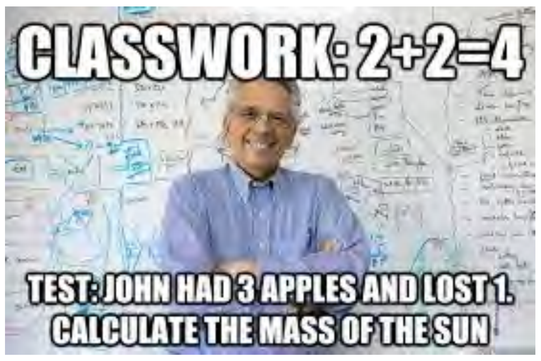








A Mixed Methods Analysis Approach to Examine Teachers' Supportiveness and Effects on Math Anxiety Among Northern New Mexico STEM and NonSTEM Studens

by Miquella Espinoza

Northern New Mexico College

Department of BAIS: PSYCHOLOGY

Abstract

My research is exploratory in nature, with a goal to examine whether perceived supportiveness that effects math anxiety among STEM and non-STEM students.

Statement of the Problem

The problem researched is the level of math anxiety students felt with their perceived overall supportiveness by their teachers.

Reference: Carlone and Johnson. STEM minority retention success. (2007).

Theory

My theory is, with the increase of support students feel by their teachers the more the students' math anxiety will decrease. A theory, according to Babbie is, "a systematic explanation for the observation that relates to a particular aspect of life" (Babbie, 2015: 533).

This is different from a hypothesis in the way that an hypothesis is, "a specific testable expectation about empirical reality that follows from a more general proposition; or more generally, an expectation about the nature of things derived from a theory" (Babbie, 2015: 527). See expectations below:

Hypotheses

My hypotheses are these:

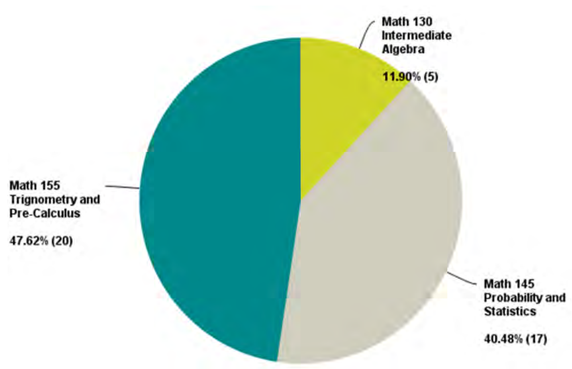
- Students who feel more supportiveness from teachers will have decreased math anxiety.
- Students who feel less supportiveness from teachers will have decreased math anxiety.
- Students who feel more supportiveness from teachers will have increased math anxiety.
- Students who feel less supportiveness from teachers will have increased math anxiety.

If the evidence does not support my hypotheses, I will have to accept the null hypothesis, which is there is no effect of perceived teacher supportiveness on math anxiety.

Data Collection & Methods

Table 1 reflects the Sample size. For Math 155 Trigonometry and Pre-Calculus (blue) there was 25 students enrolled in the course with a survey response of 20 (47.62%). For Math 130 Intermediate Algebra (green) there was 9 students enrolled in the class with a survey response of 5 (11.90%), which is the normal number of students to regularly attend the class per instructors information. For Math 145 Probability and Statistics (gray) there was 22 students enrolled with a survey response of 17 (40.48%).

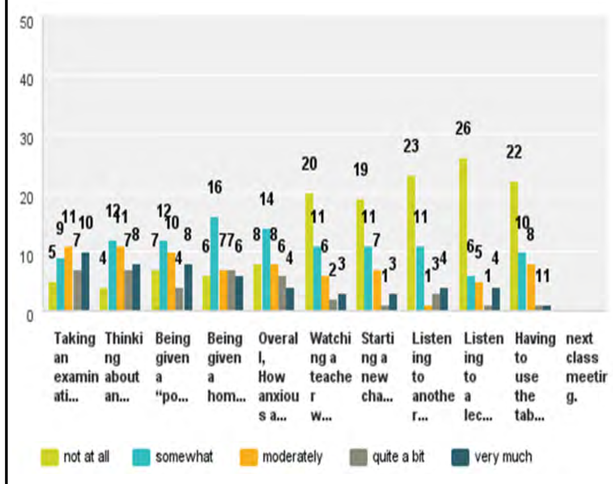
Table 1: Sample What Class Is This?
Answered: 42 Skipped: 0



Data Analysis & Findings

The analysis method used in my research data below is a univariate distribution. The concept my variable is measuring is the overall anxiety students feel regarding math at Northern New Mexico College. The scale applied to my research is the Likert Scale. The Likert Scale was developed by Rensis Likert, in an attempt to improve the levels of measurement in social research by using standardized response categories in survey questionnaires such as the survey used in this research, to determine the intensity of different items. The concept or item being measured in Q10 in the Table below is the levels of anxiety in math class.

Table 2: How Anxious Do You Typically Feel When Answered: 42 Skipped: 0



Data Analysis & Findings *cont'd*

In Table 2 Dependent Variables above the measures of central tendency are:

- Taking an examination in a math course- the median with 9 students is "somewhat anxious"
- Thinking about an upcoming math test one day before- the median with 8 students is "very much"
- Being given a pop quiz in a math class- the median with 8 students is "very much"
- Being given a homework assignment of many difficult problems which is due the next class meeting- the median with 7 students is "moderately" or "quite a bit"
- Overall, how anxious are you about math?- the median with 8 students is "not at all" or "moderately"
- Watching a teacher work an algebraic equation on the blackboard- the median with 6 students is "moderately"
- Starting a new chapter in a math book- the median with 7 students is "moderately"
- Listening to another students explain a math formula- the median with 4 students is "very much"
- Having to use the tables in the back of the book- the median with 8 students is "moderately"

Table 3. Independent Predictions of Math Anxiety Answered: 42 Skipped: 0

	not at all supportive	a little bit supportive	somewhat supportive	very supportive	extremely supportive	Total	Weighted Average
my friends are	4.88% 2	7.32% 3	19.51% 8	41.46% 17	26.83% 11	41	3.78
the college is	2.38% 1	0.00% 0	26.19% 11	45.24% 19	26.19% 11	42	3.93
my teachers are	0.00% 0	2.38% 1	14.29% 6	57.14% 24	26.19% 11	42	4.07
my family are	0.00% 0	4.76% 2	7.14% 3	35.71% 15	52.38% 22	42	4.36
my parents are	0.00% 0	7.14% 3	11.90% 5	19.05% 8	61.90% 26	42	4.36
my mentors are	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 1	1	5.00

In Table 3 above the frequency distribution for perceived supportiveness is displayed, showing the weighted average. For each variable the frequency distributions are as follows:

- My friends are: mean 0.607, median 8 (19.51%) "somewhat supportive", mode 17 (41.46%) "very supportive", range 17-2=15, there are no outliers, there is 1 missing/skipped student responses for this variable
- My college is: mean 0.607, median 11 (26.19%) "somewhat or extremely supportive", mode 19 (45.24%) "very supportive", range 19-1=18, 0 "somewhat supportive" is an outliers for this variable
- My teachers are: mean 0.607, median 6 (14.29%) "somewhat supportive", mode 21 (57.14%) "very supportive", range 24-1=23, 0 "not at all supportive" is an outlier for this variable
- My family are: mean 0.607, median 3 (7.14%) "somewhat supportive", mode 22 (52.38%) "extremely supportive", range 22-2=20, 0 "not at all supportive" is an outlier for this variable
- My parents are: mean 0.607, median 5 (11.90%) "somewhat supportive", mode 26 (61.90%) "extremely supportive", range 26-3=23, 0 "not at all supportive" is an outlier for this variable

Data Analysis & Findings *cont'd*

- My mentors are: mean 0.607, median 0 (0%), mode 0 (0%), range 1-0=1, the entire variable of 'my mentors are' is an outlier, there is 41 missing/skipped student responses for this variable
- The highest weighted average for these variables is 4.36% for 'my family are' and 'my parents are'.

Conclusions

In conclusion, over-all the amount of support students felt by their teachers was less than the perceived support from parents and family members. Additionally, there was a fair amount of anxiety each student felt.

Without doing a bivariate analysis to determine whether supportiveness would lower math anxiety, there isn't enough data to reject the null hypotheses based on my findings.

To improve this study I propose to include a bivariate analysis, perhaps to include more open ended questions to promote more personal feedback from students and I would suggest use of results that focusing more on methods teachers could use to improve their supportiveness to students, or methods of reducing math anxiety.

My data was limited due to the small sample size.

For the purpose of future research I would extend this study to several other colleges and universities throughout New Mexico and eventually the United States.

Ethics

Before administering the surveys to each mathematical course, I introduced myself using my name, major, the instructor I am working under, the purpose of the survey and study. I introduced the survey by explaining what the questions consisted of, how many questions there were and generally how long it would take to fill out the survey. I informed students and their teachers that the test was completely confidential, that participation is voluntary, and informed students that names and Eagle ID numbers are asked for tracking purpose only and would not be released or used by anyone for any other purposes.

References

Babbie, E.R. (n.d.). *The Practice of Social Research*.

Carlone and Johnson. *STEM Minority Retention Success*. (2007).

Acknowledgements

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