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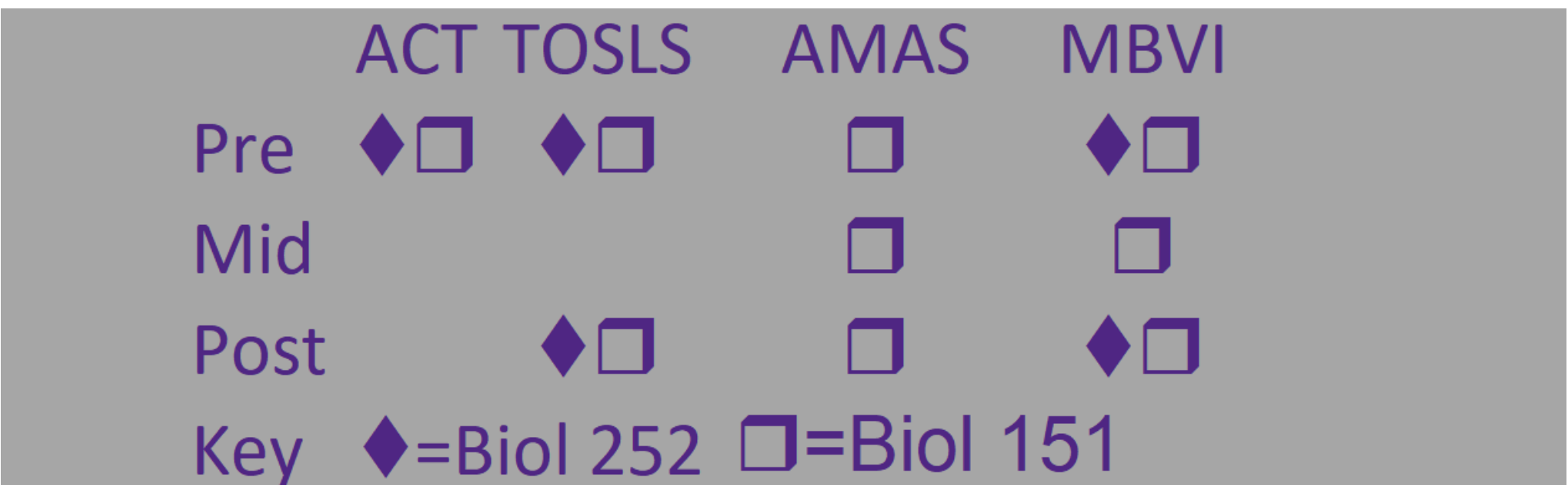
Introduction

- In recent years, there have been calls to increase the use of math in biology classrooms. [1]
- If we teach more math in biology, there are hurdles to be approached.
- Student views of math in biology needs to be more favorable to implement .
- Student math anxiety could be a problem.
 - Math anxiety causes drop in math performance – **It’s a problem.** [2]
- What can instructors use to easily predict student math anxiety or student perceptions of math in biology?
- What relationships exist between math anxiety, views of math in biology, and student performance?

Data Collected

Survey data was collected from two classes:

- BIOL 151 – General Biology II (n=157)
- BIOL 252 – Plant and Animal Diversity (n=33)



Assessment	Description
TOSLS [3]	A 28 question test that assesses 9 skills. These skills are broken into two groups: quantitative practices (QP) and non-quantitative practices (NQP).
AMAS [4]	Nine question survey to asses self-reported math anxiety, reported from low-high anxiety.
MBVI [5]	Eleven question survey to assess math values in biology. It has three categories: Cost (C), Utility (U), and Interest (I).

- Spearman’s rank correlation coefficient (r_s) was used to determine statistical significance of relationships.

BIOL 151: General Biology II

QP	$ACT \propto QP$ $ACT \propto NQP$					
NQP	0.538	$Cost \propto Utility \propto Interest$				
ACT	0.418	0.637	$QP \propto Cost$			
C	-0.243	-0.075	-0.062			
U	0.073	0.063	-0.040	-0.217		
I	0.126	0.060	-0.002	-0.484	0.447	
	QP	NQP	ACT	C	U	I

Pretest. r_s values in red signify significant relations ($\alpha=.05$)

BIOL 252: Plant and Animal Diversity

QP	$Math\ Anxiety \propto C, I\ or\ U$					
NQP	0.470	$Math\ Anxiety \propto NQP$				
ACT	0.411	0.242	$Math\ Anxiety \propto QP$			
C	-0.346	-0.314	0.088			
U	0.222	0.139	-0.046	-0.071		
I	0.073	0.397	-0.016	-0.623	0.264	
AMAS	-0.113	-0.002	-0.210	-0.085	-0.180	0.053
	QP	NQP	ACT	C	U	I

Pretest. r_s values in red signify significant relations ($\alpha=.05$)

Future Work

- Research should be conducted to determine if the relationship between student favorability of math in biology causal relationship.
- A more specialized anxiety survey relating to math anxiety in the sciences in order to account for discrepancies between established research and observed relationships between math anxiety and quantitative performance.
- Surveys given (particularly AMAS and MBVI) should be given to lager classes of upper division students in order to gain more resolution of the results.

Conclusions

- The ACT can be used as a predictor for introductory classes, but cannot be used as a predictor for upper division course
 - There has been too much time since the student took the exam for it to be predictive.
- With favorable views of math in biology being strongly linked quantitative scientific literacy, an emphasis on improving one will likely improve the other.
 - Cost is the most important factor of favorability in this.
- Student math anxiety is its own problem.
 - It must be approached independently.
- In contrast to previous literature, no significant relationship between math related anxiety and QP was observed.
- Other differences between introductory courses and important to note:
 - Cost is a more important factor in scientific literacy in upper division courses.

References and Acknowledgements

[1] American Association for the Advancement of Science. 2011

[2] Ashcraft, Mark H. 2002

[3] Gormally, Cara. Brickman, Peggy. Lutz, Mary. 2012

[4] Hopko, Derek R. Mahadevan, Rajan. Bare, Robert L. Hunt, Melissa K. 2003

[5] Andrews, Sarah E., Christopher Runyon, and Melissa L. Aikens. 2017

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