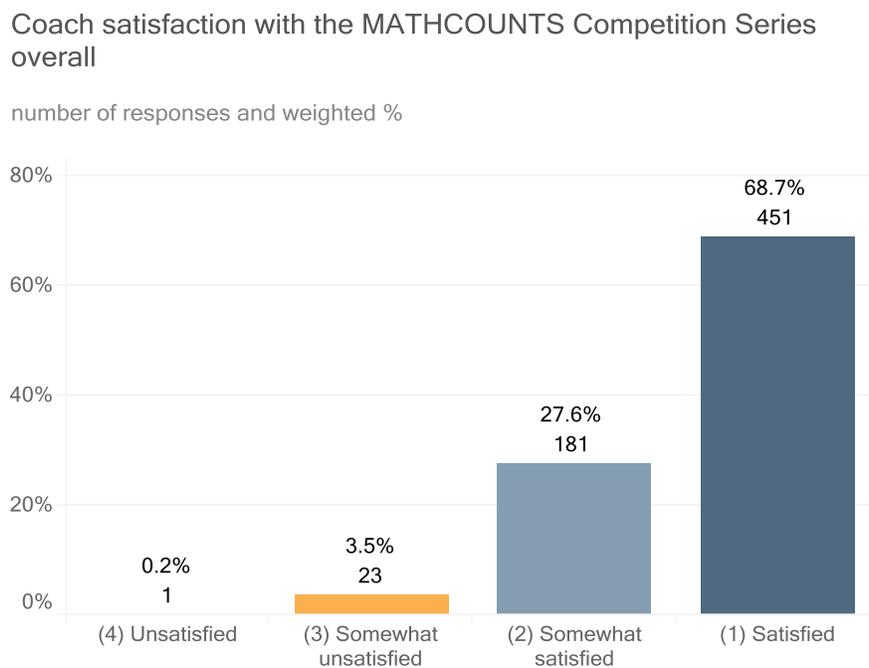
number of responses and weighted %



V.E.2 Overall Satisfaction

Coaches were asked to rate their satisfaction with the MATHCOUNTS Competitions Series on a four point Likert-type scale with the following descriptive anchors; ‘Satisfied’, ‘Somewhat satisfied’, ‘Somewhat unsatisfied’, and ‘Unsatisfied’. Roughly 96 percent of coaches indicated that they were satisfied or somewhat satisfied with the Competitions series, while just 4 percent of coaches rated as somewhat unsatisfied or unsatisfied. Figure V.E-3 below shows coaches’ level of satisfaction with the Competition Series.

Figure V.E-3



V.E.3 Satisfaction With Program Elements

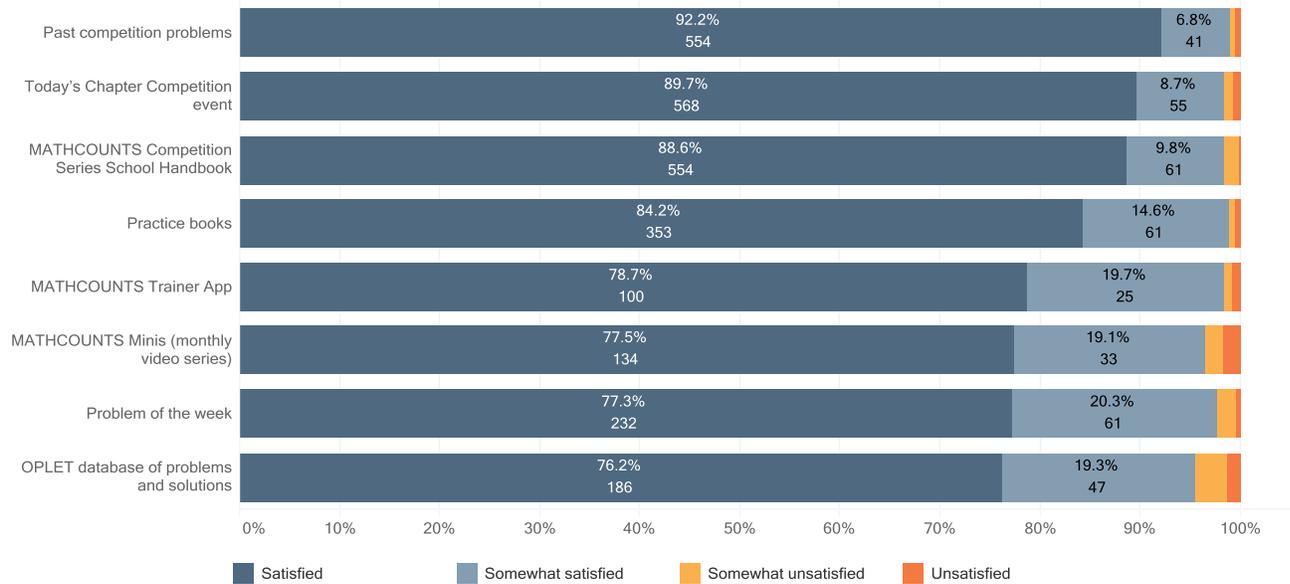
Coaches were asked to rate their satisfaction with a series of MATHCOUNTS Competitions Series elements over the course of the 2016/2017 competition period. A four point Likert-type scale was used to measure level of satisfaction with descriptive anchors of; ‘Satisfied’, ‘Somewhat satisfied’, ‘Somewhat unsatisfied’, and ‘Unsatisfied’. Additionally, coaches were given the option of ‘Didn’t use resource’ and ‘Unaware of resource’. Overall, coaches that indicated a level of satisfaction with each element or resource were very satisfied. Satisfaction with the specific MATHCOUNTS

elements/resources ranged from 99 percent satisfaction with the past competition problems to 96 percent satisfaction with OPLET database of problems and solutions as shown in Figure V.E-4.

Figure V.E-4

Coach satisfaction with MATHCOUNTS Competitions Series elements/resources

number of responses and weighted %



Coaches reported varying levels of usage and awareness for many of the MATHCOUNTS resources. As shown in Figures V.E-5 and V.E-6, 80 percent of coaches reported that they did not use, or were unaware of the MATHCOUNTS Trainer App. Additionally, 73 percent of coaches did not use, or were unaware of the MATHCOUNTS Minis (monthly video series). However, only 5 percent of coaches reported that they did not use or were unaware of the MATHCOUNTS Competitions Series School Handbook.

Figure V.E-5

Coach usage of MATHCOUNTS Competitions Series elements/resources

number of responses and weighted %

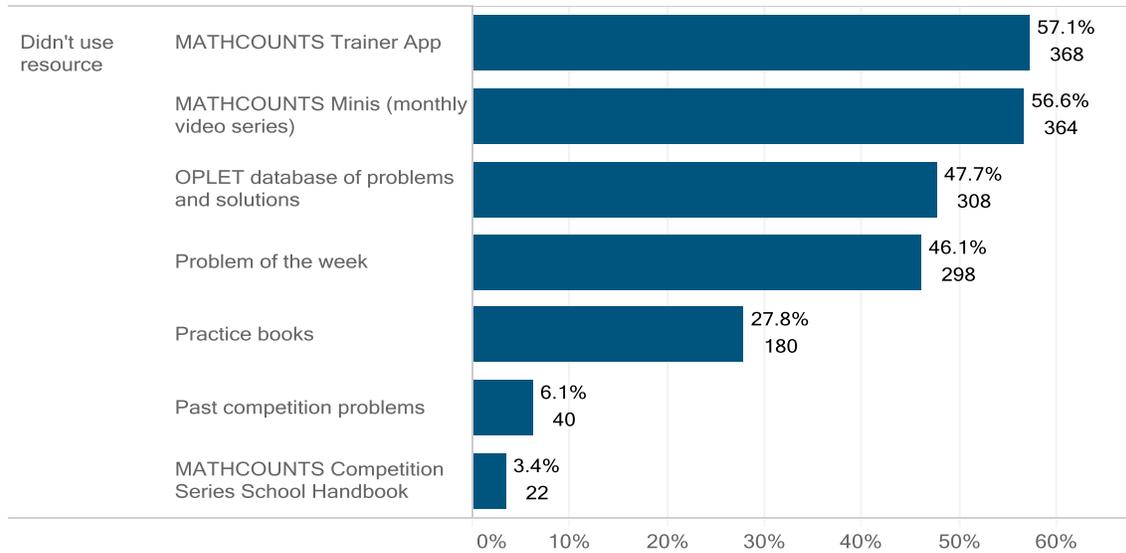
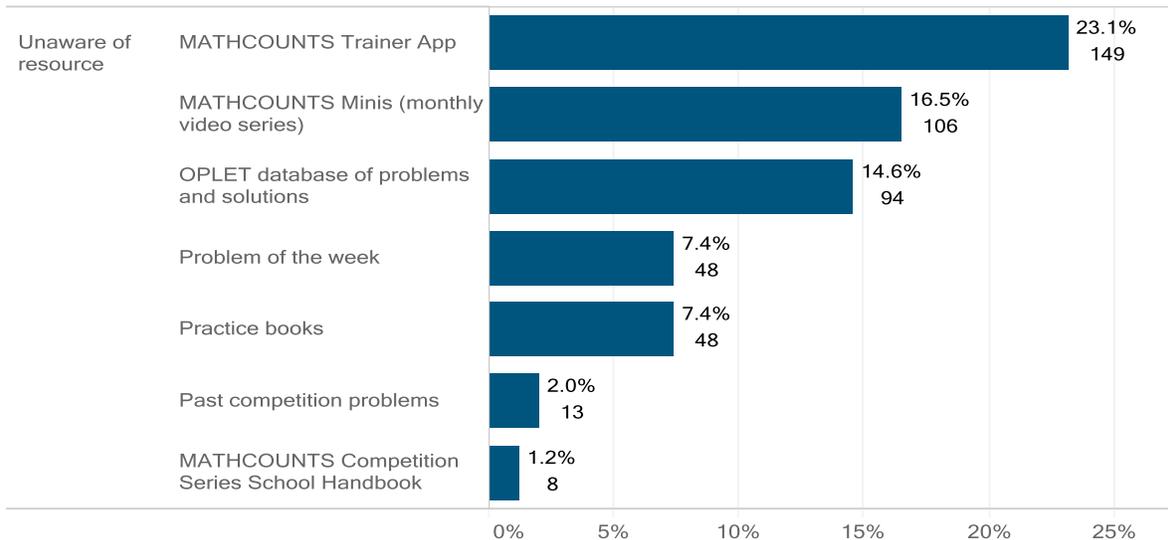


Figure V.E-6

Coach awareness of MATHCOUNTS Competitions Series elements/resources

number of responses and weighted %

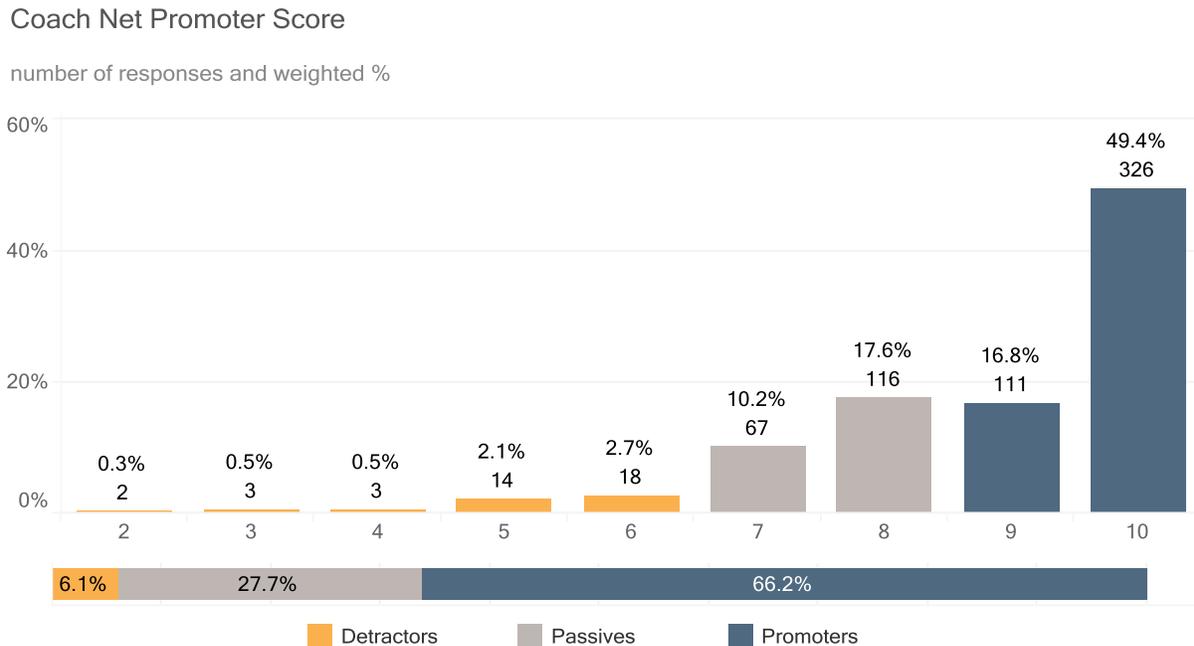


V.E.4 Net Promoter Score

Coaches were asked about their propensity to recommend participation in the MATHCOUNTS Competition Series to another educator. This question used a net promoter scale with responses from ‘0-not at all likely’ to ‘10-extremely likely’. Responses to this question were coded into three groups: Detractors, with responses ranging from zero to six, Passives, with responses between seven and eight, and Promoters, with responses between nine and ten. Figure V.E-7 shows a breakdown of coach responses.

For the MATHCOUNTS Competition Series, coaches reported a Net Promoter Score (NPS) of 60.1 based on 66.5 percent of coaches being classified as ‘promoters’ and 6.1 percent of coaches classified as ‘detractors’. A NPS of 60.1 indicates that roughly 60 percent more coaches are likely to recommend participating in the MATHCOUNTS Competition Series to a friend than would recommend avoiding the program.

Figure V.E-7



V.E.5 Favorite Aspects of Participating in MATHCOUNTS Competition Series

Coaches were asked what they liked most about participating in the MATHCOUNTS Competition Series overall during the school year. The respondents provided open-ended responses and a sample of 15 percent of the total response were randomly selected, reviewed and grouped into themes. The most popular themes are displayed below (Table V.E-1) along with the percentage of time they were mentioned. Table V.E-1 also briefly describes each theme to provide context. As the table illustrates, improving student math skills/challenges students/motivates students; then networking with other coaches, students were the most popular themes.

Table V.E-1. Liked most about participating in the MATHCOUNTS Competition Series overall

Themes	%
Improve student math skills/challenges students/motivates students	44.8
Networking with other coaches, students	27.1
Fun/increases students' love of math	18.8
Access to online items, materials, resources, etc.	9.4

Improve student math skills/challenges students/motivates students. Coaches liked that MATHCOUNTS gives them extra time to work with the students to improve their math skills and gets them excited to take on challenges outside their comfort zone. They also like how the competitive aspects of the program motivate students to give their all for their teammates.

Networking with other coaches, students. Furthermore, coaches like how the Competition Series provides opportunities for them to network with other professionals in the field to share what works and does not work to improve their ability to help these students excel in math and STEM.

Fun/increases students' love of math. In addition, coaches notice that the program fosters a love and joy of math in students and it is a fun way to get them engaged in math.

Access to online items, materials, resources, etc. Finally, coaches like the online support they receive from the MATHCOUNTS program. The materials the program provides coaches find beneficial.

V.E.6 Changes Coaches Think Would Improve the Competition Series

Coaches were asked what they would change about the MATHCOUNTS Competition Series. The respondents provided open-ended responses and a sample of 15 percent of the total response were randomly selected, reviewed and grouped into themes. The most popular themes are displayed below (Table V.E-2) along with the percentage of time they were mentioned. Table V.E-2 also

briefly describes each theme to provide context. As the table illustrates, nothing/the program is fine; then more online access to materials/improve materials/improve or lower paperwork demands/better communication; then more practice time/change competition days or times/lower cost were the most popular themes.

Table V.E-2. Something you would change about the MATHCOUNTS Competition Series to improve it

		%
Themes	Nothing/program is fine as is	28.9
	More online access to materials/improve materials/improve or lower paperwork demands/better communication	26.3
	More practice time/change competition days or times/lower cost	23.7
	Make problems easier for younger students/have varsity and JV teams based on skill level/offer gifted competitions for advanced students	13.2
	Allow more teams or students to participate	6.6
	Allow more interaction and/or sharing between schools or teams	1.3

Nothing/program is fine as is. Almost 3 out of 10 coaches thought the program is fine as it is right now.

More online access to materials/improve materials/improve or lower paperwork demands/better communication. While some coaches think of the online support as a strength of the program, about 1 out of 4 think it needs improvement. They cite too much paperwork, too little communication from the program and a need for more or better materials as their main concerns.

More practice time/change competition days or times/lower cost. Some coaches would like to have more practice time with students and for practices and competitions to be at times that are more convenient. They also would like to see lower costs associated with the program.

Make problems easier for younger students/have varsity and JV teams based on skill level/offer gifted competitions for advanced students. Coaches would like to see the program broken into smaller groups to cater to younger students or students not as gifted in math as others so that their lack of success or comprehension does not discourage these students and ultimately cause them to drop out MATHCOUNTS.

Allow more teams or students to participate. There are coaches that wish to see the amount of teams expanded so more students can get involved.

Allow more interaction and/or sharing between schools or teams. Finally, some coaches wish for the opportunity to interact more with other schools to share ideas and techniques to improve student performance.

V.E.7 Aspects of MATHCOUNTS That Have the Biggest Impact on Students

Coaches were asked what aspect of MATHCOUNTS they feel have the biggest impact on students over the school year. The respondents provided open-ended responses and a sample of 15 percent of the total response were randomly selected, reviewed and grouped into themes. The most popular themes are displayed below (Table V.E-3) along with the percentage of time they were mentioned. Table V.E-3 also briefly describes each theme to provide context. As the table illustrates, improve math or problem solving skills/improvement in self-confidence; then teamwork/seeing friends and being introduced to other kids that like math; then challenging students/competitions were the most popular themes.

Table V.E-3. Aspects of MATHCOUNTS that have the biggest impact on students

Themes	%
Improved math or problem solving skills/improvement in self-confidence	28.9
Teamwork/seeing friends and being introduced to other kids that like math	26.3
Challenging students/competitions	23.7
Exposure to new concepts and thinking	13.2
Fun while learning	6.6
Do not know	1.3

Improved math or problem solving skills/improvement in self-confidence. Almost 3 out of 10 coaches thought that MATHCOUNTS has a lasting impact on improving math and problem solving skills as well as improved self confidence.

Teamwork/seeing friends and being introduced to other kids that like math. Coaches also think that MATHCOUNTS allows students to meet likeminded individuals and improves their ability to function as a member of a team.

Challenging students/competitions. Coaches also think the challenges and competitions have a positive impact on students.

Exposure to new concepts and thinking. Additionally, the program gives coaches an opportunity to expand the knowledge base of students and challenge their ways of thinking.

Fun while learning. The program also offers a fun way for coaches to teach and interact with the students.

Do not know. Finally, a small percentage of coaches did not know the biggest impact MATHCOUNTS has on students.

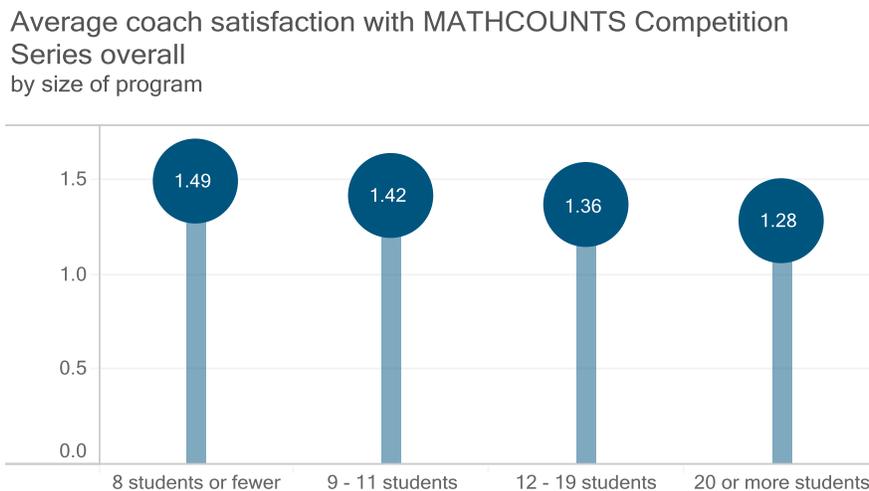
V.E.8 Influences on Coach Perception and Satisfaction

V.E.8.a Program Size

Analysis was conducted looking at the association between program size and coaches satisfaction. Lower numbers indicated higher satisfaction.

Program size appears to have an influence on coach's overall satisfaction with the MATHCOUNTS Competitions series. Coaches with programs of eight students or fewer reported a slightly lower level of satisfaction, scores of 1.49, compared to coaches with programs of 20 or more students who reported satisfaction scores of 1.28 where 1 was satisfied and 4 was unsatisfied ($p=.0046$) (Figure V.E-8).

Figure V.E-8



Statistically significant differences between '8 students or fewer' and '20 or more students' $p=.0046$, and '9-11 students' and '20 or more students' $p=.0246$

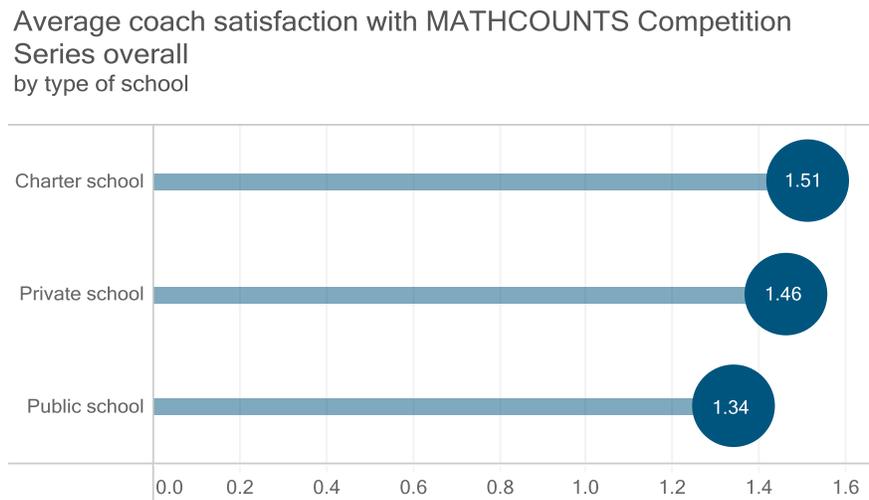
Additionally, a statistically significant relationship between program size and the coach's perceived influence of MATHCOUNTS on students was noted. Coaches with smaller programs of nine to eleven students reported a lower average influence perception score of 3.73 out of six, compared to coaches with programs of twenty or more students, who reported an average influence perception score of 4.28 out of six ($p=.0289$).

V.E.8.b School Type

Analysis was conducted looking at the association between school type and coaches satisfaction. Lower numbers indicated higher satisfaction.

As shown in Figure V.E-9, school type also contributed to a coach's overall satisfaction. Coaches in public schools reported higher levels of satisfaction with an average satisfaction score of 1.34 compared to private and charter schools with an average scores of 1.46 and 1.51, respectively, though this difference did not prove to be statistically significant. Coaches from home school settings were omitted from this analysis due to small cell sizes.

Figure V.E-9



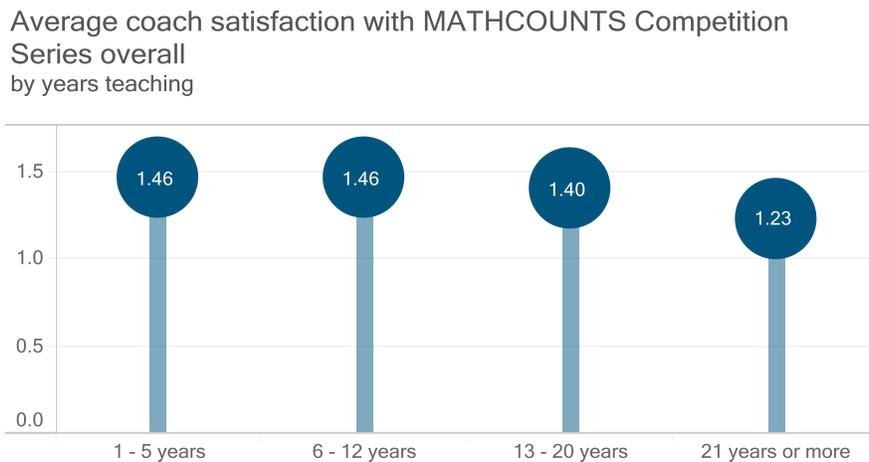
Following this same trend, coaches from public schools reported a higher average perception score for the influence of MATHCOUNTS, 4.13 out of six, than private school and charter school coaches. Private school coaches reported a similar average influence perception score of 3.96. Charter school coaches reported the lowest influence perception score of 3.56 out of six. Again, these comparisons did not prove to be statistically significant.

Though no significant difference was observed, public school coaches were slightly less likely to recommend the MATHCOUNTS Competitions Series to another educator, with an NPS of 57.8. Charter school and private school coaches reported NPS of 63.4 and 68.2 respectively.

V.E.8.c Years Teaching

Experienced teachers reported the highest level of satisfaction with the MATHCOUNTS Competitions Series. Teachers with 21 or more years of experience reported an average satisfaction score of 1.23, where one was satisfied. Teachers with fewer years of experience reported average satisfaction scores of 1.46 or 1.40 ($p < .01$). This breakdown is shown in Figure V.E-10.

Figure V.E-10



Statistically significant differences between '21 years or more' and all other categories $p < .01$

Coaches with the most years of teaching experience also reported significantly more positive perceptions of the influence of MATHCOUNTS, 4.41 out of six compared to teachers in their first five years of teaching (3.83) ($p = .0327$) and teachers with 13-20 years of experience (3.88) ($p = .0286$).

Coaches with more than 21 years of teaching experience were much more likely to recommend the MATHCOUNTS Competition Series to another educator, and reported an NPS of 72.1. Comparatively, coaches in their first five years of teaching reported an NPS of 41.1 ($p < .0001$).

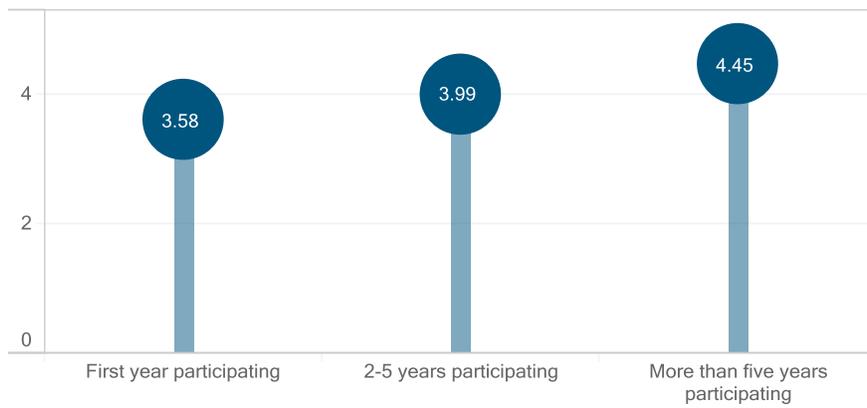
V.E.8.d Years Participating in MATHCOUNTS

Similar to years teaching, coaches that have participated in competitions for more years perceived the program to have a greater influence on students.

Figure V.E.-11 illustrates the influence of multiple years of MATHCOUNTS participation on a coach's perceived influence of the MATHCOUNTS program. Coaches with more than five years of experience in the program reported an average influence perception score of 4.5 out of six, compared to coaches in their first year of coaching who reported an average influence perception score of 3.6.

Figure V.E-11

Average coach perceived influence of MATHCOUNTS participation by coach years in MATHCOUNTS



Statistically significant differences between 'more than five years participating' and all other categories $p < .02$

Coaches with more than five years of experience in the program also reported higher levels of satisfaction with the program overall, with an average satisfaction score of 1.27, where one was satisfied. Coaches in their first year with MATHCOUNTS reported a satisfaction score of 1.5 ($p = .0035$). [Lower numbers indicated higher satisfaction.]

Coaches who have participated in MATHCOUNTS for more than five years are also the most likely to promote the program with a NPS of 69, compared to an NPS of 53 for new coaches ($p = .0388$).

V.E.8.e Main Goal for Participation

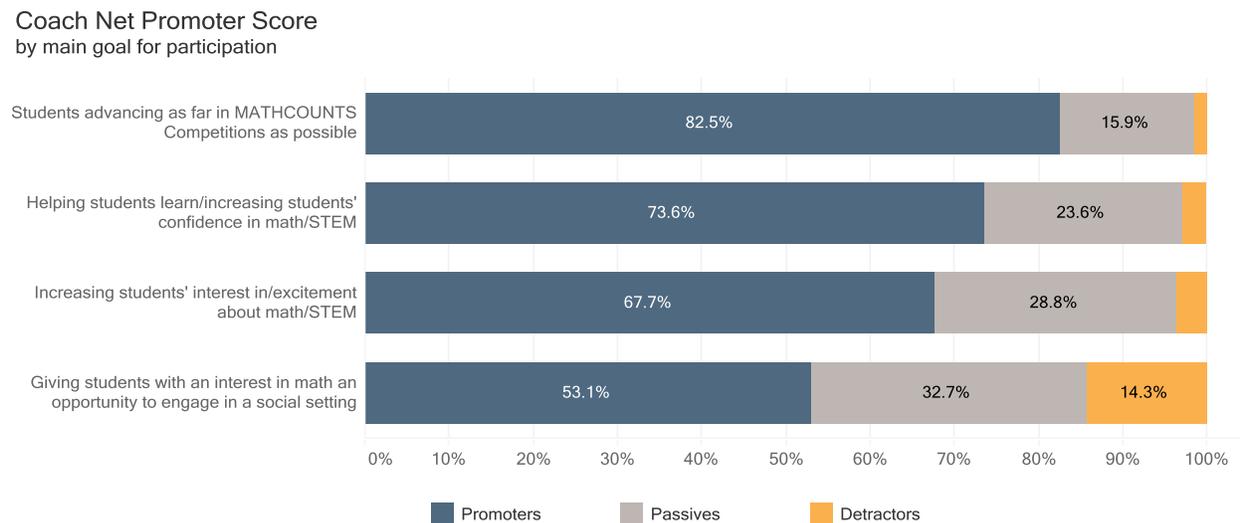
Coaches' main goals for participating in MATHCOUNTS and its association with coach perception and satisfaction were examined.

Coaches who reported participating in MATHCOUNTS to give students with an interest in math an opportunity to engage in a social setting also reported slightly lower levels of satisfaction with the program (1.5) overall compared to coached who selected other options such as ‘helping students advance as far in the MATHCOUNTS Competitions as possible’ (1.3) ($p < .005$). [Lower numbers indicated higher satisfaction.] For this analysis coaches who selected ‘Other goals’ and ‘diversifying the types of students interested in math/STEM’ were excluded due to small cell sizes.

Additionally, data suggested that coaches whose main goal was to provide a social setting for math oriented students reported lower average perception scores for the influence of MATHCOUNTS (2.8) compared to coaches with goals of advancing in the competition, or increasing students confidence or interest in math/STEM (between 4.2 and 4.5 out of six points) ($p < .0001$).

Coaches with a reported main goal of advancing in the MATHCOUNTS competition appeared to be the most active promoters of the program. As shown in Figure V.E-12, 83 percent of coaches with this stated goal were classed as ‘promoters’ resulting in a NPS of 81. Coaches with goals of increasing students’ confidence and excitement about math/STEM followed with NPS of 71 and 64 respectively. Coaches whose reported goal was to create a social setting reported lower NPS of 39, with just 53 percent of coaches classed as promoters.

Figure V.E-12



Statistically significant differences between ‘giving students with an interest in math an opportunity to engage in a social setting’ and the categories of ‘students advancing as far in the MATHCOUNTS competition as possible’, ‘Helping students learn/increasing students’ confidence in math/STEM’, and ‘increasing students’ interest in/excitement about math/STEM’ $p < .05$.

V.F Math Concepts Taught

The coach and student surveys asked a series of corresponding questions to capture the effectiveness of the MATHCOUNTS Competition Series program. Each survey contained two questions, and a grid of 11 topics (math/STEM concepts and general skills) such as geometry, statistics and data, and problem solving (a full list of the skills and abilities is presented in Appendix A). Coaches were asked to indicate how much holding MATHCOUNTS Competitions Series practices and meetings helped to introduce students to, or explore in more depth, each concept, or to enhance the students' general skills. Similarly, the students were asked to indicate how much participation in the program had helped them learn each concept or skill. The results of these measures are detailed in the section below.

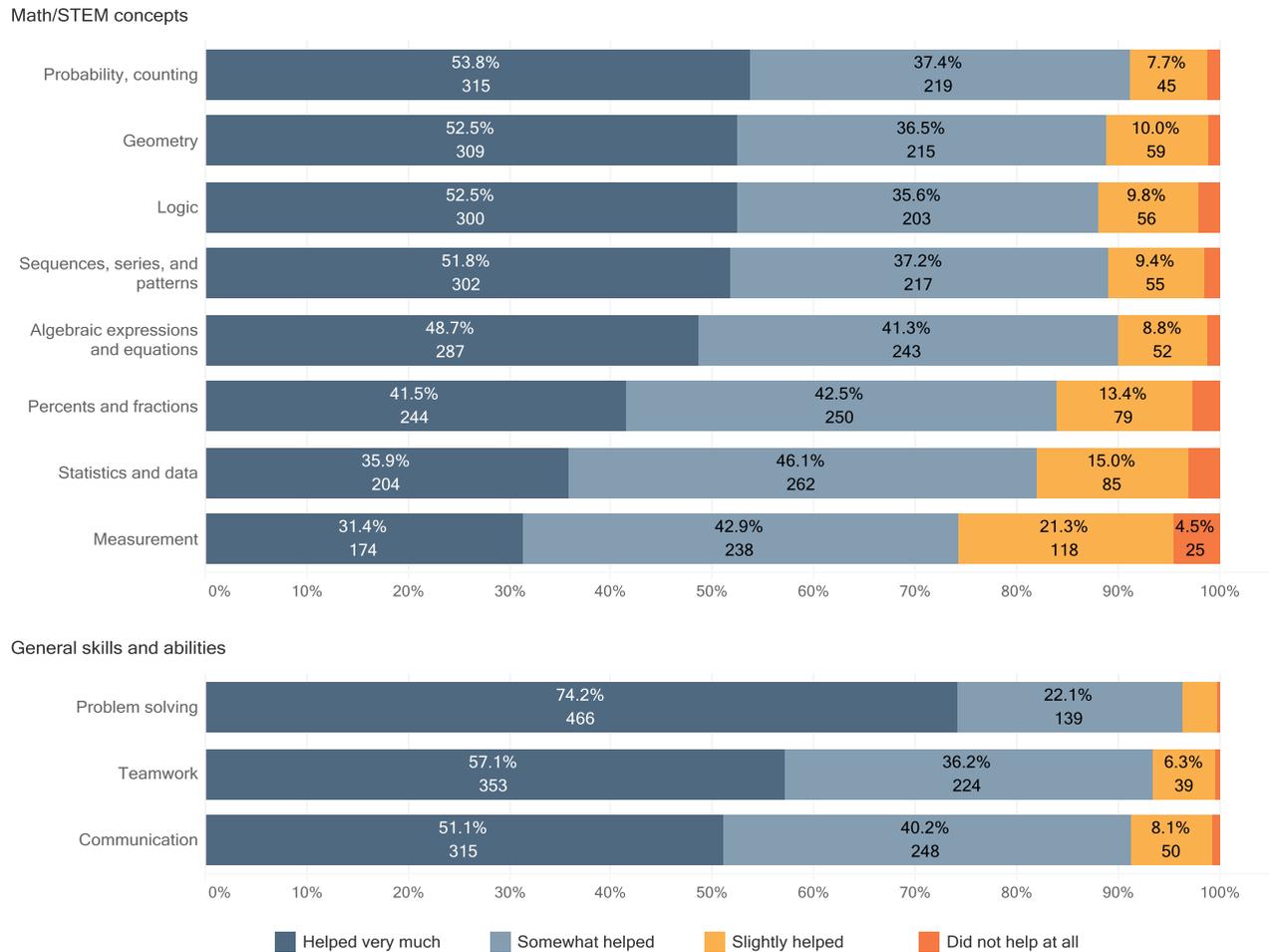
V.F.1 Coach Perceived Helpfulness of MATHCOUNTS

Overall, coaches felt that the MATHCOUNTS Competition Series was useful in teaching specific math/STEM concepts and skills (Figure V.F-1). Most of the coaches indicated the MATHCOUNTS was useful when teaching probability and counting (91% 'helped very much' or 'somewhat helped'). This was followed by 'Sequences, series, and patterns' (89%) and 'Logic' (88%). The subject that coaches reported MATHCOUNTS was the least useful was measurement (74%). Coaches also indicated that the Competition Series helped with general problem solving, teamwork, and communication skills. Ninety-six percent of coaches felt that MATHCOUNTS 'helped very much' or 'somewhat helped' with problem solving skills; 93 percent with teamwork, and 91 percent with communication. Five percent of coaches reported that measurement was not covered in MATHCOUNTS while 4.7 percent of coaches indicated that statistics and data was not covered.

Figure V.F-1

Coach perception of MATHCOUNTS Competitions Series' usefulness in teaching concepts and skills

number of responses and weighted %



To more thoroughly examine coaches' perception of the usefulness of the MATHCOUNTS Competition Series to introduce or further explore math/STEM concepts and enhance students' general skills and abilities, two perception scores were created. Shown in Figure V.F-2 below, coaches' perception of the usefulness of MATHCOUNTS to introduce and explore math/STEM concepts could range between 16 and -16, with 16 indicating the most positive perception. The majority of coaches reported a perception score between 8 and 16, 22 percent of coaches reporting a score between 7 and 8 and 22 percent reporting a score between 15 and 16. These intervals correspond to coaches selecting 'helped very much' for all categories, or 'somewhat helped' for all categories.

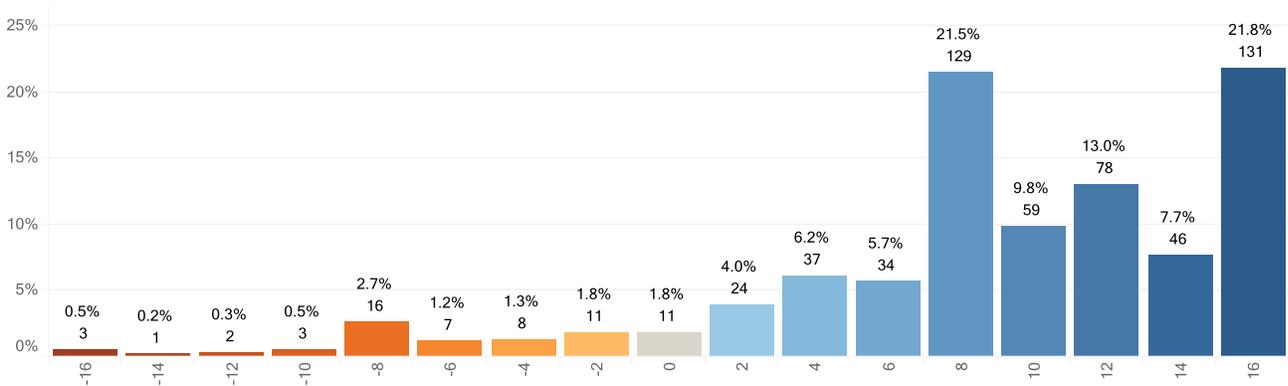
Shown in Figure V.F-2 below, coaches' perception of the usefulness of MATHCOUNTS to enhance students' general skills and abilities could range between 6 and -6. The majority of coaches (58%) reported perception scores between 5 and 6 indicating that coaches are more confident in the Competition Series' ability to enhance students' general skills and abilities in comparison to the program's ability to introduce or explore a range of math/STEM concepts.

Figure V.F-2

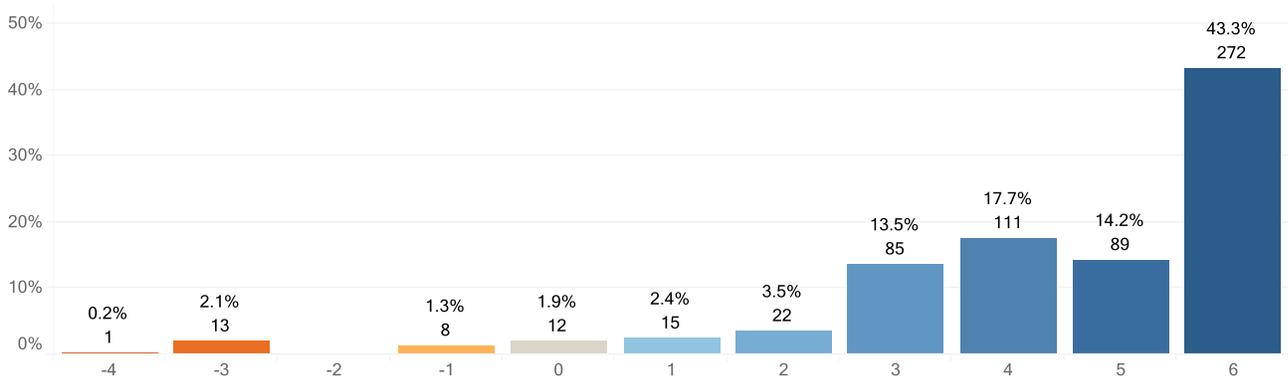
Coach perceived helpfulness of MATHCOUNTS aggregate score distribution

number of responses and weighted %

Math/STEM concepts



General skills and abilities

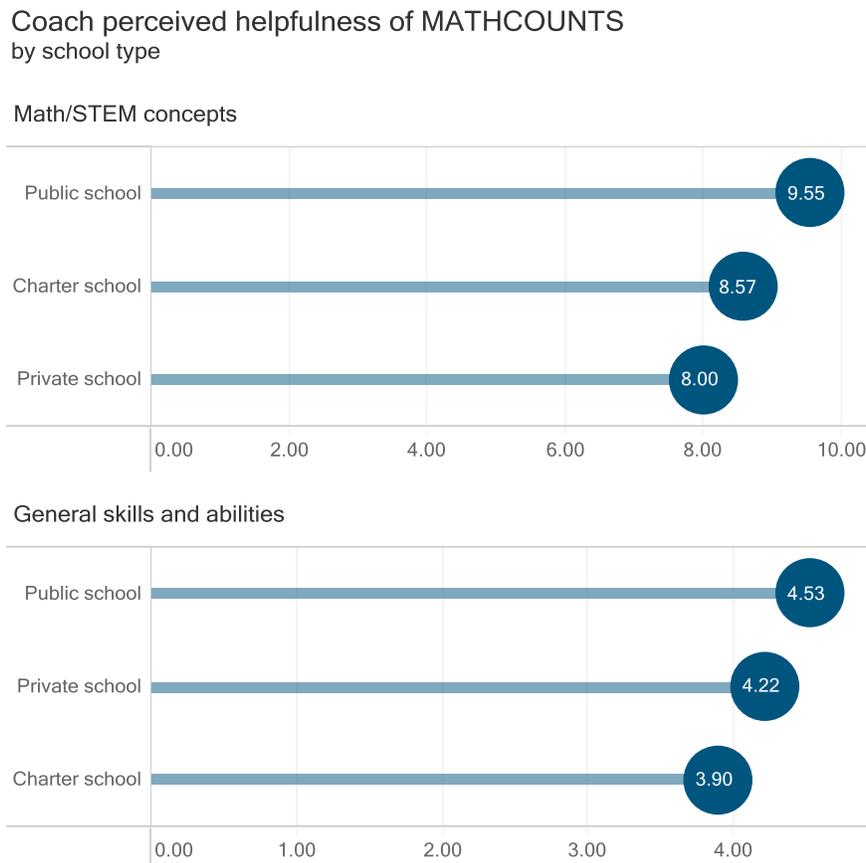


V.F.1.a School Type

Statistically significant differences were observed in coaches' perceived helpfulness of MATHCOUNTS on introducing and exploring math and STEM topics and enhancing general skills by school type, with public school coaches reporting the highest perception rankings (Figure V.F-3).

Coaches from public schools had the highest usefulness rating for math/STEM concepts at 9.6 out of 16. Charter schools had a rating of 8.6 followed by private schools at 8.0. When looking at perceived helpfulness for general skills and abilities, public schools had a rating of 4.5 followed by private schools with a rating of 4.2 and charter schools with a rating of 3.9.

Figure V.F-3



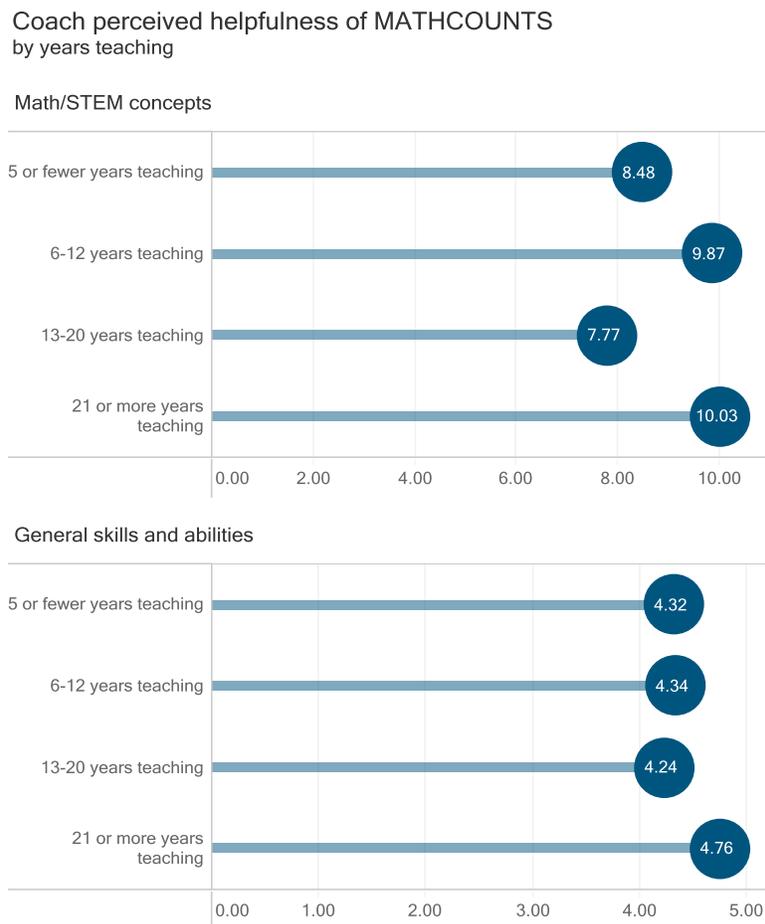
Math/STEM concepts: statistically significant differences between public and private schools $p=.0305$

V.F.1.b Years Teaching

Perceived helpfulness of MATHCOUNTS in exploring specific skills varied by years of teaching. As shown in Figure V.F-4, coaches who taught for 21 or more years indicated MATHCOUNTS was extremely helpful in teaching MATH/STEM concepts (rating of 10 on a scale of 16). However, coaches who taught for 13-20 years felt the usefulness was lower, at a rating of 7.7. This rebounded for coaches who taught for 6-12 years to a rating of 9.9 and fell again for coaches who taught for 5 or fewer years (8.5 rating).

There was little variability in the usefulness rating of general skills and abilities (Figure V.F-4). There was only a 0.52 spread between the lowest rating (4.24 for 13-20 years) and the highest rating (4.76 for 21 or more years). Additionally, minor changes by the coaches' years in MATHCOUNTS were observed. Coaches in their first year of coaching reported an average rating of 8.98 and coaches with more than five years' experience in the program reported an average rating of 9.47 ($p < .0001$).

Figure V.F-4



Math/STEM concepts: Statistically significant differences between '13-20 years teaching' and the categories of '6-12 years teaching' and '21 or more years teaching' $p < .01$

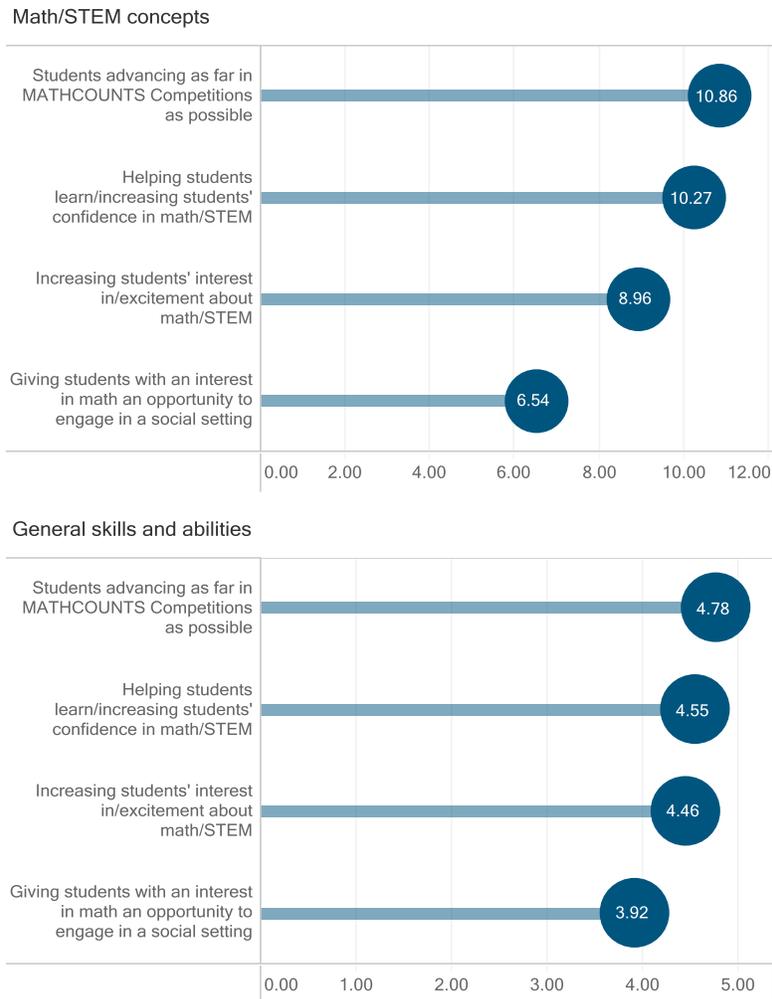
General skills and abilities: Statistically significant difference between '13-20 years teaching' and '21 or more years teaching' $p = .019$

V.F.1.c Main Goal for Participation

How coaches' main goals compared to their perception of participation in the Competition Series in helping them teach specific skills was analyzed. This analysis showed there was a relationship between perceived helpfulness of MATHCOUNTS in exploring specific concepts and the coach's main goal for participation (Figure V.F-5). Coaches with a main goal of advancing students as far in the MATHCOUNTS competition as possible had the highest perception rating of 10.9 out of 16. Coaches that wanted to give students with an interest in math an opportunity to engage in a social setting rated the usefulness of the MATHCOUNTS Competition Series on math/STEM concepts at 6.5 out of 16 ($p=.0002$). For this analysis coaches who selected 'Other goals' and 'diversifying the types of students interested in math/STEM' were excluded due to small cell sizes.

Figure V.F-5

Coach perceived helpfulness of MATHCOUNTS
by coach main goal for participation



Math/STEM Concepts: Statistically significant differences between 'giving students with an interest in math an opportunity to engage in a social setting' and all other categories $p < .01$

V.F.2 Student Perceived Helpfulness of MATHCOUNTS

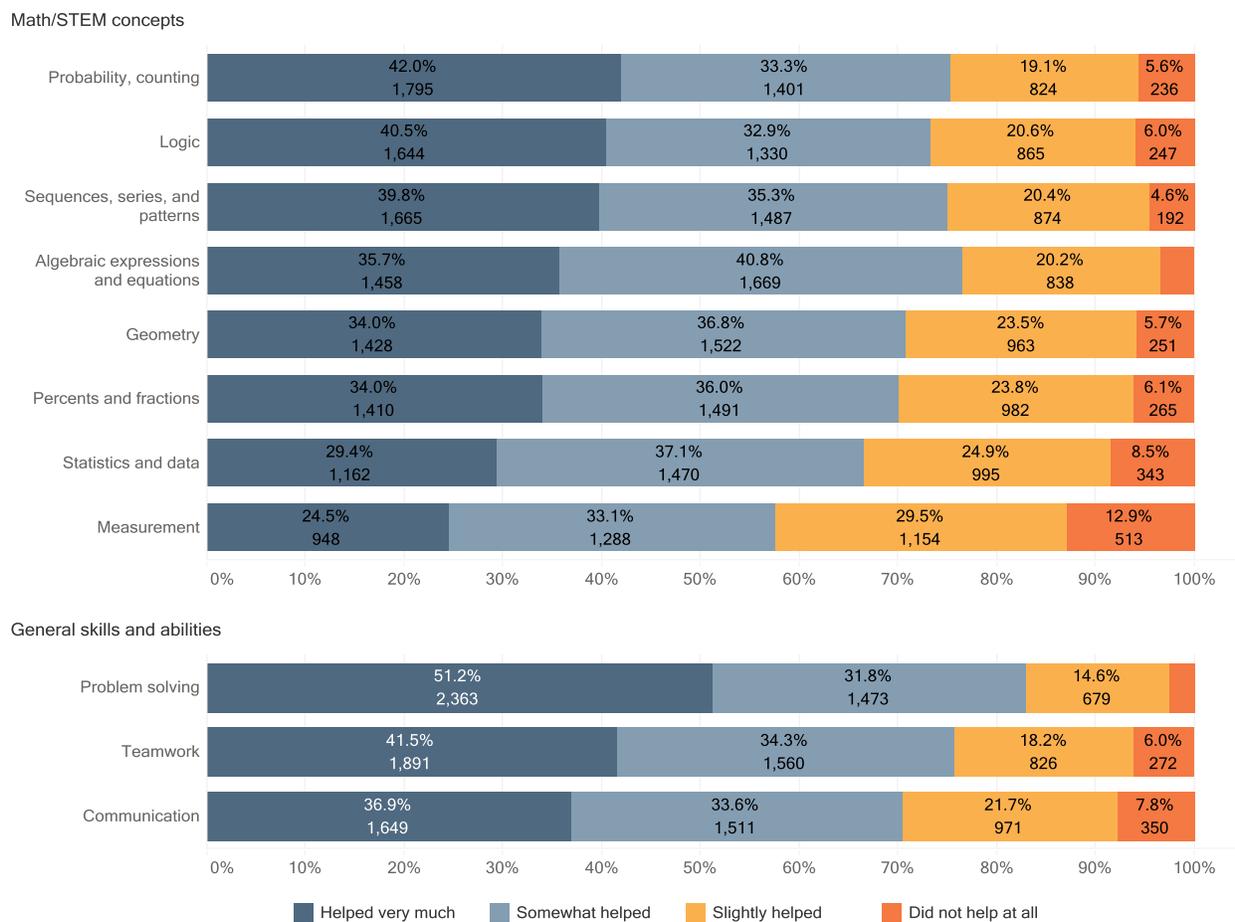
In general, students reported a positive perception of the Competition Series' usefulness in learning specific concepts and skills. Within math/STEM concepts, students reported MATHCOUNTS was the most useful in learning algebraic expressing and equations (77% indicated it was somewhat or very useful) (Figure V.F-6). The skill they felt the program was the least helpful in learning was measurement with just 57 percent of students indicating it was somewhat or very useful. When

looking at general skills, MATHCOUNTS was the most helpful in solidifying problem-solving skills (83%) following by teamwork (76%) and communication (71%).

Figure V.F-6

Student perception of MATHCOUNTS Competitions Series' usefulness in learning concepts and skills

number of responses and weighted %



When asked how helpful MATHCOUNTS was in helping them learn various skills and abilities, students were given the option to report that the skill or ability was not taught. Figure V.F-7 shows which concepts students reported were not taught in their MATHCOUNTS practices and meetings. 16.5 percent of the responding students indicated that measurement was not covered in their MATHCOUNTS Competition Series meetings and practices. This was followed by statistics and data (14%) and algebraic expressions and equations (14%). As discussed in Section V.F.1, coaches reported covering topics in MATHCOUNTS at a high rate, and students were much more likely to report that a skill or concepts was not covered in MATHCOUNTS than coaches. In comparison to

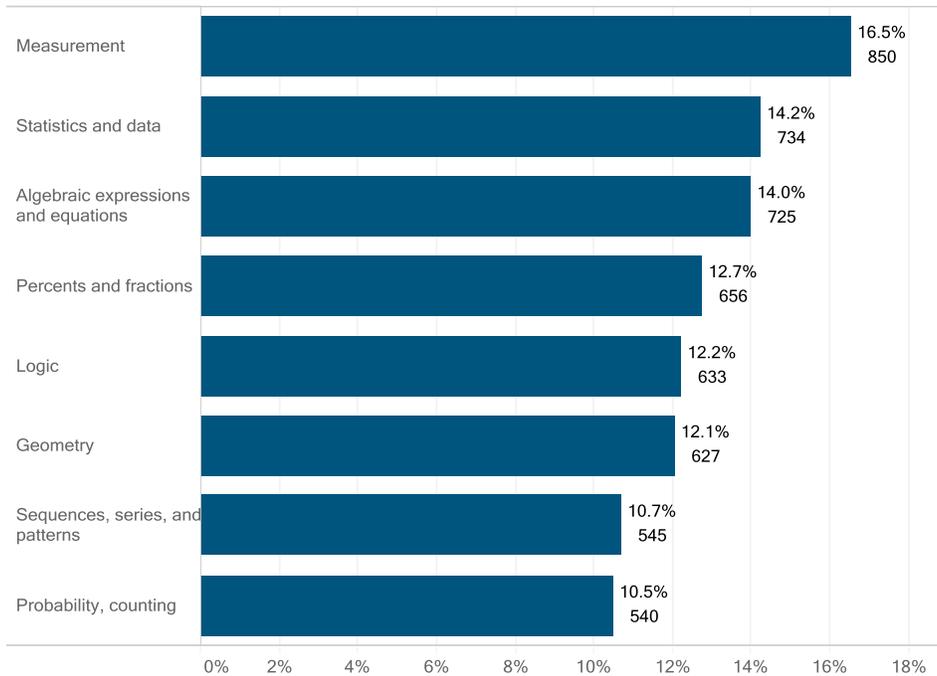
students, only five percent of coaches reported not covering measurement through MATHCOUNTS, and about 4.7 percent reported not covering statistics and data. When looking at general skills, only 6 percent of students felt the MATHCOUNTS did not cover communication, where 5 percent and 4 percent felt the same about teamwork and problem solving respectively.

Figure V.F-7

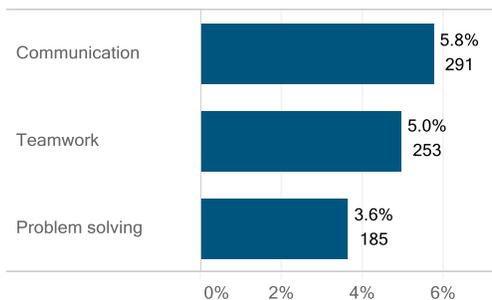
Percent of students reporting math/STEM concept or skill not taught in MATHCOUNTS

number of responses and weighted %

Math/STEM concepts



General skills and abilities



To more thoroughly examine students' perception of the helpfulness of MATHCOUNTS to learn math/STEM concepts and general skills and abilities, two perception scores were created. Shown in

Figure V.F-8 below, students' perception of the helpfulness of MATHCOUNTS to introduce and explore math/STEM concepts could range between 16 and -16. Likewise, student's perception of the helpfulness of MATHCOUNTS to introduce and solidify general skills and concepts could range from -6 to 6.

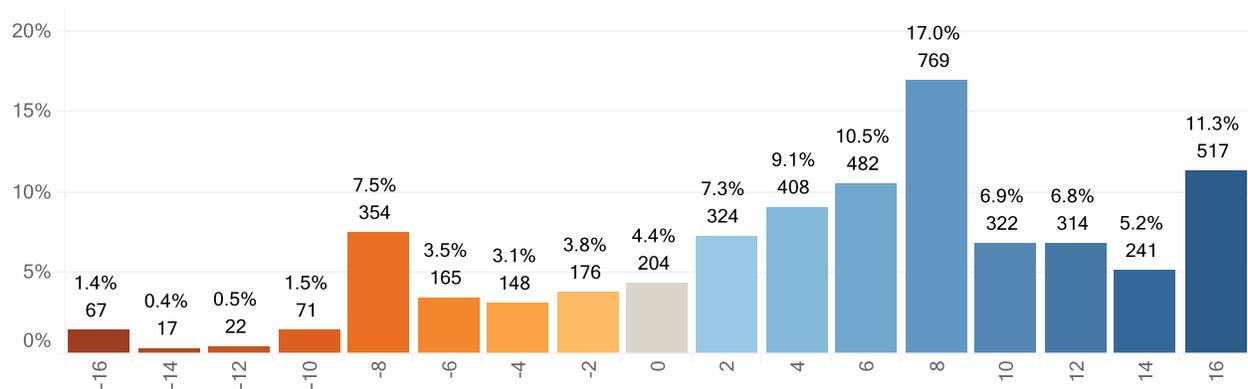
The aggregate score showed that most students, roughly 75 percent, had a positive perception of MATHCOUNTS' helpfulness in learning/refining math/STEM concepts and general skills and concepts (Figure V.F-8). It is also useful to note that roughly 20 percent of students reported a negative perception of MATHCOUNTS ability to help them learn math/STEM concepts or skills. The remainder of this section looks at perceived helpfulness with math/STEM concepts and general skills by various demographics and other key variables.

Figure V.F-8

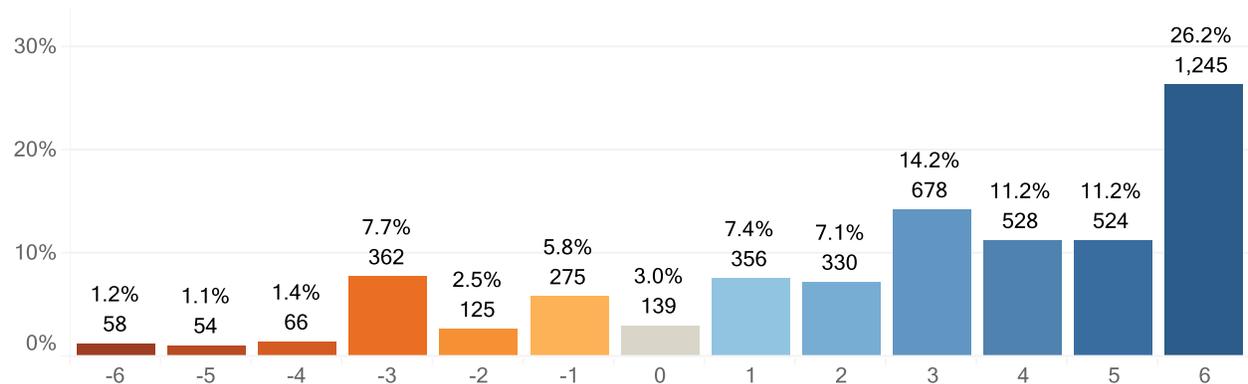
Student perceived helpfulness of MATHCOUNTS aggregate score distribution

number of responses and weighted %

Math/STEM concepts



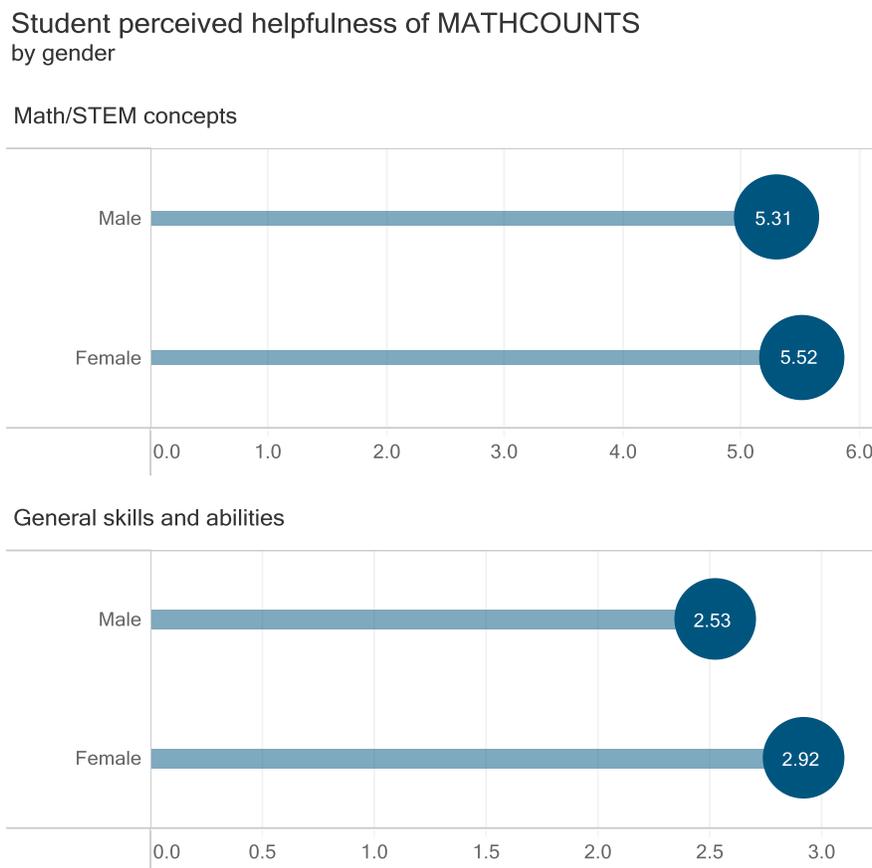
General skills and abilities



V.F.2.a Gender

Female students had a slighter higher perception of MATHCOUNTS' helpfulness with math/STEM concepts than male students. Female students had a perceived helpfulness rating of 5.5 compared to 5.3 for male students (out of 6), though this did not prove to be statistically significant. However, female students had a significantly higher perceived usefulness towards learning general skills and abilities with a rating of 2.9 out of 6 compared to 2.5 for male students ($p=.0002$). These relationships are show in Figure V.F-9.

Figure V.F-9



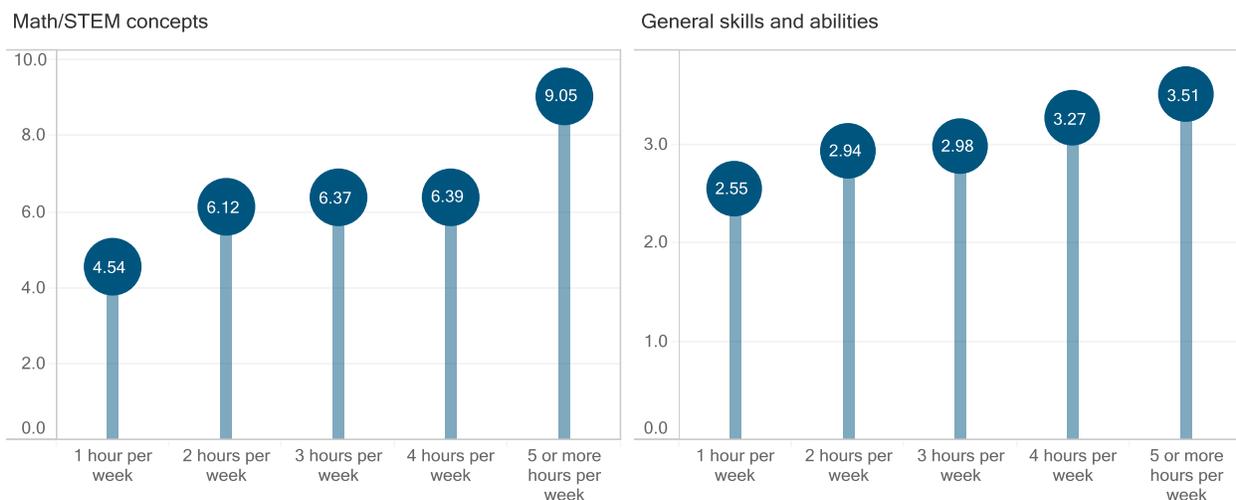
General skills and abilities: $p=.0002$

V.F.2.b Time Spent in MATHCOUNTS

Perception of MATHCOUNTS' aid in learning general skills and concepts rose as the time students spent in MATHCOUNTS meetings and practices per week increased (Figure V.F-10). Students who spent 5 or more hours in MATHCOUNTS per week had an average perception score of 9.1 for math/STEM and 3.5 for general skills. Students who spent 4 hours per week had an average math/STEM score of 6.4 and 3.3 for general skills. Students who only spent an hour per week on MATHCOUNTS had an average perception score of 4.5 for math/STEM and 2.6 for general skills.

Figure V.F-10

Student perceived helpfulness of MATHCOUNTS
by hours spent in MATHCOUNTS per week



Math/STEM concepts: Statistically significant difference between '1 hour per week' and all other categories $p < .002$ and '5 or more hours per week' and all other categories $p < .001$

General skills and abilities: Statistically significant difference between '1 hour per week' and all other categories $p < .002$ and '5 or more hours per week' and the categories '2 hours per week' and '3 hours per week' $p < .05$

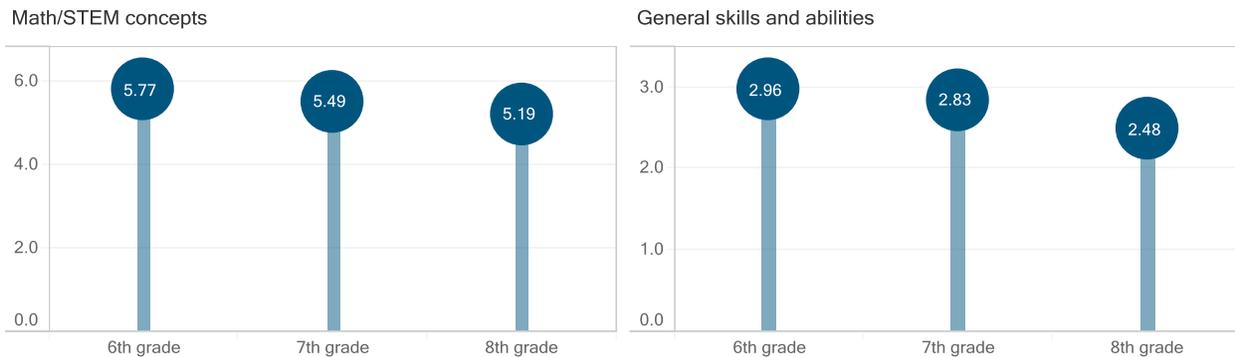
V.F.2.c Grade Level and Years in MATHCOUNTS

Minor variations in the helpfulness of MATHCOUNTS based on a student's grade level in school were observed, with statistically significant differences in students' perceptions of MATHCOUNTS ability to help learn general skills and abilities observed (Figure V.F-11). 6th grade students had a higher perception score for both math/STEM concepts and general skills (5.8 and 3.0 respectively). 7th grade students had a slightly lower perceptions score of 5.5 for math/STEM concepts and 2.8

for general skills, while 8th grade students had the lower perception score of 5.2 for math/STEM and 2.5 for general skills.

Figure V.F-11

Student perceived helpfulness of MATHCOUNTS by student grade level

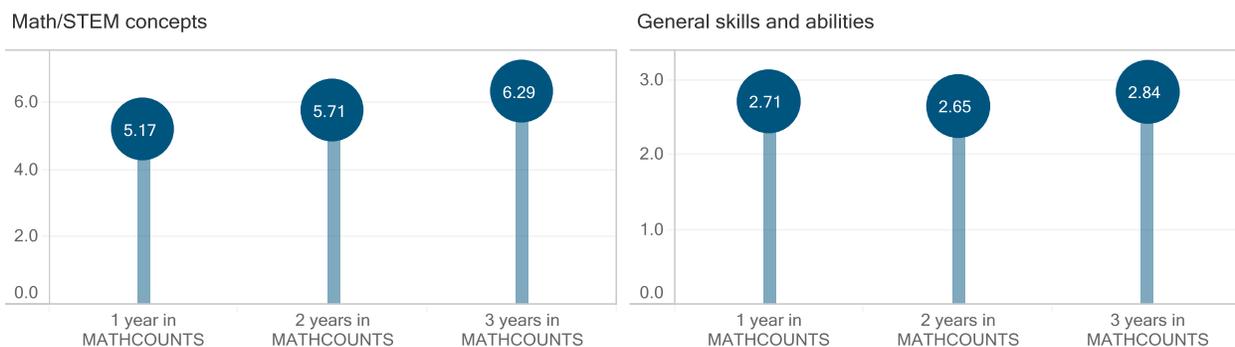


General skills and abilities: Statistically significant differences between 8th grade and all other categories $p < .002$

Conversely, the more experience a student had in MATHCOUNTS, the more the student felt it helped with math/STEM and general skills (Figure V.F-12). Students with 3 years of MATHCOUNTS experience had a score of 6.3 out of 16 for the perceived helpfulness to learn math/STEM concepts compared to 5.2 for students with just 1 years' experience ($p < .005$). When looking at general skills, those with 3 years' experience had an average score of 2.8 compared to 2.7 for those with 2 years and 1 years' experience respectively, a less defined, and not significant, trend compared to math/STEM concepts.

Figure V.F-12

Student perceived helpfulness of MATHCOUNTS by years participating in MATHCOUNTS competitions



Math/STEM concepts: Statistically significant differences between '1 year in MATHCOUNTS' and '3 years in MATHCOUNTS'

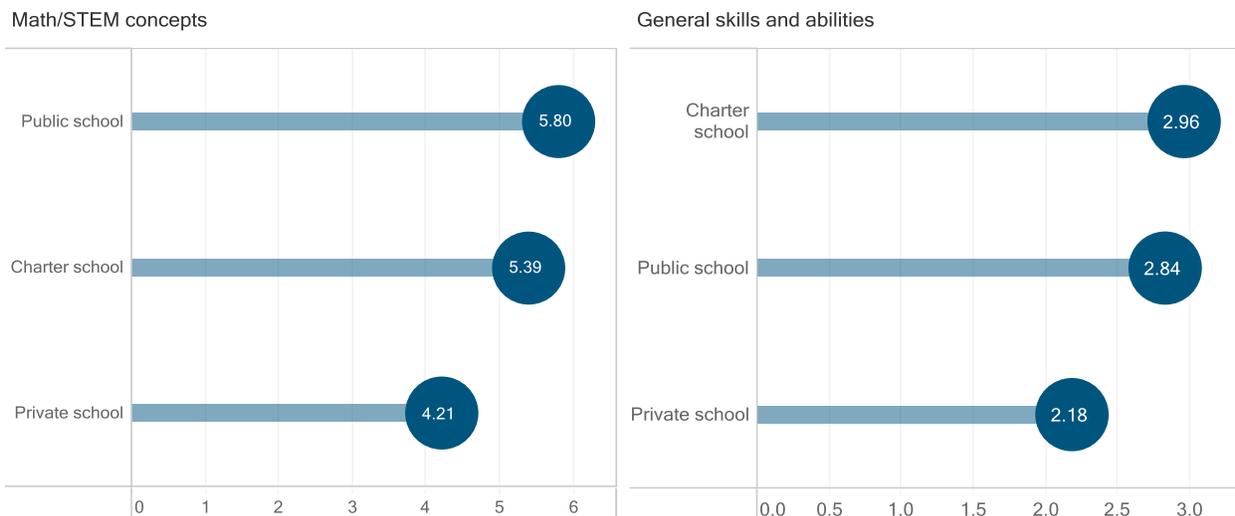
Similar trends were observed based on the number of years the student participated in MATHCOUNTS competitions. Students reported an average perceived helpfulness score of 5.3 for learning math/STEM concepts in their first year of competition, and 6.4 for learning math/STEM concepts in their third year ($p < .05$), as well as 2.7 for learning skills in their first year, and 3.0 in their third year.

V.F.2.d Program Characteristics

Students' perceived helpfulness of MATHCOUNTS on math/STEM concepts varied slightly based on school type (Figure V.F-13). The average helpfulness perception score for students attending public schools was 9.6 out of 16 followed by 8.8 for students attending charter schools. Students at private schools had the lowest perception score at 7.8. When looking at general skills and abilities, public school students still had a higher perception rating, 4.5 out of 6, followed by private school students at 4.1. Charter schools students felt the program was the least helpful with an average score of 3.9.

Figure V.F-13

Student perceived helpfulness of MATHCOUNTS by school type



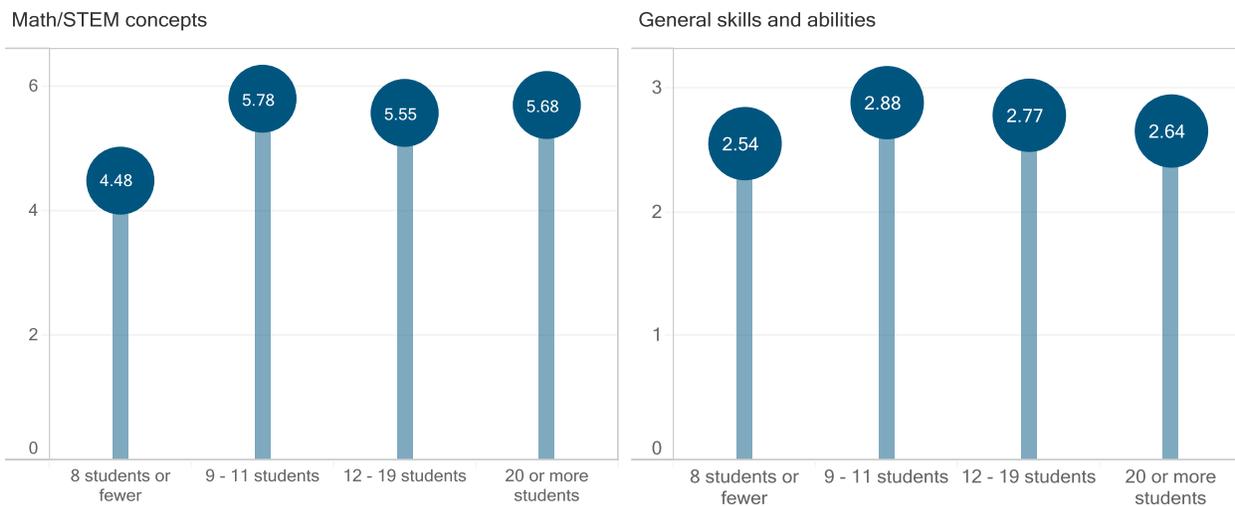
Math/STEM concepts: Statistically significant difference between 'public school' and 'private school' $p = .0001$

Math/STEM concepts: Statistically significant differences between 'public school' and 'private school' $p = .0001$ and 'private school' and 'charter school' $p = .0024$

There was some variability between perceived helpfulness and MATHCOUNTS program size. Programs with 20 or more students had the highest perception score for math/STEM concepts at 9.6 (Figure V.F-14). Programs with 12 to 19 students followed with a score of 9.4. Programs with 11 students or fewer had an average score of 8.8. When looking at general skills and abilities, a similar pattern emerges where programs with 20 or more students had a higher perception score than programs with 19 or fewer students.

Figure V.F-14

Student perceived helpfulness of MATHCOUNTS by program size



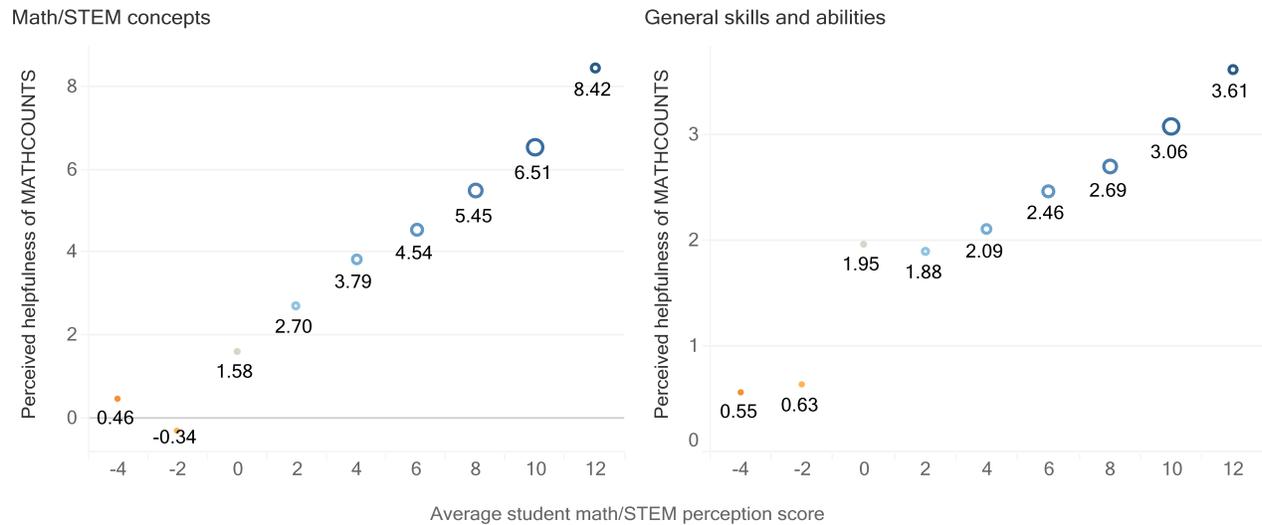
Math/STEM concepts: Statistically significant differences between '8 students or fewer' and all other categories $p < .05$

V.F.2.e Perception of Math/STEM

In general, students who had a positive perception of the math and STEM fields tended to feel that MATHCOUNTS was more helpful in learning math/STEM concepts and general skills (Figure V.F-15). Students who viewed the math and STEM fields most positively (math/STEM perception score of 12 out of 12) had an average perceived helpfulness score starting 8.4. However, students with an unfavorable view of math/STEM had an average perception score starting at 1.6 and bottoming out at -0.3. A similar pattern presented itself for general skills and abilities. Please note that for this visual math/STEM perception scores lower than -4 were removed due to small cell sizes.

Figure V.F-15

Student perceived helpfulness of MATHCOUNTS
by student math/STEM perception score



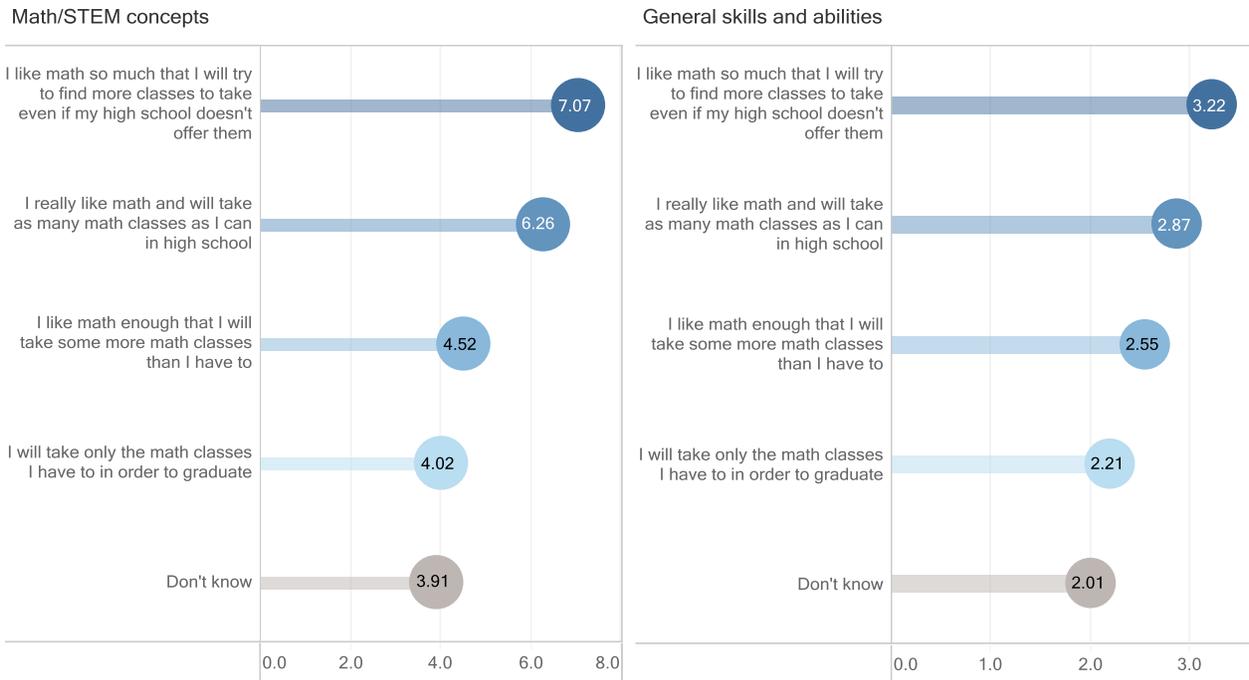
Statistical significance undetermined due to small cell sizes

V.F.2.f Education and Career Plans

Analysis was conducted to look at students' perceived helpfulness of MATHCOUNTS on concepts and skills compared to students' plans for taking math classes in high school. Results showed there was a positive relationship between perceived helpfulness of MATHCOUNTS and plans for taking math classes (Figure V.F-16). Students who planned to take as many math classes as possible even if they are not offered at their school had an average perception score of 7.1 compared to just 4.0 for students who will only take the minimum requirements ($p < .0001$). Similarly, students who want to take as many math classes as possible felt that MATHCOUNTS helped with general skills and abilities with a rating of 3.2 on a 6-point scale, comparatively. Students who only want to take the minimum required number of math classes had an average perception score of just 2.2 ($p < .0001$).

Figure V.F-16

**Student perceived helpfulness of MATHCOUNTS
by plans for taking math classes in high school**

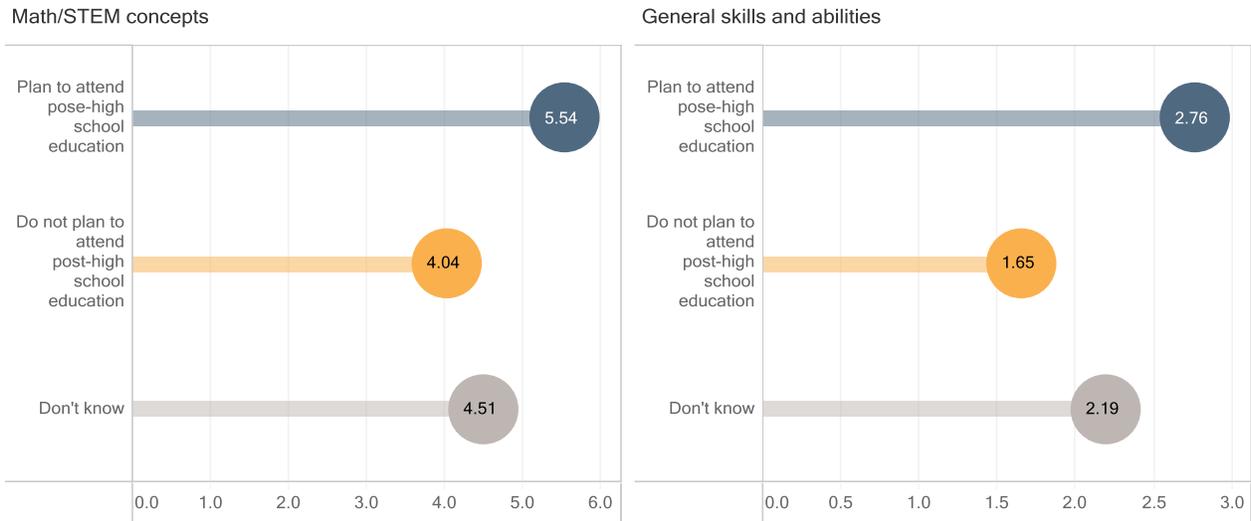


Inter group significance reported in Appendix Table V.F-16

Though not statistically significant, it was observed that students who plan to continue their education post-high school had a higher perception score for both math/STEM concepts and general skills and abilities (5.5 out of 16 and 2.8 out of six respectively) compared to those who do not plan to continue their education (4.0 and 1.7 respectively) (Figure V.F-17). Those who were undecided fell in the middle at 4.5 and 2.2 respectively, reporting a significantly lower perception of the helpfulness of MATHCOUNTS participation than students with plans to obtain post-high school education.

Figure V.F-17

**Student perceived helpfulness of MATHCOUNTS
by plans to pursue postsecondary education**



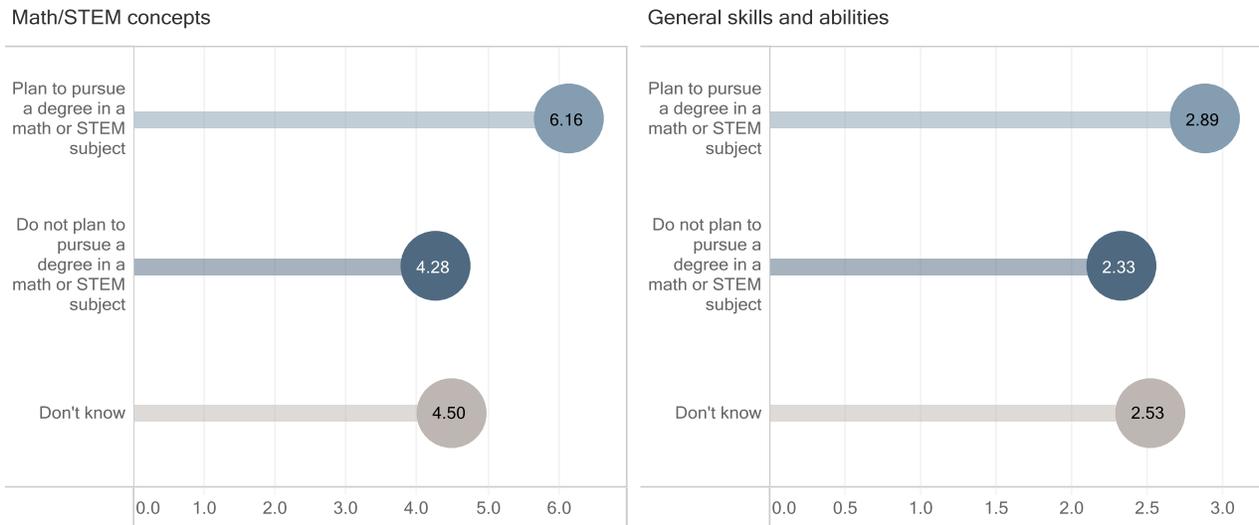
Math/STEM concepts: Statistically significant differences between categories 'Plan to attend post-high school education' and 'Don't know' p=.0093

General skills and abilities: Statistically significant differences between categories 'Plan to attend post-high school education' and 'Don't know' p=.0008

Students who plan to continue their education and pursue a degree in a math or STEM field had the highest perception score of 6.2 for math/STEM concepts and 2.9 for general skills (Figure V.F-18). Those that did not plan to major in math/STEM subjects had a lower perception score of 4.3 for concepts and 2.3 for skills. Those who were unsure had an average perception score of 4.5 for concepts and 2.5 for skills.

Figure V.F-18

Student perceived helpfulness of MATHCOUNTS
by plans to pursue degree in math or STEM field



Math/STEM concepts: Statistically significant differences between categories 'Plan to pursue a degree in a math or STEM subject' and all other categories $p < .0001$

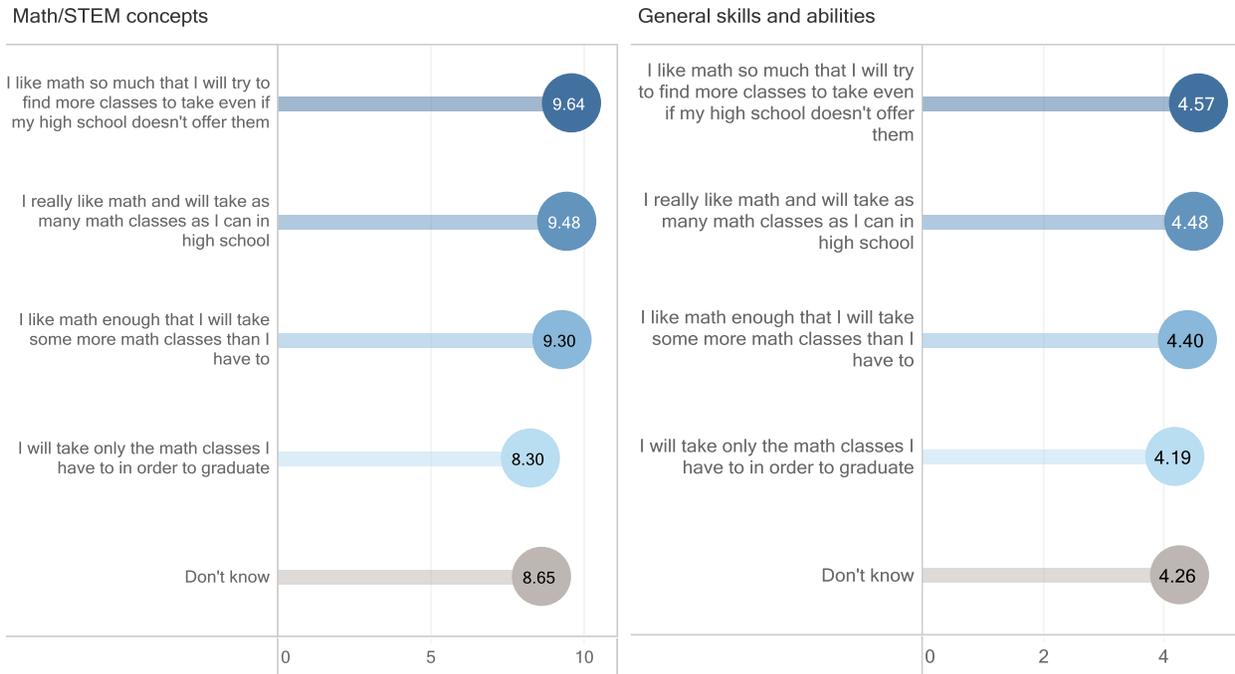
General skills and abilities: Statistically significant differences between categories 'Plan to pursue a degree in a math or STEM subject' and all other categories $p < .05$

V.F.3 Influence of Coach Perception on Student Outcomes

Coaches with a higher perception of the helpfulness of MATHCOUNTS tended to have students who reported liking math and had plans to take more math classes. Coaches with students who indicated they wanted to take as much math as possible (even if the classes are not offered at their high school) had an average perception score of 9.6 for math/STEM concepts and 4.6 for general skills. This was followed by coaches with students who 'really like math and will take as many math classes as offered in high school' with an average coach perception score of 9.5 for concepts and 4.5 for skills. Coaches with students who only wanted to take the required number of math classes had the lowest perception score of 8.3 for concepts and 4.3 for skills, significantly lower than coaches in the first two groups ($p < .05$). These relationships are shown in Figure V.F-19.

Figure V.F-19

Coach perceived helpfulness of MATHCOUNTS
by student plans for taking math classes in high school

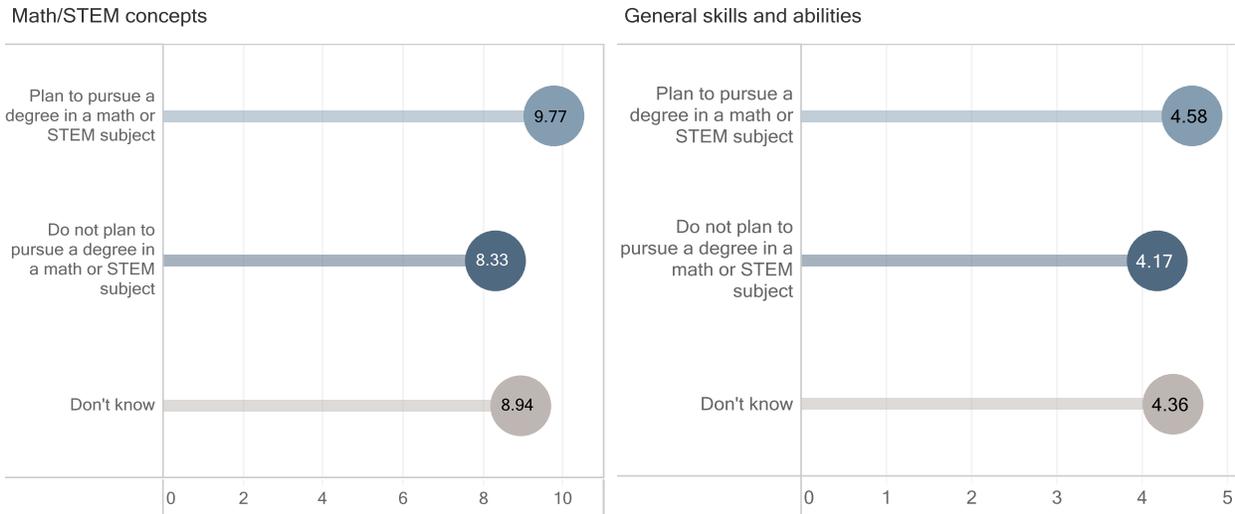


Inter group significance reported in Appendix Table V.F-19

Figure V.F-20 illustrates the relationship between coaches' perceived helpfulness of MATHCOUNTS and students' plans for pursuing a degree in a math or STEM field. Students who plan to major in a math or STEM subject had coaches that had a higher perceived helpfulness of MATHCOUNTS (9.8 out of 16). Students who did not plan to major in such subjects had coaches with a lower perception of the helpfulness of MATHCOUNTS, 8.3 ($p=.005$). Students who were undecided had coaches with an average score of 8.9. Likewise, for general skills and abilities, students who did plan to pursue degrees in math/STEM had coaches with a higher perception score (4.6 out of 6) compared to those who did not plan to pursue such a degree at 4.2 ($p<.02$). Students who were undecided had coaches with an average score of 4.4. Additionally, the influence of coach perceived helpfulness of MATHCOUNTS against students' plans to pursue postsecondary education was reviewed, but did not result in a reportable difference.

Figure V.F-20

Coach perceived helpfulness of MATHCOUNTS
by plans to pursue degree in math or STEM field



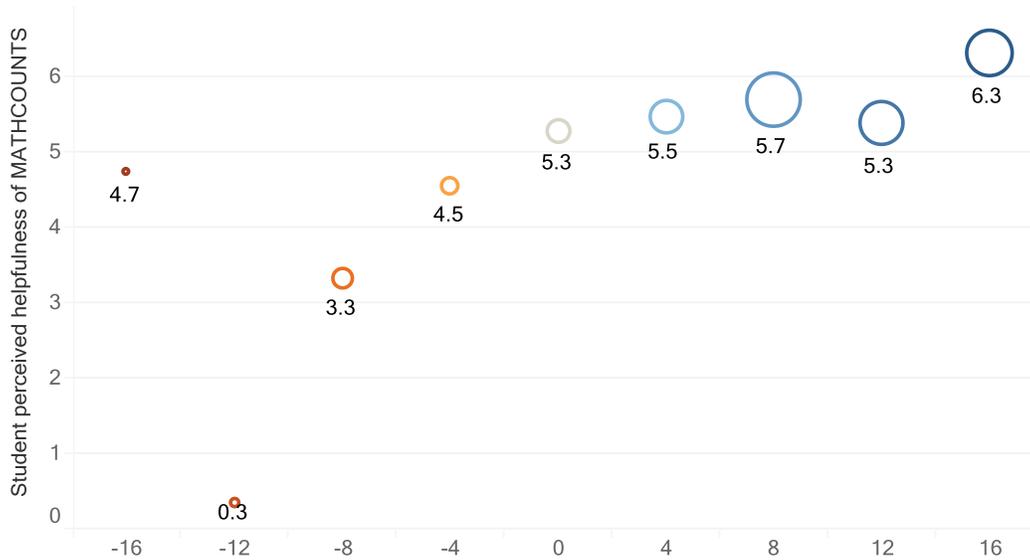
Math/STEM concepts: Statistically significant differences between categories 'Plan to pursue a degree in a math or STEM subject' and all other categories $p < .006$

General skills and abilities: Statistically significant differences between categories 'Plan to pursue a degree in a math or STEM subject' and all other categories $p < .05$

A positive relationship between students' perceived helpfulness of MATHCOUNTS to learn math and STEM concepts and coaches' perceived helpfulness of MATHCOUNTS to introduce or explore math and STEM concepts was observed. As shown in Figure V.F-22 below, coaches with the highest perception of the helpfulness of MATHCOUNTS tended to have students who also reported a higher perception of the helpfulness of MATHCOUNTS.

Figure V.F-21

Average student perceived helpfulness of MATHCOUNTS to learn math/STEM concepts
by coach perceived helpfulness of MATHCOUNTS to introduce or explore math/STEM concepts

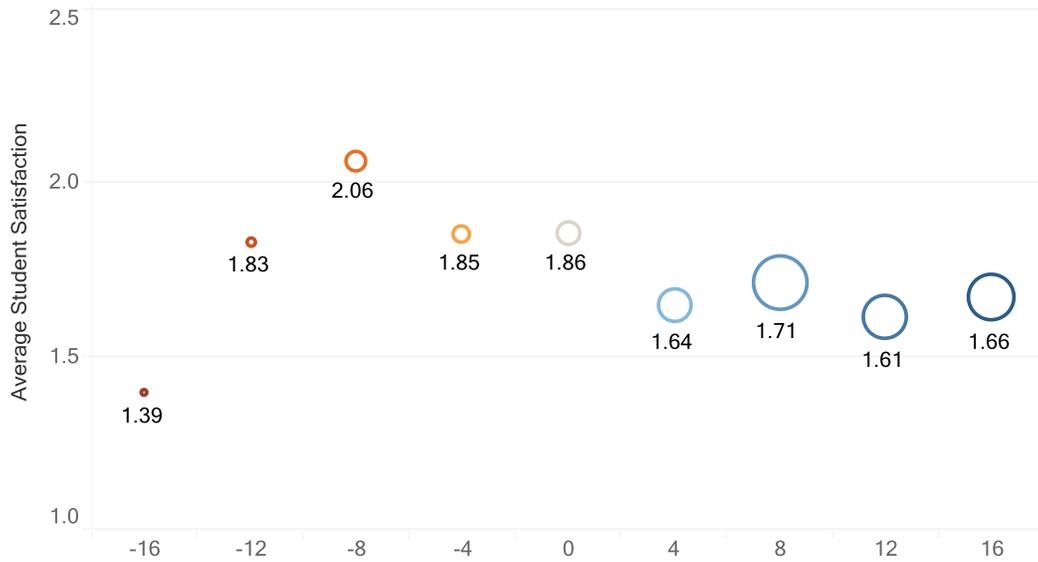


Statistical significance undetermined due to small cell sizes

To a lesser extent, coaches' perception of MATHCOUNTS' ability to introduce and explore math and STEM concepts also aligned with students' overall satisfaction with the MATHCOUNTS program. Coaches who reported a more positive perception of MATHCOUNTS' helpfulness were more likely to have students with positive satisfaction scores (on a range with one being satisfied) as shown in Figure V.F-22.

Figure V.F-22

Average student satisfaction with the MATHCOUNTS Competition Series overall by coach perceived helpfulness of MATHCOUNTS to introduce or explore math/STEM concepts



Statistical significance undetermined due to small cell sizes

Appendix A

Evaluation Packets

Letters

- Coordinator introduction letter
- Coaches letter
- Parent Letter (Opt-Out)

Coordinator Packets

- Coordinator Instructions
- Frequently Asked Questions

Instruments

- Coach survey
- Student survey

Coordinator Introduction Letter

Dear [MATHCOUNTS Coordinator],

Thank you for the time and effort you dedicate to coordinating the MATHCOUNTS competition series, and helping to build students' confidence and attitudes towards math and problem solving.

We need your help and support to make the MATHCOUNTS program even better. The MATHCOUNTS Foundation is administering a survey to MATHCOUNTS coaches and students in order to understand more about what they find most valuable and to improve the program.

We have selected a number of MATHCOUNTS chapter competitions at random to have participating coaches and students complete the survey. Your chapter competition has been randomly chosen to participate. The survey asks about the coaches' and students' utilization of the MATHCOUNTS program, satisfaction and perceived impacts of the program, and the students' and coaches' sentiment toward math/STEM topics. The responses of the coaches and students in your chapter will be used to represent similar competitions across the country.

This is not an evaluation of your chapter, the chapter competition, or your efforts to assist MATHCOUNTS. Participation in the survey is voluntary. Clubs and individuals within clubs that choose not to participate will not negatively impact your chapter, competition, or reflect on your efforts.

We will notify the coaches in your competition about the study and provided them with basic information, contacts, and letters to be provided to parents of student competitors describing the survey and allowing them to opt their student out. The coaches will be returning these opt-out forms to you on or before the competition. Please ensure that if a student has been opted-out of the survey they do not receive a survey during the competition.

Your participation is crucial to gaining this valuable information from coaches and students. We are looking to you to distribute and collect the coach and student surveys at the competition. If you have any concerns or would like additional support to administer and collect the surveys please let us know immediately so we can better support you.

How to Participate

One week prior to your scheduled competition you will receive a packet containing the MATHCOUNTS surveys along with instructions on how to administer them. The packet will include:

- Instructions on how to administer the survey at the competition
- An addressed and postage paid return envelope
- Individual packets for each school participating in the competition. These will contain:
 - A Coach Survey
 - Student Surveys

Please distribute the surveys to each club and help to administer the survey to the coaches and student competitors.

If you would like more information on the purpose of the survey and intentions of the evaluation contact me at Lou@mathcounts.org or at 703-299-9006. If you have questions, or come across any problems related to the administration of the survey, do not hesitate to contact the survey team at 855-868-5088 (toll free) or MATHCOUNTS_Survey@westat.com.

Best,

Lou DiGioia
Executive Director, MATHCOUNTS

Coaches Letter

Dear [MATHCOUNTS Coach],

Thank you for the time and effort you dedicate to coaching a team in the MATHCOUNTS Competition Series, and for helping to build students' confidence and attitudes towards math and problem solving.

We need your help and support to make the MATHCOUNTS Competition Series even better. The MATHCOUNTS Foundation is administering a survey to MATHCOUNTS Competition Series coaches and students in order to understand more about what they find most valuable and to improve the program.

We have selected a number of MATHCOUNTS chapter competitions at random to have participating coaches and students complete the survey. Your chapter competition has been randomly chosen to participate. The survey asks about your and your students' utilization of the program, satisfaction and perceived impacts of the program, and your sentiment toward math/STEM topics. Your and your students' responses to the surveys will be used to represent similar competitions across the country.

This is not an evaluation of your school. Participation in the survey is voluntary, and individual results from the surveys will not be shared with your school or school district. School names will be kept separate from the answers. The answers from your surveys will be combined with those from the other participating schools so that no individual's answers will appear alone in any reports and no single school will be identified in a report.

We have included information to be passed to the parents of all students in the competition giving them the option to opt their children out of the survey. Please send this information home with each student who will be attending the MATHCOUNTS chapter competition at least four days prior to the competition. Please bring all completed forms with you to the competition and work with the competition coordinator to ensure that students who have been opted-out of the survey by their parents are not given the survey.

If you would like more information on the purpose of the survey and intentions of the evaluation, please contact the MATHCOUNTS Foundation at Info@mathcounts.org or at 703-299-9006. If you have questions, or come across any problems related to the administration of the survey, do not hesitate to call the survey team at 855-868-5088 (toll free) or MATHCOUNTS_Survey@westat.com.

Best,

Lou DiGioia
Executive Director, MATHCOUNTS

Parent Letter (Opt-Out)

Dear MATHCOUNTS Student Parent or Guardian,

The MATHCOUNTS Competition Series is a national program that provides sixth-, seventh- and eighth-grade students the opportunity to compete in live, in-person contests against and alongside their peers. Your student is participating in a MATHCOUNTS Competition Series Chapter Competition.

The MATHCOUNTS Foundation is conducting a survey to understand more about what students and coaches in the MATHCOUNTS Competition Series find most valuable and to improve the program. The survey will be handed out at the MATHCOUNTS chapter competition in the next week.

The survey your student competitor will be asked to complete is voluntary. Participation in the survey will not impact your student's participation in the MATHCOUNTS Competition series or participation in the MATHCOUNTS program. Neither your student's coach or any other member of the competition will review their survey answers. However, if your student writes that they intend to harm others or themselves, we will share this information with their competition coordinator and coach, as required by law. The survey asks your student only about their participation in and thoughts about the MATHCOUNTS Competition Series, their interest in mathematics, and feelings towards the other elements of STEM (Science, Technology, Engineering, and Math) education. No names are being collected. The answers will be combined with those from the other participating MATHCOUNTS schools. No individual's answers will appear alone in any reports and no single school will be identified in a report.

If you do not want your student to participate in the survey, please mark an X in the box below and return this form to your student's teacher.

 I DO NOT WISH TO HAVE MY STUDENT TAKE THE MATHCOUNTS STUDENT SURVEY.

Student's Name: _____ **Parent's Name:** _____

For Further Information

If you have questions about the purpose of the survey or the MATHCOUNTS program please contact the MATHCOUNTS Foundation at info@mathcounts.org or at 703-299-9006. If you have questions about the content of the survey or how it will be administered, please call 855-868-5088 (toll free).

Best,

Lou DiGioia
Executive Director, MATHCOUNTS

Coordinator Instructions

Instructions for Administering MATHCOUNTS Surveys

Once again, thank you for helping us evaluate the MATHCOUNTS Competition Series!

The instructions below will walk you through the steps necessary to administer the surveys. It's very important to follow these instructions so that the surveys are administered in a similar way across all participating schools.

If you have any questions or problems at any point in the process, please contact us at 855-868-5088 (toll free) or MATHCOUNTS_Survey@westat.com.

Materials You Should Have Found in Your Mailing

- Instructions for administering MATHCOUNTS surveys
- Frequently asked questions
- Additional parent opt-out forms
- Envelope packets for each school containing coach and student surveys
- FedEx envelope(s) and pre-printed return label(s) for sending everything back

If you are missing any of these materials, or the materials are incomplete please contact us at 855-868-5088 (toll free) or MATHCOUNTS_Survey@westat.com immediately. Please do not make additional copies of any materials on your own.

Survey Distribution

1. **Hand out the survey.** At the most convenient point during the competition, hand the coach and student surveys out to the school indicated on the individual envelopes. Make sure to coordinate with the team's coach to exclude any students whose parents opted their child out of the survey.

Each school participating in the competition will have a personalized envelope with the name of their school on the outside of the envelope. It is important that the surveys for that school only be administered to the coach and students in that school. The identification numbers pre-printed on the survey help us keep track of school participation to enable better analysis of coach and student characteristics. It is ok to have left over blank surveys.

2. **Administer the survey.** Ask the coach and students to read the introduction to the survey and complete the survey. Use the Frequently Asked Questions document if questions arise. Coaches and students can use pencil or a dark colored pen to complete the survey. Do not review anyone's answers or provide guidance, other than the FAQ's, on answering questions. There is no 'right' answer.

3. **Collect surveys and seal in envelope.** When the coach and students are finished completing the surveys, collect them and place them in the return envelope. Do not review any of the coaches' or students' answers. You will mail these back to us when you have gathered all materials (see Mail Everything In, below). When gathering the completed surveys for return, it is not important to keep each schools' surveys separate.

Mail Everything In

1. **Gather all the completed materials and place in the provided FedEx envelope(s) using the pre-printed return label(s).** Larger competitions may have received multiple return envelopes and labels; please use as few envelopes and labels as needed to return your materials. Gather the following materials to send back to us. Place each item in the provided FedEx envelope(s).
 - **Returned Parent Opt-Out Letters**
 - **Completed Coach Surveys**
 - **Completed Student Surveys**

Call 1-800-GoFedEx (1-800-463-3339) and say “schedule a pickup” to schedule a FedEx pickup. Packages can also be handed to a FedEx driver or dropped off at any FedEx retail location. Please contact us with any questions at 855-868-5088 (toll free) or MATHCOUNTS_Survey@westat.com.

2. **Destroy Unused Materials.** You may have extra materials, such as blank student surveys, extra blank parent opt-out forms, extra envelopes, or FedEx materials. Please shred or otherwise destroy any unused materials.

Frequently Asked Questions (FAQ's)

MATHCOUNTS Survey

Frequently Asked Questions

- ***Who is sponsoring this survey?***

This survey is sponsored by the MATHCOUNTS Foundation.

- ***What is this survey about?***

The MATHCOUNTS Foundation is interested in learning how to better support coaches and students participating in the MATHCOUNTS Competition Series and the impact of the Competition Series on participating students' perceptions of math and STEM concepts. The survey will be used to understand more about what coaches and students of the MATHCOUNTS Competition Series find most valuable and improve the program. Coach and student answers to survey questions will help the MATHCOUNTS Foundation improve the program for all current and future MATHCOUNTS coaches and students.

- ***Why did you pick me?***

We have selected a number of MATHCOUNTS chapter competitions at random to have participating coaches and students complete the survey. Your chapter has been randomly chosen to participate. We cannot select anyone else to replace your school if you do not participate.

- ***Why can't you pick another school to do the surveys?***

This is a scientific study which requires special rules for selecting schools by chance. If your school does not take part in this study the results will be less complete. The rules of this study do not allow us to substitute.

- ***Why did my school not receive a survey?***

Schools that had not registered for the competition, or who were not assigned to a chapter, before December 23rd, were not eligible to be included in the survey.

- ***What types of questions will you ask me?***

MATHCOUNTS Coaches: We will ask about the general characteristics of the MATHCOUNTS Competitions Series at your school, your background, your feelings toward math and STEM (science, engineering, technology, and math), and your satisfaction with, and feelings about the value of the MATHCOUNTS Competition Series.

MATHCOUNTS Students: We will ask about your satisfaction with, and feelings about the value of the MATHCOUNTS Competition Series, your feelings towards math and STEM (science, engineering, technology and math) and your future education and career interests.

- **How long will the survey take?**

The coach survey will take about 10 minutes. Coaches may decide to skip any questions they prefer not to answer. Coordinators should not review any of the coach responses. Participation is voluntary.

The student survey will take about 10 minutes. Students may decide to skip any questions they prefer not to answer. Coordinators and coaches should not review any of the student responses. Participation is voluntary.

- **Do I have to take the survey?**

Participation is completely voluntary. Whether or not you choose to complete the survey will not impact anything about the competition or your school, nor will your answers to the survey. Your answers will only be used to help the MATHCOUNTS Foundation learn more about MATHCOUNTS participants and improve the MATHCOUNTS Competition Series.

- **Who will see the survey answers? Will names be associated with the survey answers?**

Only a few people from the MATHCOUNTS Foundation and the research team will see survey answers. Coach, student, and school identification will be kept separate from survey answers. Survey answers will be combined with those from the other participating chapters and schools so that no individual's answers will appear alone in the report and no single chapter or school will be identified in a report.

- **What will be done with the information my school provides? How will the survey results be used? Why should I participate?**

The information and opinions shared will help us better understand participants' perceptions of the MATHCOUNTS Competition Series and how it can be improved. In order to do that, we need to get information from MATHCOUNTS coaches and students.

- **How do I know this is a legitimate research project?**

This study is being conducted for the MATHCOUNTS Foundation. You can contact the MATHCOUNTS Foundation at 703-299-9006 or at info@mathcounts.org to verify the legitimacy of the survey.

- **I just don't have the time.**

We understand that your time is valuable and appreciate you taking time to contribute to the improvement of the MATHCOUNTS Competition Series.

- ***Is there someone I contact at the MATHCOUNTS Foundation?***

You may speak with:
Matt Freeman
MATHCOUNTS Foundation

Email address: info@mathcounts.org

Phone number: 703-299-9006

Mailing Address:
1420 King Street
Alexandria, VA 22314

Coaches Survey



MATHCOUNTS Competition Coaches: You are receiving this survey because your school's MATHCOUNTS Competition Series program has been randomly selected to complete a survey.

This survey will help MATHCOUNTS understand the experiences that students and coaches have with the Competition Series. Survey results will help MATHCOUNTS do a better job of developing programs and materials for coaches and students. If you decide to help us, the survey will take about 5-10 minutes.

We will not share with anyone the answers you provide on this survey.

Participation in this survey is voluntary. This is not a test. Participation in the survey will not impact your participation in the competition or any current or future program associated with MATHCOUNTS.

Thank you for your help in improving MATHCOUNTS.

If you have any questions about the survey, please call 1-855-868-5088 (toll free).

Mark your answers with a black or blue pen. Make an to indicate your answer. If you want to change your answer, mark on the wrong answer.

YOUR MATHCOUNTS COMPETITION SERIES PROGRAM

1. In addition to the MATHCOUNTS Competition Series, which MATHCOUNTS programs are offered at your school?

(Mark all that apply)

- The National Math Club, powered by MATHCOUNTS
 The Math Video Challenge, produced by MATHCOUNTS
 Don't know

2. Approximately how many students from your school participated in your MATHCOUNTS Competition Series practices and meetings this school year?

3. How many students from your school are participating in this MATHCOUNTS Chapter Competition today?

4. Which grade levels are represented by the students who participate in your MATHCOUNTS Competition Series practices and meetings? *(Mark all that apply)*

- 6th grade 7th grade 8th grade Don't know

5. Please indicate your school type: *(Mark one)*

- Public school Home School Virtual School
 Private school Charter school

6. From the list below, what was your top reason for participating as a coach in the MATHCOUNTS Competition Series? *(Mark one)*

- My principal asked me My students asked me Don't know
 The former coach at my school asked me Parents of my students asked me
 Other reason (please explain): I decided to coach a team on my own

37957



7. How did you first hear about the MATHCOUNTS Competition Series? (Mark one)

- Email from MATHCOUNTS Twitter A brochure/free materials
 Hard copy mail from MATHCOUNTS Other social media (not Facebook or Twitter) I found it on my own through web search/other means
 Conference
 Facebook From my principal/another teacher Don't know
 Other source (please list):

8. What communication channels do you use to hear about new programs and services related to math/STEM (Science, Technology, Engineering and Math) education? (Mark all that apply)

- Email
 Hard copy mail
 Facebook
 Twitter
 Other social media (please list):
 Websites (please list):
 Publications (please list):
 Other source (please list):
 Don't know

YOUR PERCEPTIONS OF MATH/STEM & MATHCOUNTS COMPETITION SERIES

9. To what extent do you disagree or agree with the following statements about math/STEM?

	Disagree	Somewhat disagree	Somewhat agree	Agree	Don't know
a. I think math/STEM is the most important part of a student's education	<input type="checkbox"/>				
b. There are lots of jobs/careers where math/STEM is useful	<input type="checkbox"/>				
c. My confidence in teaching math/STEM has grown since participating in the MATHCOUNTS Competition Series	<input type="checkbox"/>				
d. I don't think that math/STEM education is useful for a student's future education or career	<input type="checkbox"/>				
e. After participating in the MATHCOUNTS Competition Series, students are able to successfully tackle and answer math problems they have never seen before	<input type="checkbox"/>				
f. I would encourage children to pursue an education or career in math/STEM	<input type="checkbox"/>				
g. I would be disappointed if I could not coach for the MATHCOUNTS Competition Series anymore	<input type="checkbox"/>				

10. How satisfied have you been with your participation in the MATHCOUNTS Competition Series overall this school year?

Satisfied	Somewhat satisfied	Somewhat unsatisfied	Unsatisfied	Don't know
<input type="checkbox"/>				

11. How likely are you to recommend participating in the MATHCOUNTS Competition Series to another educator?

0-Not at all likely	1	2	3	4	5	6	7	8	9	10-Extremely likely
<input type="checkbox"/>										

37957



12. How satisfied have you been with the following MATHCOUNTS Competition Series elements/resources during this school year?

	Didn't use resource	Satisfied	Somewhat satisfied	Somewhat unsatisfied	Unsatisfied	Unaware of resource
a. Today's Chapter Competition event	<input type="checkbox"/>					
b. MATHCOUNTS Competition Series School Handbook	<input type="checkbox"/>					
c. OPLET database of problems and solutions	<input type="checkbox"/>					
d. Practice books	<input type="checkbox"/>					
e. Past competition problems	<input type="checkbox"/>					
f. MATHCOUNTS Trainer App	<input type="checkbox"/>					
g. Problem of the week	<input type="checkbox"/>					
h. MATHCOUNTS Minis (monthly video series)	<input type="checkbox"/>					

13. What have you liked the most about participating in the MATHCOUNTS Competition Series overall during this school year?

14. What would you change about the MATHCOUNTS Competition Series to improve it?

15. Please indicate how much holding MATHCOUNTS Competition Series practices and meetings helped you introduce to students or explore in more depth the following math/STEM concepts this school year.

	Did not cover in MATHCOUNTS	Did not help at all	Slightly helped	Somewhat helped	Helped very much	Don't know
a. Algebraic expressions and equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Geometry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Logic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Measurement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Percents and fractions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Probability, counting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Sequences, series, and patterns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Statistics and data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Please indicate how much holding MATHCOUNTS Competition Series practices and meetings helped you enhance students' general skills and abilities in the following areas this school year.

	Did not cover in MATHCOUNTS	Did not help at all	Slightly helped	Somewhat helped	Helped very much	Don't know
a. Problem solving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Teamwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. What aspect of MATHCOUNTS do you feel had the biggest impact on students over this school year?

18. Which outcome best describes your main goal for participating in MATHCOUNTS Competition Series this school year? (Mark one)

- Students advancing as far in MATHCOUNTS Competitions as possible
- Helping students learn/increasing students' confidence in math/STEM
- Increasing students' interest in/excitement about math/STEM
- Diversifying the types of students interested in math/STEM
- Giving students with an interest in math an opportunity to engage in a social setting
- Other goal (please list):

- Don't know

COACH DEMOGRAPHICS

We are interested in some general information about you. Your answers to these questions are important to us. They will help us better understand your answers to other parts of the survey.

19. If you have taught, or are currently teaching, how many years have you taught in total?

- Yes, I have taught or am currently teaching.
 └─→

 Total number of years teaching
- No, I have never taught

20. How many years have you been participating in the MATHCOUNTS Competition Series, and is this your first year?

- | |
|--|
| |
| |

 Number of years participating in the MATHCOUNTS Competition Series
- This is my first year participating

21. What is your gender?

- Male
- Female

22. Which category best represents your age?

- 20 and under
- 21–30
- 31–40
- 41–50
- 51 and older

23. Which category best describes you? (Mark all that apply)

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Middle Eastern or North African
- Some other race or origin (please list):

--
- Native Hawaiian or other Pacific Islander
- White/Caucasian

Thank you for completing this survey!



Student Survey



MATHCOUNTS Competition Participants: You are receiving this survey because your MATHCOUNTS Competition Series program has been randomly selected to complete a survey.

This survey will help MATHCOUNTS understand the experiences that students have with the competition and the MATHCOUNTS program as well as their future education and career interests. Survey results will help MATHCOUNTS do a better job of developing programs and materials for coaches and students. If you decide to help us, the survey will take about 5-10 minutes.

We will not share with anyone the answers you provide on this survey. However, if you write on the survey that you intend to harm yourself or others, we will share this information with your program, as required by law. We have already asked your parents or guardians whether you can participate in this survey, through a letter given to them by your MATHCOUNTS coach. If they returned the letter showing they do not want you to participate, please do not complete the survey. If they did not return the letter, they have agreed to let you participate, but the final decision to participate is yours.

Participation in this survey is voluntary. This is not a test. Participation in the survey will not impact your participation in the competition or any current or future program associated with MATHCOUNTS.

Thank you for your help in improving MATHCOUNTS.

If you have any questions about the survey, please call 1-855-868-5088 (toll free).

Mark your answers with a black or blue pen. Make an to indicate your answer. If you want to change your answer, mark on the wrong answer.

YOUR PARTICIPATION IN THE MATHCOUNTS PROGRAM

In this section we ask you questions about your participation in the MATHCOUNTS Program.

1. Has your MATHCOUNTS Competition Series team finished competing in this year's chapter competition?

- Yes, my team already competed No, my team will compete later Don't know

2. Are you participating in this year's MATHCOUNTS chapter competition as an individual or on a team?

- As an individual On a team Don't know

3. What is your current grade in school? (Mark one)

- 6th grade 7th grade 8th grade
 Don't know

4. During which grades have you participated in any part of the MATHCOUNTS Competition Series program by attending meetings and practicing, and during which have you competed in the MATHCOUNTS Competition Series competition (Chapter, State, or National)? (Mark all that apply)

	6th grade	7th grade	8th grade	Don't know
a. Participated in any part of the MATHCOUNTS Competition Series program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Competed in a MATHCOUNTS Competition Series competition (Chapter, State, National)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. During which grades have you participated in the following additional MATHCOUNTS programs? (Mark all that apply)

	6th grade	7th grade	8th grade	Don't know
a. The National Math Club, powered by MATHCOUNTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The Math Video Challenge, produced by MATHCOUNTS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. From the list below, which is your top reason for participating in the MATHCOUNTS Competition Series? (Mark one)

- | | |
|--|---|
| <input type="checkbox"/> I wanted to improve my math/STEM (Science, Technology, Engineering or Mathematics) skills | <input type="checkbox"/> My friends also participate |
| <input type="checkbox"/> Math/STEM is my favorite subject | <input type="checkbox"/> My parents/teacher/guidance counselor encouraged me to participate |
| <input type="checkbox"/> I needed an extracurricular activity, and it seemed interesting | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Other reason (please explain): <input style="width: 400px;" type="text"/> | |

23410



7. How did you first hear about the MATHCOUNTS Competition Series? (Mark one)

- | | | |
|--|--|---|
| <input type="checkbox"/> From a friend | <input type="checkbox"/> Flyer at school | <input type="checkbox"/> Other social media (Not Facebook or Twitter) |
| <input type="checkbox"/> From a teacher/other school staff | <input type="checkbox"/> Facebook | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> From my parents | <input type="checkbox"/> Twitter | |
| <input type="checkbox"/> Announcement at school | <input type="checkbox"/> Other source (please list): | <input type="text"/> |

8. How do you typically find out about new extracurricular activities? (Mark one)

- | | | |
|--|--|-------------------------------------|
| <input type="checkbox"/> From a friend | <input type="checkbox"/> Flyer at school | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> From a teacher/other school staff | <input type="checkbox"/> Facebook | |
| <input type="checkbox"/> From my parents | <input type="checkbox"/> Twitter | |
| <input type="checkbox"/> Announcement at school | <input type="checkbox"/> Other source (please list): | <input type="text"/> |

9. About how much time have you spent per week, on average, in practices and meetings for the Competition Series during this school year? (Mark one)

- | | | |
|---|---|---|
| <input type="checkbox"/> 1 hour per week | <input type="checkbox"/> 3 hours per week | <input type="checkbox"/> 5 or more hours per week |
| <input type="checkbox"/> 2 hours per week | <input type="checkbox"/> 4 hours per week | <input type="checkbox"/> Don't know |

10. In which other middle school extracurricular activities or clubs other than MATHCOUNTS have you participated? (Mark all that apply)

Academic Clubs/Activities

- | | | |
|---|---|---|
| <input type="checkbox"/> AMC competitions | <input type="checkbox"/> FIRST Robotics | <input type="checkbox"/> National Spelling Bee |
| <input type="checkbox"/> Math Olympiads for Elementary and Middle Schools | <input type="checkbox"/> Other academic club (please list): | <input type="checkbox"/> National Geography Bee |
-

Other Extracurricular Clubs/Activities

- | | | |
|---|--|---|
| <input type="checkbox"/> Sports | <input type="checkbox"/> Art | <input type="checkbox"/> Media (A/V, newspaper, yearbook, etc.) |
| <input type="checkbox"/> Music | <input type="checkbox"/> Theater/Drama | <input type="checkbox"/> Government (debate, student council, model UN, etc.) |
| <input type="checkbox"/> Other extracurricular club/activity (please list): | <input type="text"/> | |

- None
 Don't know

YOUR PERCEPTIONS OF MATH/STEM

11. What are your TWO favorite subjects in school? (Mark two)

- | | | | |
|---|--------------------------------|---|-------------------------------------|
| <input type="checkbox"/> Art | <input type="checkbox"/> Math | <input type="checkbox"/> Science | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> English | <input type="checkbox"/> Music | <input type="checkbox"/> Social studies | |
| <input type="checkbox"/> Foreign language | <input type="checkbox"/> P.E. | <input type="checkbox"/> Technology/Engineering | |
| <input type="checkbox"/> Other (please list): | <input type="text"/> | | |

12. When you think about math/STEM (Science, Technology, Engineering or Mathematics), what is the first word that comes to mind?

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13. To what extent do you disagree or agree with the following statements about math/STEM?

	Disagree	Somewhat disagree	Somewhat agree	Agree	Don't know
a. Math is one of my best subjects	<input type="checkbox"/>				
b. There are lots of jobs/careers where math/STEM is useful	<input type="checkbox"/>				
c. My confidence in math/STEM has grown since participating in the MATHCOUNTS Competition Series	<input type="checkbox"/>				
d. I don't think that math/STEM education will help me with my future education or career	<input type="checkbox"/>				
e. When I am faced with a new math/STEM problem I've never seen before, I can usually figure it out	<input type="checkbox"/>				
f. I am very confident working with math/STEM concepts	<input type="checkbox"/>				
g. There are lots of subjects in school that I would rather study than math/STEM	<input type="checkbox"/>				
h. My excitement for math/STEM has grown since participating in the MATHCOUNTS Competition Series	<input type="checkbox"/>				

YOUR PERCEPTIONS OF MATHCOUNTS COMPETITION SERIES

14. How satisfied have you been with your participation in the MATHCOUNTS Competition Series overall this school year?

Satisfied	Somewhat satisfied	Somewhat unsatisfied	Unsatisfied	Don't know
<input type="checkbox"/>				

15. How likely are you to recommend participating in the MATHCOUNTS Competition Series to a friend?

0-Not at all likely	1	2	3	4	5	6	7	8	9	10-Extremely likely
<input type="checkbox"/>										

16. What have you liked the most about participating in practices and meetings for the Competition Series overall during this school year?

17. What would you change about your experience in MATHCOUNTS Competition Series practices and meetings to improve it?

18. Please indicate how much participating in the MATHCOUNTS Competition Series this school year helped you learn the following math/STEM concepts.

	Did not learn in MATHCOUNTS	Did not help at all	Slightly helped	Somewhat helped	Helped very much	Don't know
a. Algebraic expressions and equations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Geometry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Logic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Measurement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Percents and fractions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Probability, counting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Sequences, series, and patterns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Statistics and data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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19. Please indicate how much participating in the MATHCOUNTS Competition Series this school year helped you learn the following general skills and abilities.

	Skill not covered in MATHCOUNTS	Did not help at all	Slightly helped	Somewhat helped	Helped very much	Don't know
a. Problem solving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Teamwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

HIGH SCHOOL, COLLEGE, AND CAREER PLANS

20. Which one of the following statements best describes your plans for taking math classes in high school? (Mark one)

- I will take only the math classes I have to in order to graduate
- I like math enough that I will take some more math classes than I have to
- I really like math and will take as many math classes as I can in high school
- I like math so much that I will try to find more classes to take even if my high school doesn't offer them
- Don't know

21. After high school, do you plan to go to a two-year college, four-year college, or other post-high school education?

- Yes
- No
- Don't know

→ 22. Do you plan to pursue a degree in a math or STEM subject?

- Yes
- No
- Don't know

23. What careers related to math or STEM interest you? (Mark all that apply)

- Mathematician
- Engineer
- Math/STEM educator
- Computer programmer/technician
- Other math/STEM career
- Doctor
- Scientist
- Architect
- Economist
- I'm not currently interested in a math/STEM career
- Don't know

(please list):

24. Has participating in the MATHCOUNTS Competition Series influenced your future education or career interests?

- Yes
- No
- Don't know

→ How?

DEMOGRAPHICS

We are interested in some general information about you. Your answers to these questions are important to us. They will help us better understand your answers to other parts of the survey.

25. What is your gender?

- Male
- Female

26. How old are you?

years

27. Which category best describes you? (Mark all that apply)

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Middle Eastern or North African
- Some other race or origin (please list):
- Native Hawaiian or other Pacific Islander
- White/Caucasian

Thank you for completing this survey!



Appendix B

Weighting of Data

The sampling weights are calculated to fulfill three purposes: (1) to reflect the likelihood of a coach and students being selected to participate in the MATHCOUNTS surveys; (2) to reduce bias by compensating for the fact that certain coaches and students are more likely to participate than others; and (3) to produce estimates that will be generalizable to the study population. Estimates are produced at the coach level, the student level, and combined coach-student level.

To reduce nonresponse bias and to improve the precision of the MATHCOUNTS estimates, the number of respondents are weighted to match the population counts in the final 2016-17 registration file. The file includes 5,191 schools that registered to participate in MATHCOUNTS in school year 2016-17, with a total of 41,032 students who registered to compete.

Coach Weight

The coach weight is computed as:

$$\text{Coach weight} = \frac{\text{number of coaches in final registration file}}{\text{number of responding coaches}} = \frac{5191}{667}.$$

The weighted number of coaches is equal to the number of coaches in the final registration file.

Student Weight

The final student weights are created in two steps:

1. Within school, a weight is applied to each responding student so that the count of students who completed the survey matches with the count of students in the final registration file. The student weight in school i is computed as:

$$\text{Student weight in school } i = \frac{\text{number of students in final registration file for school } i}{\text{number of students who completed the survey in school } i}$$

The weighted number of students in a school is equal to the number of students in the final registration file for that school.

2. Adjust the student weights in step 1 so that the weighted total number of responding students is equal to the total number of students in the final registration file. The adjustment factor is computed as:

$$\text{Student adjustment factor} = \frac{\text{total number of students in final registration file}}{\text{weighted total number of students computed in step 1}}$$

The final student weight is computed as:

Final student weight = student weight computed in step 1 * student adjustment factor.

Combined Coach-Student Weight

To facilitate analyses that involve both coach and student data, a combined weight for each responding student that has coach data was created. Of 5,299 responding students, 4,736 students have coach data. The final student weights are adjusted so that the weighted number of responding students who have coach data is equal to the number of students in the final registration file. The adjustment factor is computed as:

$$\text{Combined adjustment factor} = \frac{\text{total number of students in final registration file}}{\text{weighted number of responding students with coach data}}$$

The combined weight is computed as:

Combined weight = Final student weight * combined adjustment factor.

Appendix C Data Tables

Appendix Table V.D-9 Average Student math/STEM perception score by hours spent in MATHCOUNTS per week

Hours spent in MATHCOUNTS per week	Hours spent in MATHCOUNTS per week	Pr > t
1 hour per week	2 hours per week	<.0001
1 hour per week	3 hours per week	0.0013
1 hour per week	4 hours per week	0.1372
1 hour per week	5 hours per week	<.0001
2 hours per week	3 hours per week	0.7284
2 hours per week	4 hours per week	0.3579
2 hours per week	5 hours per week	<.0001
3 hours per week	4 hours per week	0.4766
3 hours per week	5 hours per week	0.0005
4 hours per week	5 hours per week	0.001

Appendix Table V.F-16 Student perceived helpfulness of MATHCOUNTS by plans for taking math classes in high school

Math/STEM Concepts

Student plans to take math classes in high school	Student plans to take math classes in high school	Pr > t
I will take only the math classes I have to in order to graduate	I like math enough that I will take some more math classes than I have to	0.2928
I will take only the math classes I have to in order to graduate	I really like math and will take as many math classes as I can in high school	<.0001
I will take only the math classes I have to in order to graduate	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	<.0001
I will take only the math classes I have to in order to graduate	Don't know	0.8725
I like math enough that I will take some more math classes than I have to	I really like math and will take as many math classes as I can in high school	<.0001
I like math enough that I will take some more math classes than I have to	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	<.0001
I like math enough that I will take some more math classes than I have to	Don't know	0.2288
I really like math and will take as many math classes as I can in high school	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.03
I really like math and will take as many math classes as I can in high school	Don't know	<.0001
I like math so much that I will try to find more classes to take even if my high school doesn't offer them	Don't know	<.0001

Appendix Table V.F-16 Student perceived helpfulness of MATHCOUNTS by plans for taking math classes in high school (continued)

General skills and abilities

Student plans to take math classes in high school	Student plans to take math classes in high school	Pr > t
I will take only the math classes I have to in order to graduate	I like math enough that I will take some more math classes than I have to	0.107
I will take only the math classes I have to in order to graduate	I really like math and will take as many math classes as I can in high school	0.0023
I will take only the math classes I have to in order to graduate	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	<.0001
I will take only the math classes I have to in order to graduate	Don't know	0.4549
I like math enough that I will take some more math classes than I have to	I really like math and will take as many math classes as I can in high school	0.0075
I like math enough that I will take some more math classes than I have to	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	<.0001
I like math enough that I will take some more math classes than I have to	Don't know	0.0038
I really like math and will take as many math classes as I can in high school	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.0118
I really like math and will take as many math classes as I can in high school	Don't know	<.0001
I like math so much that I will try to find more classes to take even if my high school doesn't offer them	Don't know	<.0001

Appendix Table V.F-19 Coach perceived helpfulness of MATHCOUNTS by student plans for taking math classes in high school (continued)

Math/STEM Concepts

Student plans to take math classes in high school	Student plans to take math classes in high school	Pr > t
I will take only the math classes I have to in order to graduate	I like math enough that I will take some more math classes than I have to	0.0486
I will take only the math classes I have to in order to graduate	I really like math and will take as many math classes as I can in high school	0.0288
I will take only the math classes I have to in order to graduate	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.0223
I will take only the math classes I have to in order to graduate	Don't know	0.5641
I like math enough that I will take some more math classes than I have to	I really like math and will take as many math classes as I can in high school	0.5518
I like math enough that I will take some more math classes than I have to	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.3001
I like math enough that I will take some more math classes than I have to	Don't know	0.1756
I really like math and will take as many math classes as I can in high school	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.6195
I really like math and will take as many math classes as I can in high school	Don't know	0.0905
I like math so much that I will try to find more classes to take even if my high school doesn't offer them	Don't know	0.0495

Appendix Table V.F-19 Coach perceived helpfulness of MATHCOUNTS by student plans for taking math classes in high school (continued)

General skills and abilities

Student plans to take math classes in high school	Student plans to take math classes in high school	Pr > t
I will take only the math classes I have to in order to graduate	I like math enough that I will take some more math classes than I have to	0.2204
I will take only the math classes I have to in order to graduate	I really like math and will take as many math classes as I can in high school	0.0943
I will take only the math classes I have to in order to graduate	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.0399
I will take only the math classes I have to in order to graduate	Don't know	0.7183
I like math enough that I will take some more math classes than I have to	I really like math and will take as many math classes as I can in high school	0.3613
I like math enough that I will take some more math classes than I have to	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.0785
I like math enough that I will take some more math classes than I have to	Don't know	0.2919
I really like math and will take as many math classes as I can in high school	I like math so much that I will try to find more classes to take even if my high school doesn't offer them	0.3629
I really like math and will take as many math classes as I can in high school	Don't know	0.097
I like math so much that I will try to find more classes to take even if my high school doesn't offer them	Don't know	0.042