What Role Does Mathematics Play in Accounting Performance? - A Focus on Students' Beliefs and Attitudes

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Many colleges require accounting majors to take some math courses as prerequisite courses before they can take accounting courses – a common approach which seems to be accepted by many professors. However, it is unclear if accounting students have the same perspective. This study examined students' attitudes toward mathematics, and beliefs in mathematics' influence on accounting learning. It also explored how these two factors correlate to students' scores in accounting courses. This study found that students believed that being good at math is a necessary, but not a sufficient, condition for performing well in accounting. Students who performed well in accounting usually showed a relatively positive attitude towards math.

INTRODUCTION

Accounting is a very popular major in college in the United States. According to Stockwell (2014), in 2014 accounting is among the most popular 10 majors in the United States. Moreover, besides accounting majors, there are many non-accounting majors taking accounting courses, such as business administration majors, economic majors, and non-business majors. Like many other disciplines, such as physics, chemistry, and natural resources, there is a common requirement for accounting students to have a certain level of mathematics ability (often determined by math placement test or their ACT or SAT scores) before they can formally start to take accounting courses. Accounting students are often required to take some college level mathematics classes, such as calculus I (or an equivalent mathematics course) as a prerequisite course.

Considering the large amount of numerical operations in accounting, to implement a moderate level of requirements in mathematics for accounting students seems to be well-grounded. This is a common perspective shared by some college professors or researchers (Brown, 1962; Collier & McGowan, 1989). However, it is unclear if accounting students hold the same perspectives as their professors. That is, how accounting students perceive the role of mathematics in their accounting learning remains largely unexplored, including what students' attitudes toward mathematics are, and what kind of beliefs

accounting students have in mathematics' influence on accounting learning and how these beliefs and their attitudes towards mathematics relate to their performance in accounting courses. This study aims to address these questions.

Research Questions

In this study, we will address the following research questions:

1. What are accounting students' attitudes towards mathematics?
2. What are accounting students' beliefs in mathematics' influence on accounting learning?
3. How are accounting students' attitudes and beliefs regarding mathematics connected to their accounting performance?
4. Is there any difference in how accounting students' attitudes and beliefs regarding mathematics are connected to their accounting performance between high and low achievers?

LITERATURE REVIEW

Considering the large number of students majoring in accounting, it is important to examine elements that can enhance those students' success in their accounting learning, such as if prerequisites courses (such as college algebra and calculus) are needed, and when is a good time for students to take accounting courses. For example, Collier & McGowan (1989) argues that "it is important to try to determine whether a student can be successful in an academic program … students could have better counselling if advisors could identify the knowledge, skill and abilities necessary for successful completion of an academic program." Fedoryshyn et al. (Fedoryshyn, O'Brien, Hintz, & Bosner, 2010) suggested that "The overall quality of an introductory accounting course should improve if students take the course later in their college career."

Researchers have examined how different factors, such as gender, Grade Point Average (GPA), American College Testing (ACT), and mathematics background can predict a students' performance in accounting courses. For example, many studies (Dockweiler & Willis, 1984; Fedoryshyn et al., 2010; Gist, Goedde, & Ward, 1996; Ingrain & Petersen, 1987; Phillips, 2015) found that student's GPA is a positive predictor of performance in accounting courses. For example, Dockweiler and Wills (1984) claim that a student's Grade Point Average (GPA) is the single best factor for predicting success in future coursework.

Besides GPA, some studies found that students with high standardized test scores (such as ACT and SAT) are more likely to achieve better in accounting courses (Booker, 1991; Doran & Bouillon, 1991; Fedoryshyn et al., 2010; Gist et al., 1996).

Some studies examined how students' mathematics background influence their accounting courses performance but the findings from these studies are often inconsistent. According to Burdick and Schwartz (1982) student's performance in mathematics courses (including algebra and calculus) cannot significantly predict student's performance in accounting courses. Similarly, Fedoryshyn et al. (2010) found that arithmetic reasoning did not explain a major portion of the final course average of accounting courses. Nevertheless, some other studies (Clark & Sweeney, 1985; Collier & McGowan, 1989) found that student's mathematics preparation is positively linked to the accounting coursework performance. For example, Collier and McGowan (1989) concluded that a "Grade in College Algebra and Math pretest score measure two different sets of cognitive abilities and that both computational and college algebra skills and abilities are necessary for success in professional accounting coursework." (p. 84) Collier and McGowan (1989) found that students with higher performance in mathematics are more likely to succeed in intermediate accounting courses. Gist et al. (1996) found that a B or better performance in a Calculus class was critically related to successful performance of Black students in accounting coursework. Clark and Sweeney (1985) concluded that college mathematics grades were a good predictor of success in accounting. Yunker, Yunker, and Krull (2009) also found an incremental effect of mathematics ability on student performance in principles of accounting. Despite these inconsistent findings of students' mathematics background and their performance on their accounting courses, researchers paid little

attention to the accounting students' attitude towards mathematics and their beliefs of mathematics' role in their accounting learning.

There is very limited literature which examined students' attitudes or beliefs toward mathematics and the relationship between accounting learning. Shotwell (1999) conducted an analysis of business and non-business students' performance in financial accounting and examined students' attitudes toward math. She found that "thirty-seven percent (37%) of business students and thirty-one percent (31%) of non-business students surveyed indicated that math is one of their favorite subjects. Twenty-seven percent (27%) and twenty-three 23%, respectively, indicated that they perform well in courses that have math. However, 22% and 23%, respectively, indicated that math is their least favored subject, and 10% and 12%, respectively, responded that math intimidates them and that they try to avoid the subject." However, this study fails to address if the students have positive attitudes towards in mathematics are the ones who do well in their financial accounting courses.

METHODOLOGY

Sample

This study was conducted at a four-year college in the Midwest area of the United States. The interest of this study is to look at student's attitudes towards math and their beliefs in the relationship between math and accounting. Therefore, students who are taking accounting courses at this university were selected as the population of this study. The sample of this study is the portion of accounting students who participated in the survey. Data collection for this research project consists of the following three steps:

Step 1, a survey invitation was sent out to students who were enrolled in an entry-level or intermediate accounting course, such as introductory financial accounting, introductory managerial accounting, intermediate financial accounting I & II, and cost accounting. Participants completed a consent form to take the study and were invited to finish a survey (23 questions) online towards the end of a semester. The same survey invitation was sent out during spring 2017, fall 2017, and spring 2018 semesters, to a total of 726 student counts. 462 responses were received. The response rate is 63.6%. Some students took the same survey in multiple semesters. In this case, only the survey responses from the earliest semester were kept for these students. All unfinished surveys were excluded from data analysis.

After cleaning the survey data, our sample consists of 422 undergraduate students. Participants are 22% (93) accounting majors, 40.8% (172) business administration majors, 4.3% (18) economics majors, and 32.9% (139) non-business majors. Entry-level accounting courses, such as introductory financial accounting and introductory managerial accounting, are required for all School of Business and Economics students. Intermediate financial accounting I is required for both accounting major and minor students. Intermediate financial accounting II and cost accounting are only required for accounting major students. So, the selection of courses covered a wide range of students in different majors yet minimized duplicated responses from accounting students. There are 198 (47%) female students and 224 (53%) male students.

Step 2, survey participants' final grades in accounting courses were collected from instructors when each semester ended. For those students who have taken the same survey in different semesters, only the accounting grades from the earliest semester were kept. No missing values were found in students' final accounting grades.

Step 3, survey participants' ACT math section scores were retrieved from the university's registrar's office. ACT math scores were available for 322 out of the total 422 respondents. Some students took SAT instead of ACT, and some students have neither of the two scores available.

Survey

To answer the three proposed research questions, an online survey was conducted through Qualtrics to collect necessary data from students enrolled in accounting courses at this university. There are 23

questions in the survey. A copy of the survey is included in the Appendix. Students' demographics data, attitudes towards math and beliefs in the relationship between math and accounting were collected in the survey. As presented in Figure 1, 14 questions were asked on students' attitudes towards mathematics.

FIGURE 1
ATTITUDES TOWARDS MATH

	1	2	3	4	5
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
1. I like mathematics	O	O	O	O	O
2. Mathematics is one of my favorite subjects	O	O	O	O	O
3. Usually, I do very well in mathematics	O	O	O	O	O
4. I always enjoy mathematics classes	O	O	O	O	O
5. I consider mathematics is important in my life	O	O	O	O	O
6. I think mathematics is useful	O	O	O	O	O
7. Mathematics is interesting to me	O	O	O	O	O
8. Generally speaking, mathematics is easy for me	O	O	O	O	O
9. Mathematics is a very difficult subject for me	O	O	O	O	O
10. If possible, I want to avoid any mathematics classes	O	O	O	O	O
11. I am always nervous about mathematics	O	O	O	O	O
12. I am always nervous about courses related to mathematics	O	O	O	O	O
13. I don't consider myself as a math person	O	O	O	O	O
14. I don't think I need much mathematics in my life	O	O	O	O	O

Question 1 through 8 are positive attitude questions, while question 9 through 14 are negative attitude questions. To be consistent, reverse coding was performed on the negative attitude questions before calculating the attitudes mean. For example, if a student chose somewhat disagree (2) with question 9 Mathematics is a very difficult subject for me, after reverse coding, it will change to somewhat agree (4) with Mathematics is not a very difficult subject for me.

To investigate student's beliefs in usefulness of mathematics in accounting learning, six questions were asked in the survey, as shown in Figure 2.

FIGURE 2
BELIEFS IN THE USEFULNESS OF MATH

	1 Strongly disagree	2 Somewhat disagree	3 Neither agree nor disagree	4 Somewhat agree	5 Strongly agree
1. Mathematics is important for accounting learning	O	O	O	O	O
2. My previous knowledge of mathematics helps me to learn accounting	O	O	O	O	O
3. If I have better mathematics ability, it would be helpful to my accounting learning	O	O	O	O	O
4. If a student is not doing well in accounting, that is because that student is not good at mathematics.	O	O	O	O	O
5. I don't think I need much mathematics in accounting	O	O	O	O	O
6. I think mathematics doesn't matter in accounting	O	O	O	O	O

Question 1 through 4 are positive beliefs questions, while question 5 and 6 are negative beliefs questions. To be consistent, reverse coding was performed on the negative beliefs questions before calculating beliefs mean.

Variables

The following variables are used in this study:

Accounting final grade: accounting final grade was collected from accounting instructors at the end of each semester. If a respondent was enrolled in multiple accounting courses, the final grade from the smallest accounting course number was kept for consideration. For exam, if a respondent enrolled in both Acct 310 Intermediate Financial Accounting and Acct 321 Cost Accounting, the final grade from Acct 310 Intermediate Financial Accounting would have been used in the multiple regression analysis. This is consistent with our selection decision on earlier survey responses were kept, since usually the smaller the course number, the earlier the students would take them. The accounting final grade is controlled for instructors in the regression model.

ACT math section score: ACT math section scores were retrieved from the university's registrar's office.

Attitudes mean: arithmetic mean of the 12 attitudes measures.

Beliefs mean: arithmetic mean of the six beliefs measures.

Gender: students were asked to choose from female, male, gender identity not listed, or prefer not to answer.

Major: students were asked to identify themselves as accounting, business administration and economics major students, or as non-business major students. There are some students that are majoring in multiple subjects. In this case, one major was picked to represent each student based on the reclassification criteria presented in Appendix II. This decision is made based on the course requirements for each major. In the School of Business and Economics (SBE), three majors are offered, accounting, business administration and economics. Accounting and economics major students are required to take all the business administration core courses plus the core course from accounting or economics. Therefore, if a student double-majors in accounting and any other major, accounting was picked as the student's major. If a student double majors in economics or any other major, accounting was picked as the student's major. And if a student double majors in business administration and another non-business major, business

administration was picked as the student's major. If none of a student's majors is from SBE, then that student was classified as non-business.

Instructor: instructor information was collected from university timetable.

T Tests

To answer research question 1, T-tests were chosen to examine whether there is any difference in attitudes towards math between female and male students, as well as among different majors. Respondents were also divided into four groups based on their ACT math section score, then bottom 25% and top 25% of respondents are compared in terms of their attitudes towards math. The same T-tests are applied to beliefs measures to answer research question 2.

Multiple Linear Regression

Multiple linear regression is employed to answer the third research question, to investigate how are accounting students' attitudes and belief regarding math connected to their accounting performance. Student's final accounting grade is the dependent variable. Student's attitude towards math and beliefs in the usefulness of math in accounting learning are independent variables. Gender, major, instructor, and ACT math section score are included in the original model as control variables. Therefore, the proposed model is:

Model 1

$$final\ grade = \beta_0 + \beta_1 ACT_{math} + \beta_2 attitudes_{mean} + \beta_3 beliefs_{mean} + \beta_4 gender + \beta_5 major + \beta_6 instructor_{ID} + \varepsilon \quad (1)$$

RESULTS

Students were asked to respond to 14 questions on their attitudes towards mathematics, and six questions on their beliefs in the usefulness of mathematics. The results revealed a positive relationship between a student's attitude towards mathematics and accounting performance. However, no significant general relationship was found between a student's belief in the usefulness of mathematics and accounting performance. Students agreed that their previous mathematics knowledge was help in accounting learning. However, they did not believe that they were not doing well in accounting because they were not good at math.

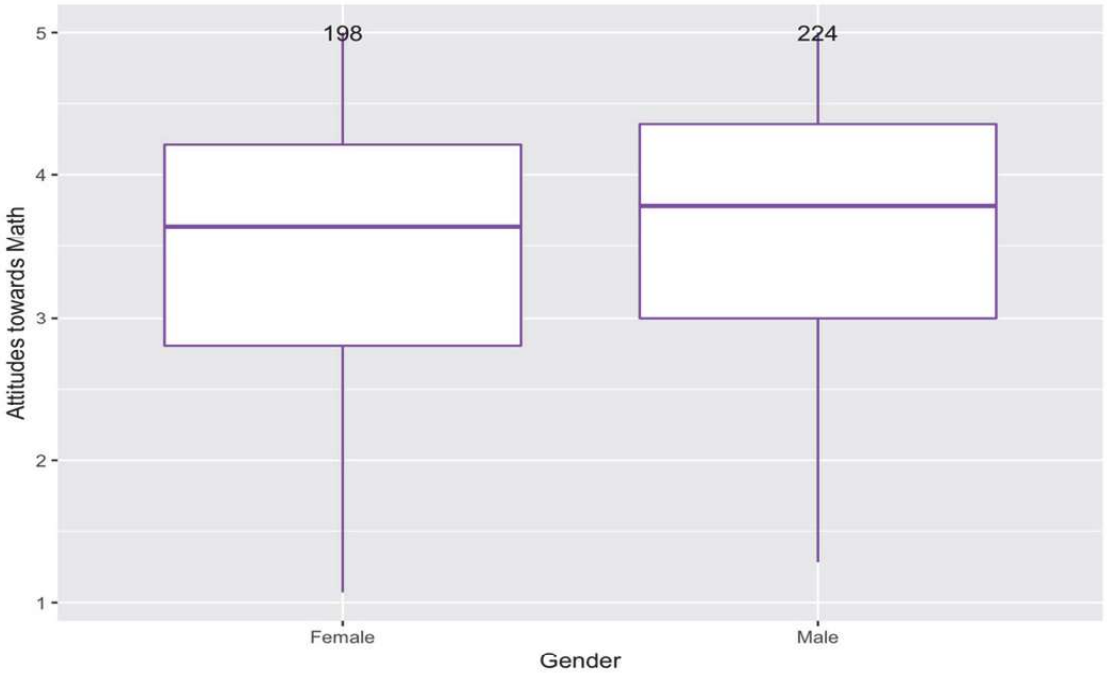
T Tests

Attitudes

Alpha value is calculated to examine the internal consistency of attitudes related questions. The Alpha value is 0.953, which indicates a high reliability. Therefore, an attitudes mean measure is calculated to represent the 14 individual attitudes questions.

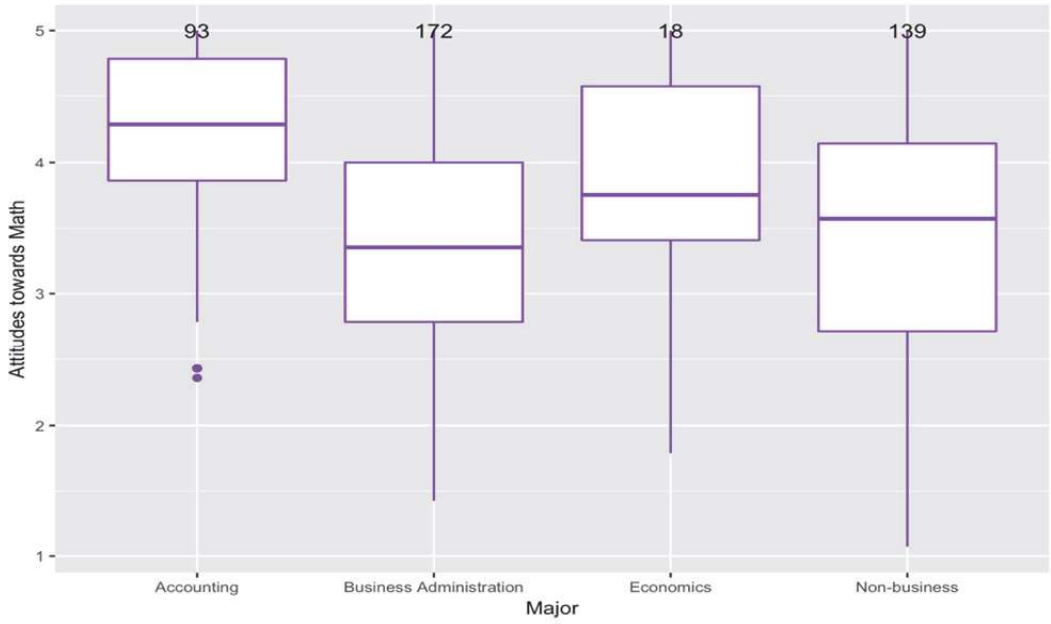
By gender. The attitudes difference between female and male students was first investigated. However, as shown in Figure 3, the median difference is not very significant with means of 3.48 for female and 3.62 for male students.

FIGURE 3
ATTITUDES TOWARDS MATH BY GENDER



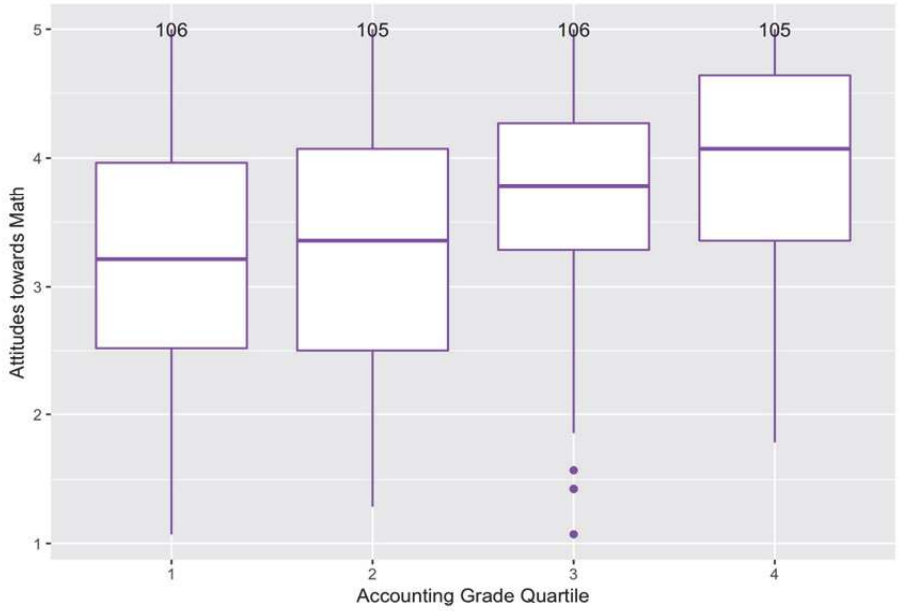
By major. Students' attitudes towards math differ by their majors. As depicted in Figure 4, accounting major students have the most positive attitudes towards math with a mean of 4.17, while business administration major students have the least positive attitudes towards math with a mean of 3.34. The difference of these two means is statistically significant at 0.01 level.

FIGURE 4
ATTITUDES TOWARDS MATH BY MAJOR



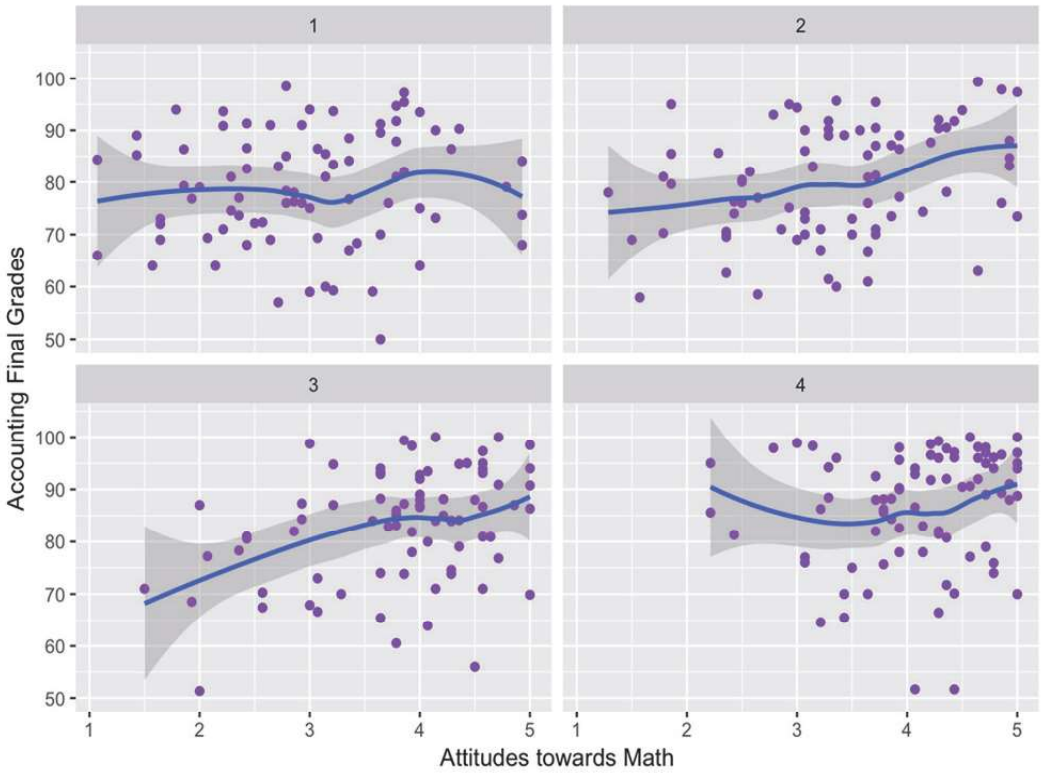
By accounting grade quartile. Students' attitudes towards math may also differ by their performance in accounting courses. To examine how students' attitudes towards math may differ at different accounting performance level, respondents are divided into four quartiles based on their accounting final grades. As shown in Figure 5, the top 25% best performers in accounting courses have the most positive attitudes towards math with a mean of 3.95, while the bottom 25% best performers in accounting courses have the least positive attitudes towards math with a mean of 3.26. The difference of these two means is statistically significant at 0.01 level.

FIGURE 5
ATTITUDES TOWARDS MATH BY ACCOUNTING GRADE QUARTILE



By ACT Math Score Quartile. The result from previous T test has shown that students' attitudes towards math differ significantly by their performance in accounting courses. However, Students' mathematics capabilities might also interact with their attitudes. Therefore, the respondents were divided into four quartiles based on their ACT math section scores. Then the relationship between students' attitudes towards math and their performance in accounting courses was reexamined by ACT math score quartiles. As presented in Figure 6, as the students' ACT math scores increases, the responses are clustered more closely to the upper right corner of the graph, which means the students have more positive attitudes towards math, and generally perform better in accounting courses. The top 25% best performers in ACT math section have the most positive attitudes towards math with a mean of 3.95, while the bottom 25% best performers in ACT math section have the least positive attitudes towards math with a mean of 3.21. The difference of these two means is statistically significant at 0.01 level.

FIGURE 6
ATTITUDES TOWARDS MATH BY ACCOUNTING AND ACT MATH QUARTILE

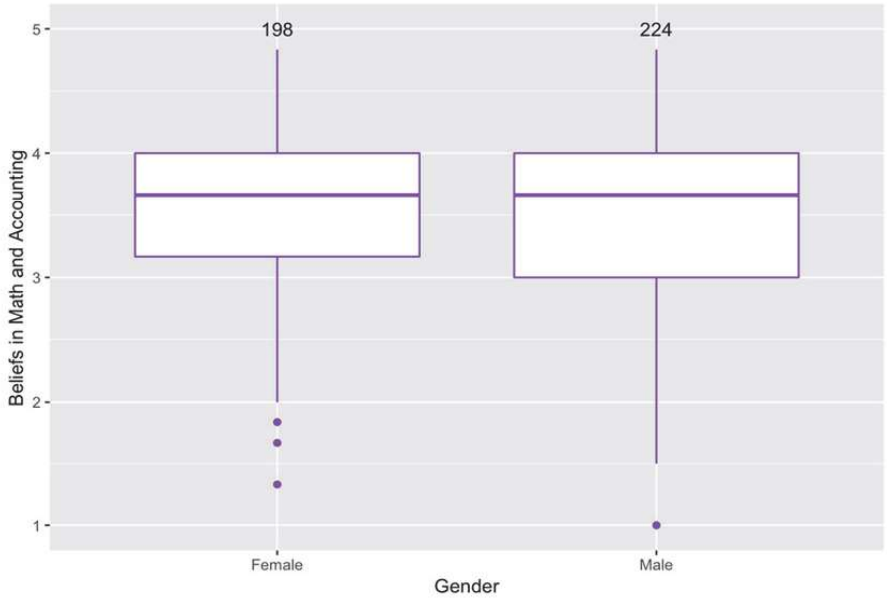


Beliefs

The Alpha value was calculated to examine the internal consistency of the beliefs related questions. The Alpha value is 0.752. Although not as high as the attitudes measure, it still indicates an acceptable reliability level. Therefore, a belief mean measure is calculated to represent the 6 individual beliefs questions.

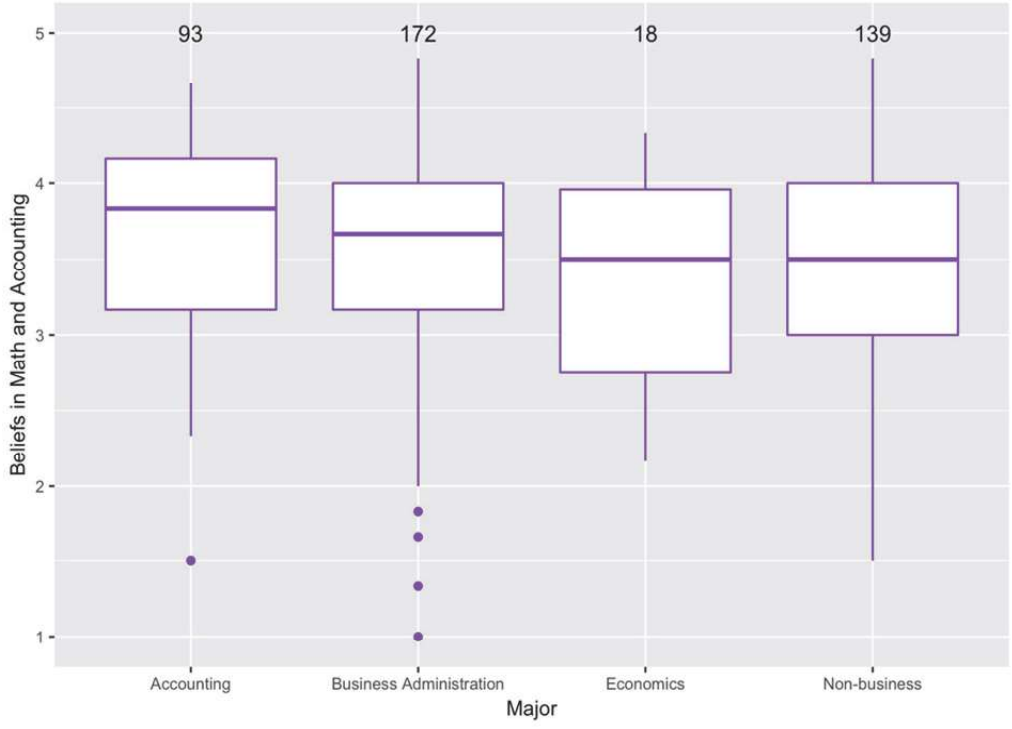
By gender. The beliefs difference between female and male students was first investigated. However, as shown in Figure 7, the median difference is not very significant with means of 3.55 for female and 3.47 for male students.

FIGURE 7
BELIEFS IN USEFULNESS OF MATH IN ACCOUNTING BY GENDER



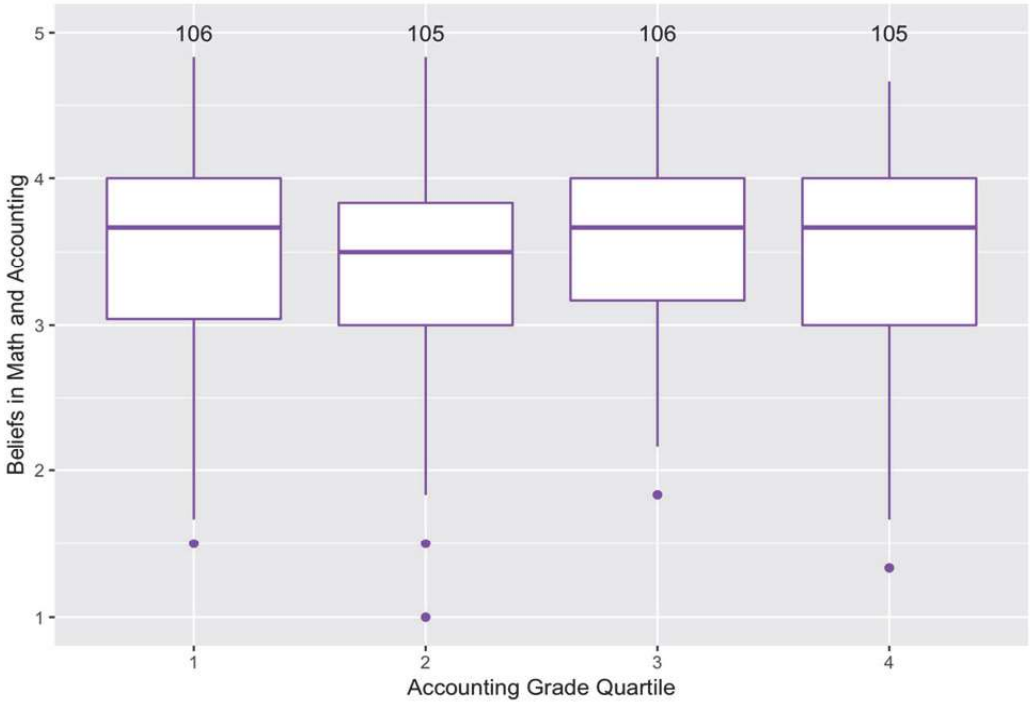
By major. Students' beliefs towards math differ by their majors. As depicted in Figure 8, accounting major students have the strongest beliefs in the usefulness of math in accounting with a mean of 3.63. However, it is not statistically significant from students majoring in other subjects at the 0.01 level.

FIGURE 8
BELIEFS IN USEFULNESS OF MATH IN ACCOUNTING BY MAJOR



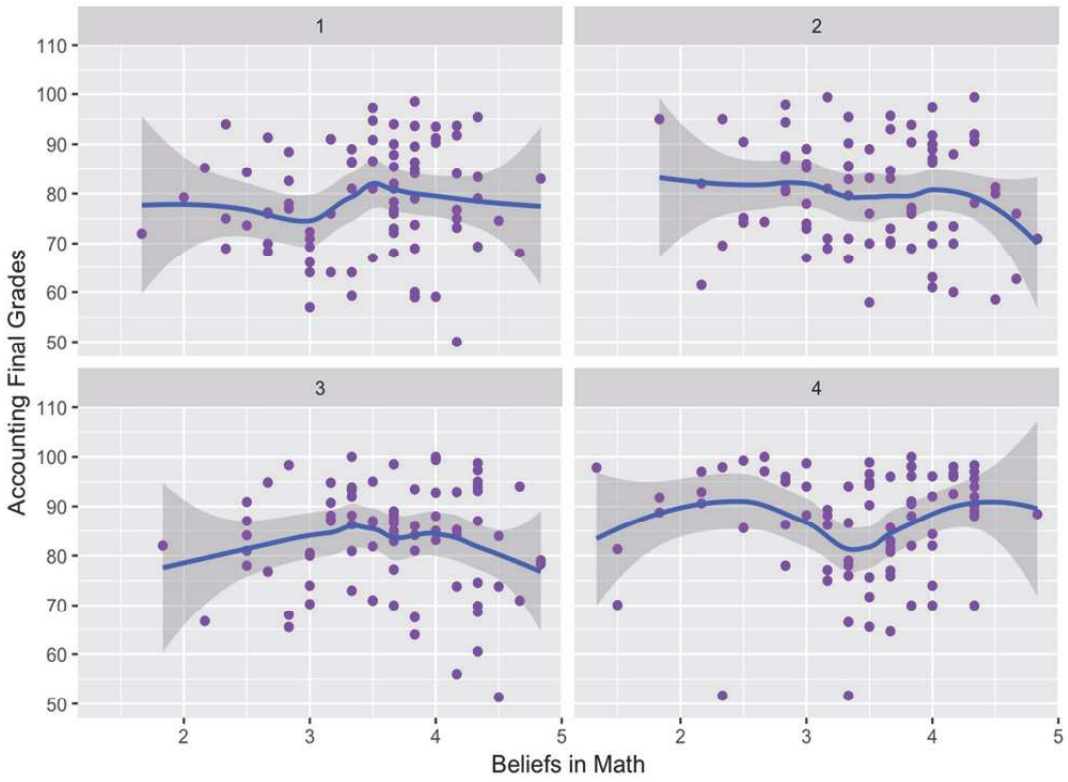
By accounting grade quartile. Students' beliefs in the usefulness of math in accounting may also differ by their performance in accounting courses. To examine how students' beliefs in the usefulness of math in accounting may differ at different accounting performance levels, respondents are divided into four quartiles based on their accounting final grades. However, as shown in Figure 9, students' beliefs in the usefulness of math in accounting do not differ that much at different accounting performance levels.

FIGURE 9
BELIEFS IN USEFULNESS OF MATH IN ACCOUNTING BY ACCOUNTING GRADE QUARTILE



By act math score quartile. Figure 10 presents how students' mathematics capabilities might interact with the relationship between their beliefs in the usefulness of math in accounting and their accounting performance. Therefore, the respondents were divided into four quartiles based on their ACT math section scores. Then the relationship between their beliefs in the usefulness of math in accounting and their accounting performance was reexamined by ACT math score quartiles. As presented in Figure 10, there is no significant pattern in the response distribution across four ACT math score quartiles.

FIGURE 10
BELIEFS IN USEFULNESS OF MATH IN ACCOUNTING BY ACCOUNTING AND ACT MATH QUARTILE



Multiple Linear Regression

Correlation

Correlations were first examined before performing multiple linear regression analysis. The correlation between a student's accounting final grade and the student's mean attitudes response is 0.32. However, the correlation between a student's accounting final grade and the student's mean beliefs response is only 0.02. The lower correlation between grade and beliefs confirms the lower alpha value of the beliefs values. "Usually I do very well in mathematics", "Generally speaking mathematics is easy for me", and "Mathematics is not a very difficult subject for me" have the strongest correlation (cor > 0.3) with accounting final grade among attitudes measures. The correlation between accounting final grades and beliefs measures are mixed. "If a student is not doing well in accounting, that is because that student is not good at mathematics" has a negative correlation (-0.31) with accounting final grade, while "My previous knowledge of mathematics helps me to learn accounting" has a positive correlation (0.14) with accounting final grade. A student's ACT math score has a relatively strong correlation with the student's final accounting grade.

FIGURE 11
CORRELATION BETWEEN ATTITUDES MEASURES AND FINAL GRADE

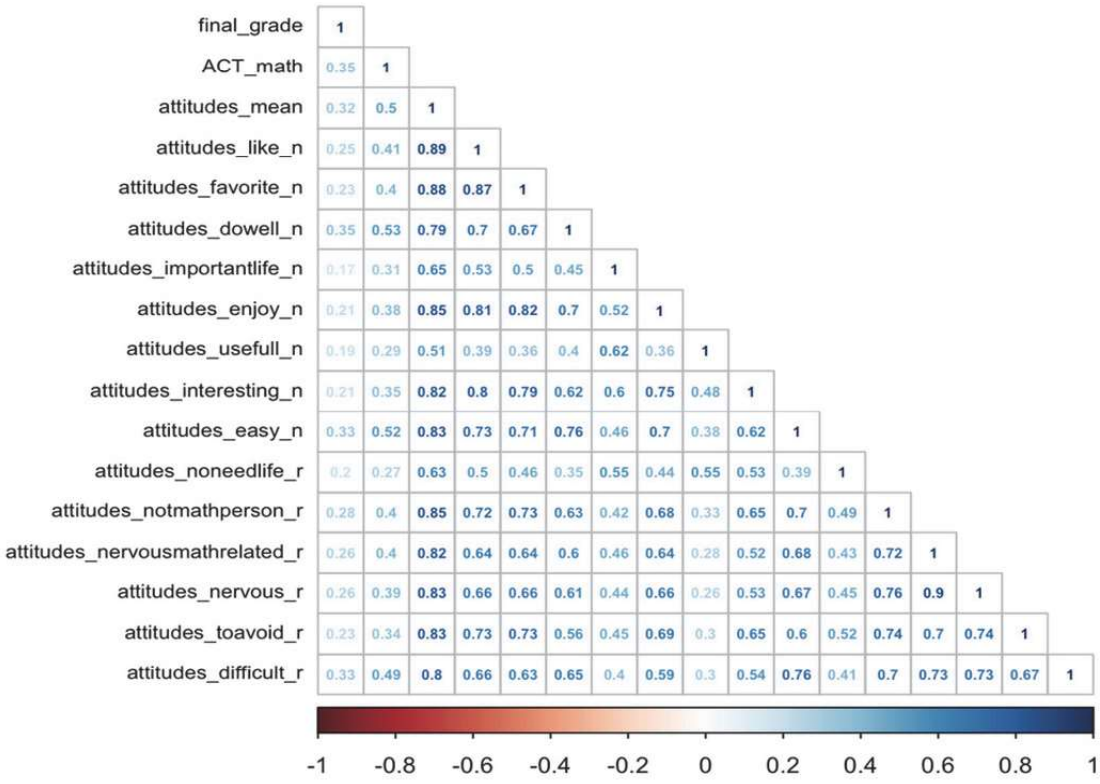
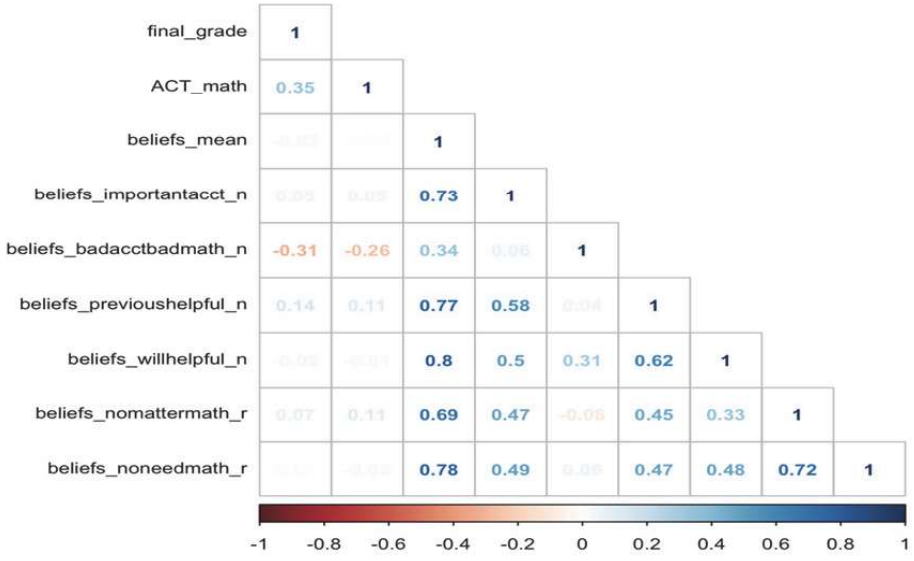


FIGURE 12
CORRELATION BETWEEN BELIEFS MEASURES AND FINAL GRADE



To answer the third research question of how accounting students' attitudes and beliefs regarding math are connected to their accounting performance, multiple linear regression method was employed. The Results summary is presented in Table 1. Model 1 takes attitudes mean and beliefs mean as independent variables, and gender, major, instructor and ACT math score as control variables. The adjusted R-square is 0.186. However, attitudes mean is only statistically significant at 0.1 level, while beliefs mean is not statistically significant at all.

Model 1

$$final\ grade = \beta_0 + \beta_1 ACT_{math} + \beta_2 attitudes_{mean} + \beta_3 beliefs_{mean} + \beta_4 gender + \beta_5 major + \beta_6 instructor_{ID} + \varepsilon \quad (1)$$

final grade =

To improve Model 1, individual attitudes and beliefs measures having the strongest correlation with final grade were selected as the independent variables in Model 2, keeping the same control variables.

Model 2

$$final\ grade = \beta_0 + \beta_1 ACT_{math} + \beta_2 attitudes\_difficult\_n + \beta_3 beliefs\_badaccountingbadmath\_n + \beta_4 beliefs\_previoushelpful\_n + \beta_5 gender + \beta_6 major + \beta_7 instructor\_ID + \varepsilon \quad (2)$$

TABLE 1
MULTIPLE REGRESSION RESULTS

Results

	Dependent variable:	
	Final Grade	
	(1)	(2)
ACT Math Score	0.749***	0.612***
	(0.171)	(0.165)
Attitudes math not very difficult		0.950*
		(0.551)
Beliefs bad acct due to bad math		-2.338***
		(0.636)
Beliefs previous math helpful in acct		1.042*
		(0.565)
Gender Male	-1.601	-1.367
	(1.170)	(1.133)
Major Business Administration	-5.964***	-5.357***
	(1.630)	(1.553)
Major Economics	-3.550	-3.661
	(2.917)	(2.832)
Major Non-business	-6.322***	-5.441***
	(1.659)	(1.576)
Instructor B	0.828	2.726
	(2.483)	(2.434)
Instructor C	0.851	2.625
	(2.725)	(2.687)

Instructor D	-1.089	0.818
	(2.506)	(2.475)
Attitudes Mean	1.409*	
	(0.774)	
Beliefs Mean	-0.925	
	(0.897)	
Constant	68.484***	68.166***
	(5.695)	(5.118)
Observations	322	322
R2	0.212	0.256
Adjusted R2	0.186	0.229
Residual Std. Error	10.156 (df = 311)	9.883 (df = 310)
F Statistic	8.346*** (df = 10; 311)	9.684*** (df = 11; 310)
Note:	*p<0.1; **p<0.05; ***p<0.01	

As presented in Table 1. The adjusted R-square increased to 0.229. The attitudes measure "Mathematics is not a very difficult subject for me" and the beliefs measures "My previous knowledge of mathematics helps me to learn accounting" are both statistically significant at 0.1 level. The beliefs measure "If a student is not doing well in accounting, that is because that student is not good at mathematics" is statistically significant at 0.01 level, with a negative coefficient (-2.338). The negative coefficient indicates that for every one-point increase in the 5-point belief scale a student contributes their bad accounting performance to their bad math, the student's accounting final grade drop 2.338 points. Accounting major students' final grades on average are 5.357 points higher than Business Administration major students. The same pattern has been identified between accounting major students and Economics major students (3.661 points), and between accounting major students and Non-Business major students (5.441 points). The grade variance contributed to gender and instructors are not statistically significant.

CONCLUSIONS AND DISCUSSIONS

Based on our research, we have some interesting findings. First, we find students believe that being good at mathematics is a necessary, but not a sufficient, condition for performing well in accounting. That means mathematics is important in accounting learning, but mathematics alone cannot guarantee a high performance in accounting courses. This may be because that to do well in accounting, students may need to master other skills as well, such as good study habits, time spent on learning the content, a good understanding of the accounting course content, etc.

Second, students who perform well in accounting usually show a relatively positive attitude towards mathematics. This suggests that a positive attitude towards math may contribute to students' accounting learning. Among the 4 groups of students (accounting majors, business administration majors, economic majors, and non-business majors) accounting majors have the highest level of attitudes towards mathematics. Accounting majors also have the highest performance in accounting courses. Their high performance in accounting courses may be at least partially explained by their high positive attitude towards mathematics.

Third, this study suggests that comparing attitudes, students' beliefs in mathematics' role in accounting learning seems does not have a significant impact on their accounting courses performances. Thus, if possible, to help students do better in accounting courses, it may be more valuable to raise students' attitude of mathematics rather than their beliefs.

Lastly, this study confirms previous studies that students' ACT math scores works as a good predictor for students' accounting course performance (Phillips, 2015). If students have high ACT score, they are more likely to succeed in college accounting courses that those who have low ACT scores.

Other interesting findings include: 1. There is no gender difference in male and female students' accounting performance. 2. Business administration majors and non-business majors generally underperform in accounting courses comparing to accounting and economics majors. 3. In terms of students' accounting grades, there is no difference among different instructors.

CONTRIBUTION AND IMPLICATIONS

This study examined the relationship between students' attitudes towards mathematics and their performance in accounting courses. It also analyzed students' belief in the role of their account courses learning. Based on our research of literature, these areas are not sufficiently addressed by researchers.

This study has several implications. First, teachers and advisors may find ways to increase students' attitude in mathematics, as a positive attitude towards mathematics is positively linked to their accounting courses performance. Second, for students who have not chosen their major, it would be helpful to conduct a survey includes attitude towards mathematics. If students have a positive attitude towards mathematics, accounting may be a good choice for them, otherwise, advisors may suggest students to try some other majors which may require less mathematics skills.

LIMITATIONS AND FUTURE DIRECTIONS

There are several limitations in this study. First, we have a limited number of participants. Second, all participants are from one institution. Thus, it is difficult to generalize the findings. In our future research, we may enroll more participants and hopefully from multiple institutions. Furthermore, in this study we did not specify specific areas of mathematics (such as arithmetics, algebra, geometry, and calculus). In our future study, we may consider including students' attitude and beliefs in different areas of mathematics and how they impact their accounting learning.

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APPENDICES

APPENDIX 1
RESPONDENTS DEMOGRAPHICS

N = 422		Number	%
Gender	Female	198	47%
	Male	224	53%
Major	Accounting	93	22%
	Business Administration	172	41%
	Economics	18	4%
	Non-business	139	33%

APPENDIX 2
DESCRIPTIVES FOR ACT MATH SCORE AND ACCOUNTING FINAL GRADE

N = 422	Min	Q1	Median	Q3	Max	Mean	Missing
ACT Math Score	15	20	23	26	36	23.15	100
Accounting Final Grade	50	74	84	91	100	82.19	0

APPENDIX 3
NUMBER OF COURSES TAUGHT BY EACH INSTRUCTOR

Instructor ID	Number of Courses
A	2
B	7
C	1
D	3

APPENDIX 4
DESCRIPTIVES FOR ATTITUDES MEASURES

Attitudes	Min	Q1	Median	Q3	Max	Mean	Missing
Generally speaking mathematics is easy for me	1	3	4	4	5	3.40	0
I always enjoy mathematics classes	1	2	3	4	5	3.23	0
I am always nervous about courses related to mathematics	1	3	4	5	5	3.50	0
I am always nervous about mathematics	1	2	4	4	5	3.38	0
I consider mathematics is important in my life	1	3	4	4	5	3.74	0
I don't consider myself as a math person	1	2	4	4	5	3.33	0
I don't think I need much mathematics in my life	1	3	4	5	5	3.98	0
I like mathematics	1	3	4	4	5	3.59	0
I think mathematics is useful	1	4	4	5	5	4.30	0
If possible I want to avoid any mathematics classes	1	2	3	4	5	3.27	0
Mathematics is a very difficult subject for me	1	3	4	5	5	3.56	0
Mathematics is interesting to me	1	3	4	4	5	3.53	0
Mathematics is one of my favorite subjects	1	2	3	4	5	3.19	0
Usually I do very well in mathematics	1	3	4	5	5	3.82	0
Attitudes Mean	1.07	2.93	3.71	4.29	5	3.56	0

APPENDIX 5
DESCRIPTIVES FOR BELIEFS MEASURES

Belief Mean	Min	Q1	Median	Q3	Max	Mean	Missing
I don't think I need much mathematics in accounting	1	3	4	4	5	3.67	0
I think mathematics doesn't matter in accounting	1	4	4	5	5	4.06	0
If a student is not doing well in accounting, that is because that student is not good at mathematics	1	1	2	3	5	1.93	0
If I have better mathematics ability, it would be helpful to my accounting learning	1	3	4	4	5	3.52	0
Mathematics is important for accounting learning	1	4	4	5	5	4.14	0
My previous knowledge of mathematics helps me to learn accounting	1	3	4	4	5	3.72	0
Beliefs Mean	1	3	3.67	4	4.83	3.51	0

APPENDIX 6
MAJOR RECLASSIFICATION CRITERIA

Reclassified Major	Original Response
Accounting	Accounting, Accounting and Business Administration
Economics	Economics, Economics and Business Administration, Economics and Non-business, Economics and Business Administration and Non-business
Business Administration	Business Administration, Business Administration and Non-business
Non-business	Non-business