

# Mathematical Mindsets of Prospective Middle School Teachers

Candace Corvino

Dr. Mark Hogue and Dr. Rich Busi

## Introduction:

The purpose of this project was to conduct an initial study that investigates the mindsets of prospective middle school teachers (grades 4-8). The study examines how these prospective teachers react to being given a challenging task especially if the task questions their ability.

## Preliminary information:

Before looking at the research, we must first understand the differences between growth and fixed mindsets. A growth mindset is the belief that things such as intelligence and character can be improved by learning and asking questions. While a fixed mindset is the belief that intelligence and character are predestined. These mindsets have been researched by many people the main researcher being Carol Dweck who has spent years figuring out the impacts that mindsets have on different things that us school, work, relationships, etc. Research has shown there are two different ways to determine someone's mindset.

The first is through self-reported surveys, where people answer questions that are directed to decipher between the two mindsets. These questions may look something along the lines of "when you have to try hard at something it means that you cannot be good at it" or "your intelligence is something you cannot do much about?" These questions may not look like a typical question but are usually posed on a scale, meaning that you would respond with a number, 1 through 6 for instance. These numbers are taken and usually averaged out to discern the mindset that the person has. Typically, the mindset the corresponds to each number is based on the questions asked. Let's look at the first question that was posed, "when you have to try really hard at something it means you are not good at it." If someone were to answer this with a 1 for strongly disagree then a one would mean that the person has a growth mindset, but if a 6 meant strongly disagree then 6 would correspond to a growth mindset. Although, this is sometimes unreliable because research has shown that these surveys do not reflect the true mindset of people.

Hence, we also use a second research method to determine someone's mindset. This second method is through observation. This requires the researcher to give the subject a task and watch what they do. Through observation a researcher can see how subjects respond to different tasks. For instance, if a subject responds to a hard tasks by avoiding the situation by playing with a cellphone, doodling on the paper, fidgeting, falling asleep, or spending extra time writing down the problems then the subject would be displaying that they have a fixed mindset. While if the subject responds to the task by embracing the challenge, asking questions, or finding alternative routes to the answer if the first one doesn't work then it is determined that the person has a growth mindset.

## Methods:

This study was approved by the Institutional Review Board of Slippery Rock University.

Students from the SEFE 200 class were recruited for this study. These students were not obligated to be a part of this study and their participation held no bearing on their class standing or grades.

All participants in this study completed a pre-assessment, assessment, and post-assessment.

They were highly encouraged to work together through the math assessment

## Findings:

**Question a.** Some people are good at math and others aren't. being a "math person is something you can't really change.

**Question b.** Your intelligence is something about you that you can't change very much

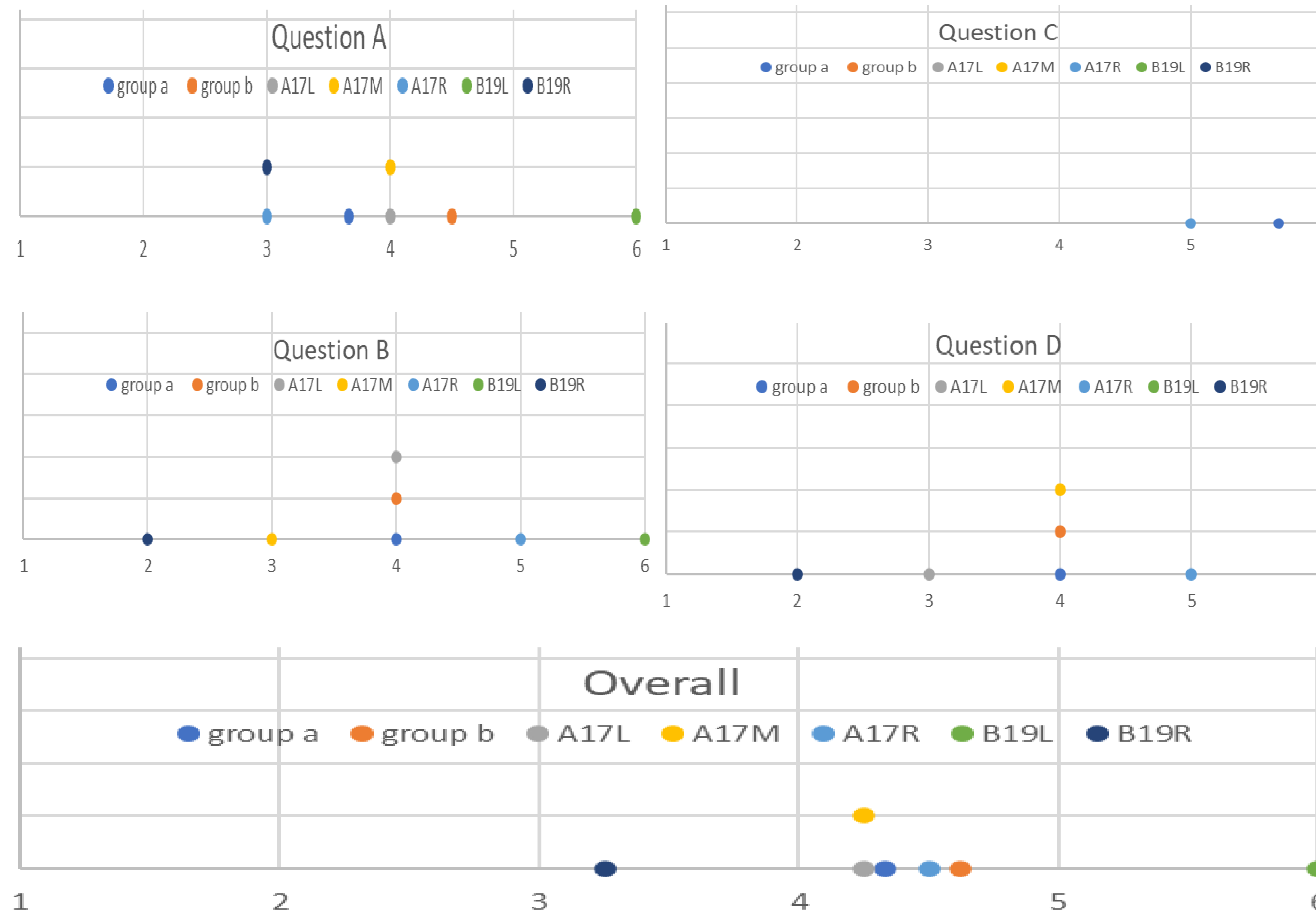
**Question c.** When you have to try really hard in math, it means you can't be good at math

**Question d.** You have a certain amount of intelligence, and you really can't do much to change it

1 being strongly fixed

3.5 being neutral

6 Strongly growth



The graphs above show the data collected from the self-reported surveys. This data shows that most of the participants in the survey reported that they had a growth mindset. They also reported that they typically do not work on math assignments in groups. If they want help, they said that they would try to use notes and examples on other assignments then go to their professor to get the help they need. Although, the data collected from the video taken of the math assessment portion of the study showed different information than what was self-reported. Group A in whole showed more of a fixed mindset while performing the task then they did a growth mindset. This was shown through the group's disengagement from the task. Group A also did not work together until the very end of the assessment when one member believed that they had found an answer. Where Group B worked together through the whole assessment. They also were engaged in the assessment the entire time they were given.

## Discussion/Analysis

While four of the five study participants reported that they had a growth mindset, the data collected from the math assessment and post-assessment suggest otherwise for some.

Specifically participant A17M reported behaviors were different from the collected data from the assessments. The participant reported that they had a growth mindset, but through the analysis of the math portion of the survey participant A17M displayed the they had more of a fixed mindset. This is shown through the disengagement with the tasks. The participant was often looking around the room and checking the work of the other participants. These displays of disengagement suggest that the participant has more of a fixed mindset when it comes to math. A few of the other participants were like A17M in the sense that they self reported that they had growth mindsets but displayed signs of a fixed mindset. Including participant B19L who reported a 6, which is the highest score that could be reported. Although, their actions show that their score should have been lower.

The study also showed one participant, B19R, self reported that they had a neutral mindset. Despite this reporting the participant displayed that they had a growth mindset during the math portion of the survey. This was shown by his lack of disengagement with the tasks. The participant worked for the entire given time. Due to these observations, it shows that participant B19R had a growth mindset rather than a neutral mindset.

In conclusion, when given the ability to self report many of the participants reported they had a growth mindset. Although by observing the groups it is evident that the participants have more of a fixed mindset then they had reported and vice versa.

## Contact Information:

Candace Corvino – [cnc1009@sru.edu](mailto:cnc1009@sru.edu)

Mark Hogue – [mark.hogue@sru.edu](mailto:mark.hogue@sru.edu)