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Predictors of Success in Post-Secondary Mathematics

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Predictors of Success in Post-Secondary Mathematics

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Introduction and Methods

- Recent research shows ANS, Mental Rotation, and math anxiety influence math testing scores [1, 2, 3]

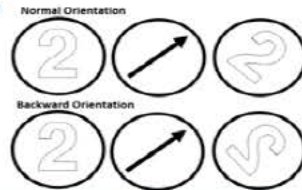
Does approximate number system, mental rotation, and math anxiety predict an individual's mathematical academic performance? Does an individual's study habits and SAT scores correlate with their mathematical academic performance?

- Approximate Number System (ANS): ability to estimate number representations (i.e. walk into a room and guess the total number of people present)



"Press the 'A' key if there are more black dots and press the 'L' key if there are more white dots"

- Mental Rotation (MR): ability to rotate mental representations of 2D and 3D shapes



"Press the 'N' key if the image is rotated normally and press the 'B' key if the image is rotated backwards"

- The SAT (Scholastic Aptitude Test) measures an individual's skills in three core areas (Critical Reading, Math, and Writing) to judge their academic preparedness for college
 - Participants indicated their SAT Math scores to correlate their STAR Math performance with the predictability of the SAT
- Math Anxiety (MA): feeling of tension and anxiety that interferes with the manipulation of numbers and solving mathematical problems
 - Participants filled out a survey asking about their study habits and experiences with math anxiety

How comfortable were you in answering a question in math class?

Very comfortable 1 2 3 4 5 6 7 Very uncomfortable

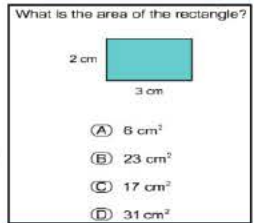
Who helped you with math homework?

- a. Parent/Guardian
- b. Friend
- c. Teacher
- d. Tutor
- e. Other

Can you provide your SAT math score?

- a. 200-299
- b. 300-399
- c. 400-499
- d. 500-599
- e. 600-699
- f. 700-800

- The STAR Math algebra assessment was utilized to test a participant's math abilities
 - This assessment is a computer-based system that consists of 35 multiple choice algebra questions



Results

	ANS	MR	SAT	Ask Teacher	STAR Math	Math Anxiety	Mean	SD
ANS	1						1.24	0.14
MR	-0.27 [†]	1					934	66.16
SAT	0.04 [†]	-0.57	1				4.71	0.75
Ask Teacher	0.29 [†]	-0.95*	0.5 [†]	1			0.2	0.44
STAR Math	0.23 [†]	-0.7*	0.91**	0.91*	1		2.1	0.73
Math Anxiety	0.4 [†]	0.21 [†]	-0.32 [†]	0.23 [†]	-0.18 [†]	1	0.77	0.05

Note, [†]p<0.1; *p<0.05; **p<0.01

Discussion and Conclusion

- All data preliminary due to small sample size (COVID-19 interruption).
- Data shows a strong positive correlation between SAT scores and performance on the STAR Math assessment, indicating a high accuracy in the SAT's ability to predict mathematical academic success
- A strong positive correlation was found between STAR Math performance and a participant asking a teacher for help.
 - This indicates that participants with consistent contact with their teacher improves math performance.
 - This is likely due to more one on one time with teacher and more guided math practice

- A strong negative correlation was found between Mental Rotation performance and STAR Math performance
 - This indicates that Mental Rotation is not an indicator of success in algebra assessments
 - This could be because the assessment is based in algebra and not geometry
- No relation was found with math anxiety or ANS measures.
- Overall, data indicates that SAT is a good predictor of college algebra performance and that willingness to ask a teacher for help improves math performance.

References

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