End of Summer Report
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During my research project, I investigated the relationship between spatial skills, overall creativity, math self-efficacy and math creativity in college students. My main goal was to understand how students' spatial skills and overall creativity may be related to their beliefs about their math abilities and specific math creativity. Research suggests neurodiverse individuals with Developmental Dyscalculia (DD) and Attention Deficit Hyperactivity Disorder (ADHD) have difficulty with mathematics. I researched the underlying neurological correlates of DD, ADHD, as well as math creativity to help inform my project.

Both Dyscalculia and ADHD affect the normal acquisition of arithmetic skills, but in different ways. Dyscalculia often involves dysfunction in the parietal lobe, which is associated with spatial skills, whereas ADHD often consists of a dysfunction in the frontal lobe, which is associated with attention. Hence, my research question was, "How are general creativity abilities, inattention (linked to the frontal lobe), and spatial skills (linked to the intraparietal sulcus) related to math self-efficacy and math creativity?" I was motivated to do this research due to the growing recognition that math creativity is important in everyday life.

I found that spatial skills as measured by a mental rotation task predicted both math self-efficacy and math creativity. Mental rotation is an example of internal spatial skills, and from my research, we see that spatial skills seem to be important for math self-efficacy and creativity. I was curious whether external spatial skills (e.g., manipulating blocks, using an abacus) and internal spatial skills (e.g., mental rotation tasks) are equally important for math creativity, or if one is more important than the other. Therefore, in my study, I added a physical block completion task, where participants were asked to replicate an image while being timed.

Throughout FURSCA, I had 36 participants, which was fewer than I wanted (my goal was to get to 50). However, from the data I analyzed, I found that the mental rotation skills were more important than external spatial skills. Although this is not what I hoped to find, it is in line with another study that found similar results supporting the idea that internal spatial skills play an important role in math creativity. I was also expecting to find a positive correlation between divergent creativity and math convergent creativity, as I found in a pilot study run in Spring 2025; however, the relationship wasn't clear in the data I've collected so far. Therefore, I will be continuing to recruit participants in the coming fall semester and then re-running my statistical analyses.

This topic is important because understanding how the brain is related to math creativity and math self-efficacy may help us create more targeted educational practices for math in universities and colleges. Seeing that internal spatial skills seem to be more important for math creativity, supports the need for more mental imagery, visualization, and abstract reasoning tasks to be included in math courses. Additionally, the results from my pilot study suggest that

students tend to underestimate the need for creativity in math tasks, which may not be the case - even in quantitative fields, diverse ways of thinking matter.

Overall, this project was quite meaningful for my academic growth at Albion College. The research process taught me to embrace unexpected findings and to value exploration as much as results. I enjoyed reading various articles on the topic, seeing what other researchers have found, and discussing them with my advisor. This experience sharpened my skills in the data entry process, statistical analysis, and presentation. I plan to share my results and conclusions at the Elkin R. Isaac Research Symposium and possibly at the Psychonomic Society conference this Fall.