Journal of Mathematics Education © *Education for All*
June 2019, Vol. 12, No. 1, pp. 74-89 https://doi.org/10.26711/007577152790039

Mathematics and Science Self-efficacy and STEM Careers: A Path Analysis

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The number of students who are majoring in science, technology, engineering, and mathematics (STEM) fields and subsequently entering STEM-related careers is insufficient to fill the growing number of job positions in the STEM job market. Research has shown that students' self-efficacy is strongly related to not only students' academic performance but also their course selection and future career choices. In the present study, researchers developed, tested, and applied a theoretical model based on previous research to see if there were important connections between students' science and mathematics self-efficacy and their interest toward STEM careers. The path analysis results showed a statistical significance between science self-efficacy and STEM career interest. In addition, the path analysis results representing the relationship between mathematics self-efficacy and interest in technology, engineering, and mathematics (TEM) careers showed statistical significance. However, the path analysis results did not indicate a statistical significance between mathematics self-efficacy and interest in science careers.

Keywords**:** STEM education, self-efficacy, STEM career, path analysis

The number of science, technology, engineering, and mathematics (STEM) careers is increasing (Torlakson, 2014). However, the number of students who are majoring in STEM fields and subsequently entering STEM-related careers is currently insufficient to fill the growing number of job positions in the STEM job market (Dorssen, Carlson, & Goodyear, 2006). It is therefore critical to identify ways to increase the number of students pursuing STEM pathways. Students' STEM career interest is an important factor to consider when attempting to bolster the number of individuals entering the STEM workforce (Tyler-Wood, Knezek, & Christensen, 2010; Wang, 2013). Many variables can influence students' STEM career interest such as their sense of identity, values, and self-efficacy (Estrada, Hernandez, & Schultz, 2018). Given the need to foster students' STEM career interest, researchers in the present study chose to examine students' self-efficacy toward mathematics and science. In particular, the researchers investigated the relationship between students' science and mathematics self-efficacy and STEM career interest through a path analysis.

Self-Efficacy

In the area of STEM education research, self-efficacy, achievement, and career interest are prevalent topics of discussion. Within an academic context, self-efficacy refers to a student's beliefs and self-confidence regarding how capable he or she is at performing or succeeding in specific academic tasks and activities (Bandura, 1986; Pajares & Graham, 1999). Previous research has indicated that students' self-efficacy is highly correlated with their academic achievement, engagement, effort, motivation, course selection, and future career choice (Bandura, 1997; Webb-Williams, 2018; Wigfield & Eccles, 2000; Zimmerman, 2000). In addition, findings have shown that students with high self-efficacy are more successful at developing and adhering to a work schedule, checking their progress, and setting academic goals when compared to students with average or below average self-efficacy (Zimmerman & Bandura, 1994). There are important connections between a student's self-efficacy, achievement, career interest, and future decisions.

Self-efficacy in mathematics. Students' mathematics self-efficacy has been found to influence their understanding and learning of mathematics. Within a mathematics context, self-efficacy is defined as an individual's judgment of his or her capability to solve mathematics problems, to perform mathematics-related tasks, or to succeed in mathematics-related courses (Betz & Hackett, 1983). Mathematics self-efficacy has been linked to a variety of positive learning outcomes for students such as improved mathematics achievement and effective problem-solving skills (Betz & Hackett, 1983). In fact, students with high mathematics self-efficacy have been found to demonstrate more efficient problem solving and greater persistence when solving difficult mathematics problems than students with average or below average mathematics self-efficacy (Hoffman & Schraw, 2009). Moreover, the positive learning outcomes resulting from higher mathematics self-efficacy have been shown to influence students' selection of advanced mathematics courses, choice of college major, and interest in particular careers (Lopez, Lent, Brown, & Gore, 1997; Pajares, 2005). Strong links between a student's mathematics self-efficacy and mathematics achievement exist.

Self-efficacy in science. Science self-efficacy differs from mathematics self-efficacy in terms of context (i.e. science context vs mathematics context); however, science self-efficacy also refers to a student's judgment of his or her capabilities to solve and perform tasks or activities (Aurah, 2017). Although the findings vary, most research has shown a significant correlation between science self-efficacy and science achievement (Aurah, 2017; Juan, Reddy, & Hannan, 2014; Pajares, 2002; Sabah & Hammouri, 2010; Singh, Granville, & Dika, 2002). Furthermore, when positive (i.e., high self-efficacy and high science achievement), the relationship has been found to be strongly associated with students' decisions to pursue science-related majors and careers (Britner & Pajares, 2006; Lyons, 2006). Findings have indicated that improved science self-efficacy may translate into higher levels of enjoyment when engaging in science, which could influence the level of commitment, motivation, and effort students invest into learning school science (Hassan, 2008; Juan et al., 2018). Self-efficacy has been shown to be one of the most influential subcomponents of affect in terms of its impact on the science and mathematics success of students (Kesan & Kaya, 2018). Science self-efficacy has a significant influence on students' success in science courses and their overall career trajectory.

Mathematics Self-Efficacy and STEM Career Interest

There is a relationship between students' mathematics self-efficacy and their interest in STEM careers. This relationship between mathematics self-efficacy and STEM career interest is established through several other student-variable relationships. To illustrate, some researchers have argued that mathematics self-efficacy is correlated with achievement in mathematics courses (Kesan & Kaya, 2018). Moreover, mathematics achievement has also been shown to predict students' success and persistence in other STEM-related courses (Rask, 2010; Singh, Granville, & Dika, 2002; Tyson, Lee, Borman, & Hanson, 2007). These relationships between the variables of mathematics self-efficacy, mathematics achievement, and success and persistence in STEM-related courses play a critical role in influencing students' interest in STEM career pathways (Kesan & Kaya, 2018; Rask, 2010; Tyson, Lee, Borman, & Hanson, 2007; Wang, 2013). Those students who possess high mathematics self-efficacy were found to have higher mathematics achievement, exhibit greater persistence in STEM-related courses, and be more successful in STEM pathways than students who possessed average or low levels of mathematics self-efficacy. These factors (i.e., success in mathematics and STEM courses, persistence, etc.) cumulatively fostered students' interest in STEM careers (Kesan & Kaya, 2018; Rask, 2010; Singh, Granville, & Dika, 2002; Tyson, Lee, Borman, & Hanson, 2007; Wang, 2013). By contrast, students with low mathematics self-efficacy were less likely to express interest in pursuing STEM career pathways (Jones, 2015; Lent & Hackett, 1987). Therefore, identifying and implementing strategies that will foster students' mathematics self-efficacy may play a critical role in developing and maintaining students' interest in STEM academic and career pathways.

Science Self-Efficacy and STEM Career Interest

Researchers have also examined science self-efficacy in relation to students' science achievement and desire to pursue STEM careers. Prior research has indicated there is a positive correlation between students' science self-efficacy and persistence in STEM courses, both of which are correlated to interest in entering a STEM career (Chemers, Zurbriggen, Syed, Goza, &

Bearman, 2011; Estrada, Woodcock, Hernandez, & Schultz, 2011; Robnett, Chemers, & Zurbriggen, 2015). Students who reported having high self-efficacy toward science, combined with identifying as a scientist and upholding STEM values (e.g. empathy, curiosity, passion, imagination, etc.), were more likely to sustain their interest in both STEM fields and careers (Chemers et al., 2011; Estrada et al., 2011; Estrada et al., 2018; Hernandez et al., 2018; Robnett et al., 2015). In other words, students who had higher self-efficacy toward science were more likely to consider a STEM career (Estrada et al., 2011). Conversely, students who exhibited low self-efficacy beliefs toward science were less likely to choose careers within STEM-related disciplines (Webb-Williams, 2018). Science self-efficacy plays a vital role in predicting students' interest in STEM careers.

Although prior research has indicated that there is a connection between self-efficacy and interest in STEM careers, the specific relationship between self-efficacy and student career interest across the individual STEM disciplines remains unclear. In particular, there have been few studies in which researchers examined the relationship between science and mathematics self-efficacies and specific STEM disciplines. Therefore, researchers in the current study aimed to explore the relationship between students' interest in careers within and across the individual STEM disciplines in relation to their mathematics and science self-efficacy.

Methodology

Researchers conducted a quasi-experimental study to explore the relationship between students' mathematics and science self-efficacy and their interest in pursuing a STEM career. To determine how self-efficacy toward science and mathematics influenced students' career interest across STEM disciplines, data were analyzed using path analysis. The following research questions guided the current study:

1. How does mathematics self-efficacy influence students' career interest in STEM across the STEM disciplines?
2. How does science self-efficacy influence students' career interest in STEM across the STEM disciplines?

Participants

For this study, researchers used a convenience sample that included 38 middle school students and 177 high school students who attended a two-week STEM summer camp at a research-intensive university. The camp was an open-enrollment STEM summer camp, and the students either self-selected to attend or had parents who registered them for the camp. Therefore, it can be assumed that a portion of the participants already had an interest in STEM pathways prior to the camp. The students were from various places in the United States (97%) and internationally (3%). The ethnic backgrounds of the sample included 116

Caucasians (54%), 49 Hispanics (23%), 27 Asians (13%), 7 African Americans (3%), and 16 who identified as other (7%). The sample compared favorably to the United States population, with a noted difference that African Americans were slightly underrepresented in the sample. The sample included 94 females (44%) and 121 males (56%).

Instrument

Students were administered two surveys prior to attending the STEM summer camp (see Appendix). The first survey, the STEM Career Interest survey (Tyler-Wood, Knezek, & Christensen, 2010), consisted of 12 items and measured students' level of interest in pursuing a STEM-related career. The second survey, Student Attitudes toward STEM (S-STEM) (Friday Institute for Educational Innovation, 2012), consisted of 30 items and measured both students' self-efficacy related to STEM and their interest in pursuing a STEM career. The two surveys included a Likert scale with ratings from strongly disagree (1) to strongly agree (5). Three of the items from the S-STEM survey were negatively worded (e.g. Math is hard for me), and the responses from these items were reverse-coded for the data analyses. For instance, if a student rated the negatively worded item a 1, the researchers reverse-coded the item score to a 5. The Career Interest survey was primarily designed to measure students' interest and attitudes toward science careers, and the S-STEM survey was more general and provided data on students' attitudes toward each of the specific STEM fields and careers (i.e. science, technology, mathematics, and engineering).

Factor analysis. To search for patterns of correlations (Henson, Capraro, & Capraro, 2004) among the 42 items, principal component exploratory factor analysis (EFA) was performed. The factor analysis was conducted using Statistical Package for the Social Sciences (SPSS) software version 25.

Factor analysis is often performed on studies with large sample sizes around 300 (Henson et al., 2004); therefore, because the sample size in the current study was smaller, the data were inspected to ensure that the data set could be factor analyzed. To determine if a data set can be factor analyzed, the data should meet three criteria: (a) the correlation matrix should have several correlation coefficients of .3 and above, (b) Bartlett's test of sphericity should be statistically significant ($p<.05$), and (c) the Kaiser-Meyer-Oklin (KMO) measure of sampling adequacy should be 0.6 or greater (Pallant, 2007). To determine if the data set in the present study adhered to the three criteria, a correlation analysis was performed. The correlation matrix showed that half of the coefficient indices were equal to or greater than .3. The KMO measure of the sampling adequacy resulted in a value of 0.912, and Bartlett's test of sphericity resulted in an approximate Chi-Square value of 6884.166 with $p<0.05$. The findings from the correlation analysis indicated that the data set in the present study was suitable for analysis.

After determining that the data set was suitable for factor analysis, the 42 survey items were subjected to an EFA using the extraction method principal component analysis (PCA) with Varimax rotation. Based on the results of the EFA, four components were formed: (a) interest in pursuing a science career (science career), (b) interest in pursuing a career in technology, engineering, or mathematics (TEM career), (c) mathematics self-efficacy, and (d) science self-efficacy. Of the 42 items, 12 items measured interest in a science career, 13 measured interest in TEM career, 7 measured mathematics self-efficacy, and 4 measured science self-efficacy. In addition, the factor analysis findings revealed that 6 items of the 42 items did not load or fit into the four components being analyzed in the current study, and those items were therefore not used. After conducting the factor analysis, the research team also read each of the remaining 36 items and evaluated whether the statements aligned to the four components in order to confirm that the items fit within the components. Then, measures of Cronbach's alpha were calculated for the four components, which ranged from 0.889 to 0.963. The components, along with the percent variance explained, Cronbach's alphas, and sample questions can be found in Table 1. New culminating variables were created using a mean score for all the questions within that component.

Based on the findings from the factor analysis, the researchers created a theoretical path model to represent the relationships between the following: (a) science self-efficacy (ScSE) and mathematics self-efficacy (MaSE), (b) ScSE and science career interest (SciCar), (c) MaSE and SciCar, (d) ScSE and technology, engineering, and mathematics career interest (TEMCar), and (e) MaSE and TEMCar (see Figure 1). The theoretical model in the present study was also supported by results from previous studies (Chemers et al., 2011; Estrada et al., 2011; Rask, 2010; Robnett et al., 2015; Tyson et al., 2007; Wang, 2013).

Statistical Analysis

Before conducting any analyses, data imputation was used to complete the data set. This process was necessary because six of the participants had missing data. However, the six participants were only missing responses to two or fewer items; therefore, a simple mean replacement was used because using the mean had the least possible negative consequences (Schlomer, Bauman, & Card, 2010). Missing values were replaced with the mean value of the participant's responses on all other questions in the related component.

After accounting for the missing data from the six participants, SPSS 25 was used to answer the research questions. First, the researchers calculated descriptive statistics for mathematics and science self-efficacies and interest in pursuing a STEM career. Then, the researchers conducted a path analysis to determine whether a predictor variable (mathematics and science self-efficacy) significantly predicted the outcome variable (science career and TEM career interest).

Table 1
Factor Analysis Results and Sample Questions

Components	% Variance Explained	Chron-bach α	Sample Questions
Science Self-efficacy	6.5%	0.852	- I am sure of myself when I do science. - I know I can do well in science. - I can handle most subjects well, but I cannot do a good job with science.**
Mathematics Self-efficacy	11.17%	0.889	- I could do advanced work in math. - I am good at math. - Math has been my worst subject.**
Science Career	23.12%	0.963	- I expect to use science when I get out of school. - I will need science for my future work. - I will have a successful professional career and make substantial scientific contributions.
TEM Career*	16.9%	0.927	- I will need a good understanding of math for my future work. - I am curious about how electronics work. - I believe I can be successful in a career in engineering.

Note: *Technology, Engineering, or Mathematics Career (TEM Car); **Results Reverse-Coded

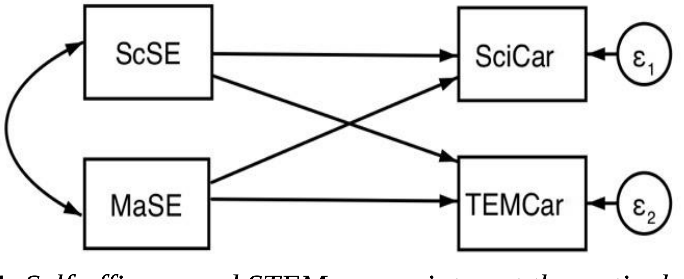

Figure 1. *Self-efficacy and STEM career interest theoretical path model.*

Results

In the present study, researchers conducted an EFA analysis that resulted in the division of student interest in STEM careers into two categories: interest in science careers and interest in TEM careers. This categorization of student interest in STEM careers allowed the researchers to examine how self-efficacy toward mathematics and science influenced students' career interest across the STEM disciplines. Researchers first ran descriptive statistics to determine the mean and standard deviation of the four component variables MaSE, SciSE, SciCar, and TEMCar (see Table 2). The results showed that the average science self-efficacy (x = 4.271) was higher than the average mathematics self-efficacy (x = 4.169). In addition, the average TEM career interest (x = 4.126) was higher than the average science career interest (x = 4.095).

Table 2

Descriptive Statistics of Measured Variables

Variable	$\bar{X}$	SD
MaSE	4.169	0.639
SciSE	4.271	0.599
SciCar	4.095	0.743
TEMCar*	4.126	0.645

Note: *Technology, Engineering, or Mathematics Career (TEM Car); Likert scale: 1 (strongly disagree) - 5 (strongly agree)

Path Analysis

To see if the proposed theoretical model was identifiable, researchers used the *t*-rule and null-*B* rule. Although the *t*-rule was satisfied, satisfying this rule alone was not sufficient to conclude that this model was identifiable. Thus, the researchers used the null-*B* rule, which provided a sufficient condition. Because the *B* matrix was zero, the researchers were able to conclude that the model was identifiable.

After the researchers determined the model was identifiable, a chi-square test and fit statistics were calculated and analyzed to examine the fit of the model. The chi-square test results were χ^2 =2.7, p = 0.1, which indicated a good fit. The researchers also calculated and examined both the standardized root mean square residual (SRMR), which was found to be 0.024, and the comparative fit index (CFI), which was found to be 0.990. The SRMR and CFI values suggested a good fit. In addition, the root mean squared error of approximation (RMSEA) was 0.089, which indicated a mediocre fit, but was very close to being a fair fit. Moreover, when the modification indices were run, all the modification indices were less than 3.84, which suggested no changes to the covariance of error terms. Thus, the model was found to be a good fit, and there was no statistical evidence to suggest otherwise.

The path analysis result (see Figure 2) showed that there was a strong relationship between science self-efficacy and mathematics self-efficacy, and the correlation between those two variables was statistically significant (p < .001). Moreover, the findings indicated that, on average, one standard deviation increase in science self-efficacy would result in a 0.77 standard deviation increase in science career interest. In addition, on average, one standard deviation increase in science self-efficacy would result in a 0.34 standard deviation increase in TEM career interest. Both of these paths showed statistical significance ($p < .001$). Thus, the results indicated that there was a strong relationship between science self-efficacy and STEM careers.

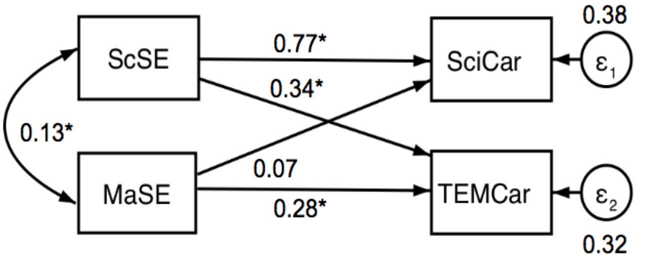

Figure 2. *Self-efficacy and STEM career interest model results *p<0.05.*

According to the path coefficient estimates, on average, one standard deviation increase in mathematics self-efficacy would result in a 0.28 standard deviation increase in TEM career interest, and this path showed statistical significance ($p < .001$). In comparison, on average, one standard deviation increase in mathematics self-efficacy would result in a 0.07 increase in science career interest. However, this path did not show statistical significance. Therefore, the results indicated that there was a strong relationship between mathematics self-efficacy and career interest in TEM; however, there was no significant relationship between mathematics self-efficacy and science career interest.

Although there was evidence of a relationship between science self-efficacy and STEM career interest and between mathematics self-efficacy and TEM career interest, the squared multiple correlations for each endogenous variable showed that 38% of the variance in science career could not be explained by the two predictors. However, the two predictors could predict science career interest by 62%. On the other hand, TEM career interest could be explained by the two predictors by 57%, but 43% of the variance in TEM career could not be explained by the two predictors.

Discussion

In the current study, researchers examined the influence students' self-efficacy in mathematics and science had on their interest in pursuing a STEM career after participating in a STEM summer camp. Prior research has shown that mathematics and science self-efficacy affect students' interest in STEM fields, and ultimately their desire to pursue a STEM career (Chemers et al., 2011; Estrada et al., 2011; Rask, 2010; Robnett et al., 2015; Tyson et al., 2007; Wang, 2013). In the current study, the results of the descriptive statistics allowed the researchers to conclude that participants had high self-efficacy toward both mathematics ($\bar{X} = 4.169$) and science ($\bar{X} = 4.271$). Furthermore, the results indicated that the participants were also highly interested in pursuing STEM careers. However, the sample in the current study consisted of students participating in a STEM summer camp, and these students likely had some degree of interest in STEM disciplines prior to the camp. Therefore, the nature of the sample may have influenced this result.

The researchers next examined the relationship between students' self-efficacy and their interest in pursuing a STEM career. The result of path coefficients showed that science self-efficacy had a strong relationship with students' interest in pursuing STEM careers. This finding aligns with results from previous research that indicated that students with higher science self-efficacy are more likely to pursue a STEM career (Chemers et al., 2011; Estrada et al., 2011; Estrada et al., 2018; Hernandez et al., 2018; Robnett et al., 2015). While students' science self-efficacy was statistically significantly correlated with interest in STEM careers, students' mathematics self-efficacy was statistically significantly correlated with TEM career interest. Mathematics self-efficacy also predicted students' science career interest, but the relationship between the variables did not indicate statistical significance. This result for the relationship between mathematics self-efficacy and career interest differs slightly from findings from previous research, in which mathematics self-efficacy was found to be highly correlated to STEM career interest (Chen, 2013; Jones, 2015; Lent & Hackett, 1987).

Although mathematics is an inextricable facet of many science careers, it is not necessarily applied within those careers to the same extent as the various subdisciplines of science. For instance, a biologist will likely use principles of mathematics throughout his or her career, but he or she will likely use mathematics, not as an end to itself but to complete a scientific task. Although the same could be said of technology and engineering in their relation to science careers, further research is needed to determine the reason for these results. It is possible that the secondary students in the present study lacked sufficient understanding of the applicability of mathematics in science careers, but other variables could have influenced these findings as well. Thus, secondary school students may not see the relationship between specific science careers and their self-efficacy toward mathematics. Furthermore, because researchers in previous studies examined students' interest in STEM careers as a whole, interdisciplinary unit, variation in students' career interest across STEM disciplines would have been difficult to identify. Moreover, the proposed theoretical model in the present study also aligned to previous research findings (Chemers et al., 2011; Estrada et al., 2011; Rask, 2010; Robnett et al., 2015; Tyson et al., 2007; Wang, 2013) and was tested and validated for goodness of fit.

There are several implications that can be derived from the findings of this study. First, if the U.S. intends to fill the growing number of job positions in the STEM job market, fostering students' science and mathematics self-efficacies is key. Researchers in the present study found a direct relationship between students' mathematics and science self-efficacies and their desire to pursue and sustain interest in STEM careers. Furthermore, although the present study demonstrates a connection between mathematics and science self-efficacy and STEM career interest, the findings merely lay the groundwork for several questions and variables that need to be investigated and addressed.

For instance, self-efficacy has been shown to be influenced by students' parental support as well as students' identity and values (Chemers et al., 2011; Hazari, Sonnert, Sadler, & Shanahan, 2010). More specifically, students' self-efficacy has been linked to parental support for pursuing mathematics and science academic and career pathways (Hazari et al., 2010; Turner, Steward, & Lepan, 2004). Therefore, the role of parental expectations in shaping students' mathematics and science self-efficacy merits additional investigation. In the context of the present study, the parental role could have been a significant influential factor for those students who did not self-select to attend the camp but instead had parents who enrolled them in the camp. It can be assumed that the parents who enrolled their students in the STEM camp expressed at least some degree of support in terms of encouraging their children to engage in STEM. Although previous findings have indicated that parental support in pursuing mathematics and science pathways has a positive influence on students' self-efficacy, further research should be done to examine what instances of parental support are effective in improving students' self-efficacy.

There are limitations to the present study. First, the participants were administered both surveys after engaging in a two-week STEM summer camp, and any potential influence of the camp was neither controlled for nor measured in the present study. Previous research has indicated that self-efficacy may be altered by students' personal experiences of mathematics and science (Estrada, Hernandez, & Schultz, 2018); therefore, engagement in a STEM summer camp may have influenced the students' self-efficacy and responses. Furthermore, most students chose to attend this STEM summer camp, therefore indicating a prior interest in STEM pathways that could have influenced responses on the surveys. In addition, the surveys used in the present study did not allow for the separate analysis of students' career interest in each of the STEM disciplines. Although the Career Interest survey used in this current study allowed the researchers to measure items specifically related to science careers, it may be beneficial for researchers to create surveys that allow for the measurement of students' career interest specifically related to mathematics, technology, or engineering careers. Surveys designed to measure students' interest in each of the specific STEM fields would enable educators and researchers to gain additional insight into students' desire to pursue these specific STEM fields. This will allow researchers to look more closely at how science and mathematics self-efficacies influence specific STEM career interests.

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Appendix
Likert scale: 1 (strongly disagree) - 5 (strongly agree)

Student Attitudes toward STEM (S-STEM) Survey
Q1 Math is important for my life.
Q2 Math has been my worst subject.
Q3 I would consider choosing a career that uses math.
Q4 Math is hard for me.
Q5 I will need a good understanding of math for my future work.
Q6 I am the type of student to do well in math.
Q7 I can handle most subjects well, but I cannot do a good job with math.
Q8 I am sure I could do advanced work in math.
Q9 I can get good grades in math.
Q10 I am good at math.
Q11 I am sure of myself when I do science.
Q12 I would consider a career in science.
Q13 I expect to use science when I get out of school.
Q14 Knowing science will help me earn a living.
Q15 I will need science for my future work.
Q16 I know I can do well in science.
Q 17 Science will be important to me in my life work.
Q18 I can handle most subjects well, but I cannot do a good job with science.
Q19 I am sure I could do advanced work in science.
Q20 I like to imagine creating new products.
Q21 If I learn engineering, then I can improve things that people use every day.
Q22 I am good at building and fixing things.
Q23 Understanding engineering concepts will help me earn a living.
Q24 I am interested in what makes machines work.
Q25 Designing products or structures will be important for my future work.
Q26 I am curious about how electronics work.
Q27 I would choose a career that involves building things.
Q28 I would like to use creativity and innovation in my future work.
Q29 Knowing how to use math and science together will allow me to invent useful things.
Q30 I believe I can be successful in a career in engineering.

STEM Career Interest Survey
1. I would like to have a STEM-related career.
2. My family is interested in the STEM courses I take.
3. I would enjoy a STEM-related career.
4. My family has encouraged me to study STEM curriculum.
5. I will go to college and major in an area needed for a STEM-related career.

6. I will graduate with a college degree in a major area needed for a STEM-related career.
7. I will have a successful professional career and make substantial contributions towards STEM.
8. I will get a job in a STEM-related field.
9. Some day when I tell others about my career, they will respect me for doing work in STEM.
10. A STEM-related career would enable me to work with others in meaningful ways.
11. Engineers and scientists make a meaningful difference in the world.
12. Having a STEM-related career would be challenging.

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Acknowledgements: Thanks to Drs. Luciana Barroso, Mary Margaret Capraro, Robert M. Capraro, and the Aggie STEM team for providing the data used for this study.

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