An Investigation into How Learning Styles Effect Math Anxiety in NNMC STEM Students, Spring 2017

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Abstract
Math anxiety is a burden to students across all educational levels and poses a threat to the development of competent future generations who will occupy professional positions that demand computational skills. Students are likely to display stress, worry, or fear when requested to engage in tasks that involve mathematics or to think about mathematics in a learning environment (Warwick 2008, as cited in Tatar 2012).

Statement of the Problem
Twenty-first century’s educational landscape demands excellence from students in all academic disciplines but the stake is even higher for the STEM students in today’s world in which competition in engineering and technological advancements is at the core. Emphasis is on devising and applying the most effective teaching techniques that tap into the intellectual acuity of math students to maximize their comprehension rate. To achieve this feat, individual learning styles, the preferred method of assimilating and registering materials in learning environments that best fits each student, must be understood. This is an exploratory study to conduct research on how learning styles effect a scale of math anxiety. This study took a look at the consequences of math anxiety utilizing a sample selected as a census of all NNMC math classes during the semester of Spring, 2017.

Theory
The theory of multiple intelligence by Howard Gardner suggests that every individual has eight or more different intellectual abilities developed through evolutionary process and that each of these intelligences has its specific way of processing information (Springer, M., Kopik, A., & Formella, Z. 2014). When students’ learning styles are not met through across-the-board teaching styles that disregard the differences mentioned above, it is likely to create fear, stress, nervousness, discomfort and worry among the students.

Hypotheses
Below are the five possible hypotheses:
- When the preferred learning style is used more, the scale weighted score of math anxiety increases
- When the preferred learning style is not used, the scale of math anxiety goes up
- When the preferred learning style is not used, the scale of math anxiety goes down
- When the preferred learning style is used more, the scale of math anxiety goes down
- No statistical significance between learning style and the scale of anxiety (null hypothesis)

Data Collection & Methods
Data was collected through self-administered questionnaire survey. One reason I favored this survey method was because it enabled the respondents to willfully respond to sensitive matters that were contained in the questionnaire. Also, using self-administered survey offered me the opportunity to collect data from a bigger sample size; however, I recognize that I run the risk of missing complicated issues that are person-specific to the inflexible nature of self-administered surveys.

Table 1: Sample What Class Is This?
Answered: 232 Skipped: 0

Data Analysis & Findings

Table 2a: Dependent Variable (Anxiety)
Overall, how anxious are you about math?

Table 2b: Measures of Central Tendency for the Dependent Variable
Overall, how anxious are you about math?

Table 3a: Independent Variable (Auditory Learning Style)
I learn mostly by listening to the instructor

Table 3b: Independent Variable (Visual Learning Style)
Do you learn more when reading math in a book?

Table 4: Correlation Matrix

Conclusions
The correlation analysis table (Table 4) investigated the dependence or relationships, or lack thereof between the multiple variables at a time. Note that all the correlations are statistically significant at the .05 level. For the purpose of this exploratory study, I focused on the relationships among “Listening to a lecturer in math class,” “Overall, How anxious are you about math,” and “Watching a teacher work on algebraic equation on the blackboard.” In Table 4, r ranges from a low but significant correlation of .343 to a high correlation of .445. The correlation coefficient between “Listening to a lecture in math class” and the respondents’ overall anxiety about math is r=.503. This means that 25% of the variation in both variables are related (.503 squared = .253). Hence, the correlation of r=.503 suggests a moderate positive association and a statistically significant one between listening to a lecture in class and overall anxiety about math. The matrix also shows the correlation between “Watching a teacher work an algebraic equation on the blackboard” and “Overall, How anxious are you about math?” to be r=.465. This means that there is a stronger positive association between the two variables. Hence, if a straight line is drawn on a plane in which the data points of both variables are plotted, the variability from the linear measure will be less compared to the data from the two variables investigated above. In other words, 42% of the variance is related in this case (.465 squared = .416).

The findings from this study suggests a moderate to strong correlation between auditory and visual learning styles and math anxiety. I therefore reject the null hypothesis because there appears to be a statistical significance between the variables investigated. However, correlation does not mean there is causal relationship between the learning styles investigated and math anxiety, it suggests there is an association. An explanatory research is needed to determine any causal relationship, which is beyond the scope of this current research.

Ethics
The data collected from this survey is for informational purpose only, and will not be published for public consumption.

All personal information will be kept confidential to avoid any emotional harm to the respondents. The safety of the respondents will be considered above everything else, including over the information this study will seek to find.

References


Acknowledgements
Dr. Aji Hira
Dr. Ana Vasilic
Dr. David Torres
NNMC Students Success Center and staff