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Beyond the Numbers: Interventions Addressing Math Anxiety

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Introduction: Setting the Scene

Math anxiety is “a feeling of tension, apprehension, or fear that interferes with math performance” (Ashcraft, 2002).

It is separate from general trait anxiety or test anxiety (Hembree, 1990; Kazelskis et al., 2000).

Math anxiety is a global phenomenon (OECD, 2015).

It can be a gatekeeper to advanced studies and certain careers.

In the U.S., an estimated 25% of 4-year college students and up to 80% of community college students suffer from moderate to a high degree of math anxiety (Yeager, 2012).

Math anxiety in elementary children is a neglected area of research (Jameson, 2014).

However, research that exists has shown that math anxiety increases with age during childhood (Dowker et al., 2016).

Purpose of our literature review presentation is to explore what has been done in the realm of childhood math anxiety and what needs to be done to help guide us in fine-tuning our research study.

Methods



Literature Review

- Reviewed 56 articles
- Search terms
 - Math anxiety/mathematics anxiety
 - Causes/factors
 - Treatment
 - Intervention
 - High, middle, and elementary school & college
- Google Scholar & SUNY databases

Math Anxiety Assessments

- Math anxiety measures & previous research using math anxiety measures
- Measures found in the U.S. for elementary populations
 - Mathematics Anxiety Rating Scale (MARS) (Suinn, 1972-1988)
 - Mathematics Anxiety Scale – Revised (MAS-R) (Bai et al., 2009)
 - Scale for Assessing Early Mathematics Anxiety (SEMA) (Wu et al., 2012)
 - Children’s Anxiety in Math Scale (CAMS) (Jameson, 2013)
 - Math Anxiety Scale for Young Children Revised (Ganley & McGraw, 2016)
 - Child Math Anxiety Questionnaire-Revised (CMAQ-R) (Ramirez et al., 2013; Suinn, Taylor, & Edwards, 1988)

Activity	Circle closest answer				
	No bad feelings	Some-what bad	Fearful, tense or nervous	Very bad feelings	Worst feelings
1. Having to use the tables in the back of a math book.	1	2	3	4	5
2. Thinking about an upcoming math test one day before.	1	2	3	4	5
3. Watching a teacher work out a problem on the blackboard.	1	2	3	4	5

Results: Math Anxiety Interventions

Supplemental math instruction/strategy training reduced math anxiety

(Supekar et al., 2015; Passolunghi et al., 2020)

Counseling lunch groups addressing improving math confidence and teaching math study skills effective in reducing math anxiety (Ruff & Boes, 2014)

Reappraising anxiety as excitement (Brooks, 2014) or interpretation of math performance and physiological responses (Ramirez, Shaw, & Maloney, 2018)

“Writing out” the negative affect and worry has shown promising effects (Dowker, Sarkar, & Looi, 2016)

Sedative music has been shown to lead to self-reported math anxiety gains, but not physiological effects (Gan, Lim, & Haw, 2015)

Relaxation training reduced math anxiety (Sharp et al., 2000)

There is some merit to focused breathing exercises (Brunye et al., 2013)



Discussion and Implications

Math anxiety is prevalent in young children, but much research is still needed to explore the developmental trajectory of math anxiety, contextual factors related to its development, and the consequences of math anxiety in this population

(Jameson, 2014;
Passolunghi et al., 2020)

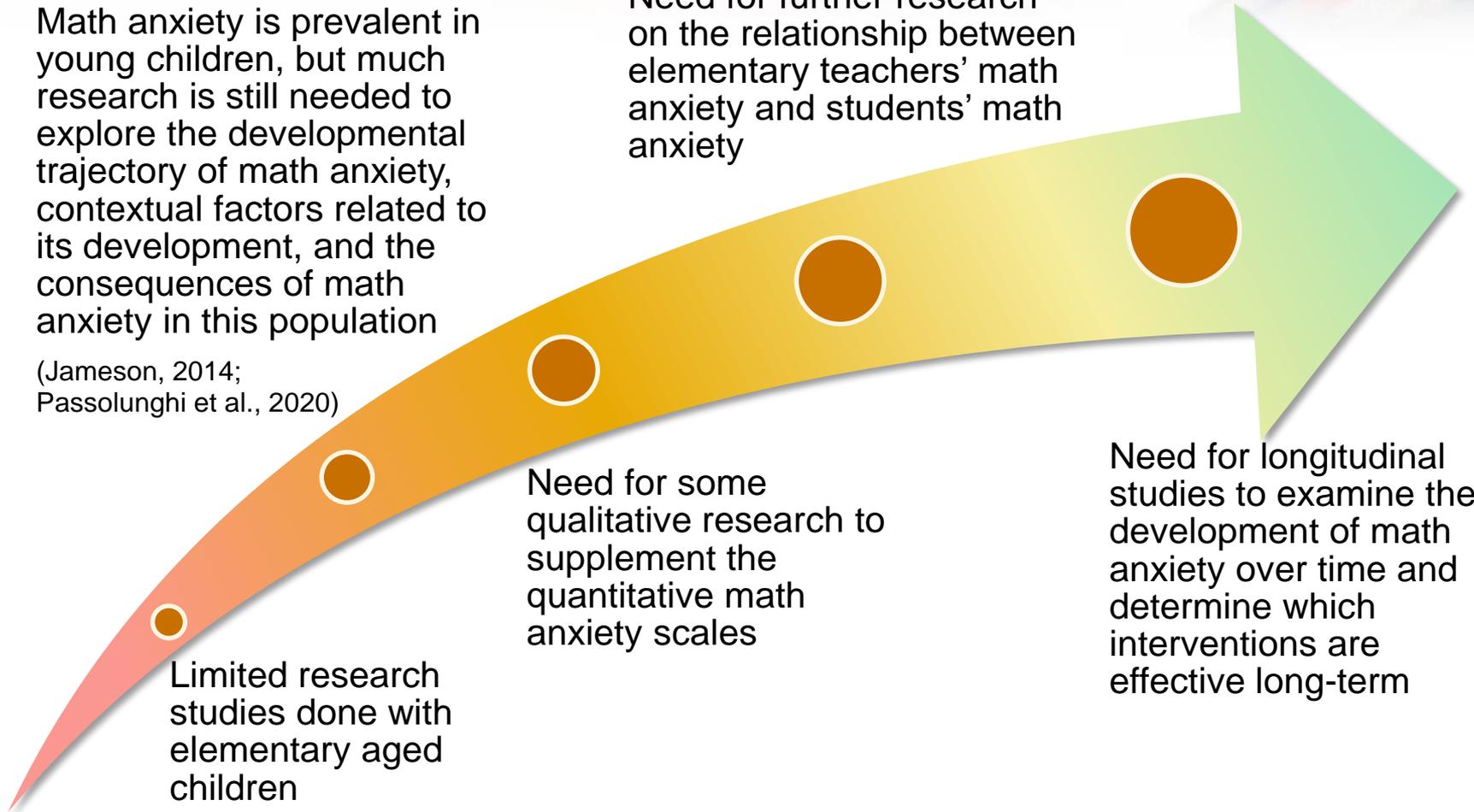
Limited research studies done with elementary aged children

(Gunderson et al., 2018;
Namkung, Peng, & Lin, 2019)

Need for further research on the relationship between elementary teachers' math anxiety and students' math anxiety

Need for some qualitative research to supplement the quantitative math anxiety scales

Need for longitudinal studies to examine the development of math anxiety over time and determine which interventions are effective long-term



Selected References



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*For additional references, please email the authors at their email addresses on the final slide.

Summing it Up



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Thank you!