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Thursday morning, Board 8

Science Reading Comprehension Instructions for Students with Disabilities: A Literature Review

Introduction: Scientific literacy is a necessity for modern day citizens to understand science materials and reports on media, develop workforce competency and represent better citizenship (DeBoer, 2000). Reading and understanding science texts is required to perform scientific literacy (Norris & Phillips, 2003). According to the National Reading Panel (2000), reading comprehension is crucial to reading skills development and accordingly have education. However, recent reports indicate decline in the reading and science scores for students through grade levels (NAEP, 2022). Students with disabilities face difficulties in comprehending science texts. Research attributes this problem to science text features (Mason & Hedin, 2011; Pearson et al., 2010; Sáenz & Fuchs, 2002) and disability characteristics which would disrupt monitoring comprehension (Botsas 2017; Kaldenberg et al, 2015; VanUitert et al., 2020). The purpose of this research is to expand on the work of previous literature (Gajria et al. 2007; Kaldenerg et al., 2015.; Mason & Hadin, 2011; Scruggs et al., 1998; Therrien et al., 2011; Therrien et al., 2014) and review the recent interventions to improve reading comprehension of expository science texts among students with disabilities.

Method: The researcher conducted a literature search to identify studies published from January 2015 to December 2022 that focused on teaching science text reading comprehension to students with disabilities. The year of 2015 was selected because it is when the latest review was published (Kaldenberg et al. 2015). The following questions guided the research review process: What are effective interventions for improving reading comprehension of expository science texts for students with disabilities (SWD)? What is the impact of vocabulary-based interventions on improving reading comprehension of expository science texts for students with disabilities (SWD)? What are the effective instructions in current literature in improving reading comprehension of science texts for culturally and linguistically diverse SWD? Data Search First, the researcher examined 4 databases for recent studies. Academic Search Premier, Education Full Text (H.W. Wilson), ERIC and PsycINFO databases were searched using the following key terms adopted from Kaldenberg et al. (2015): students with disability*; "science", "science reading" and "science vocabulary"; and "reading strateg*" and "reading intervention". Total 4,507 articles were found, and after primary examination Hand search In addition, a hand-search for recent issues of the special education journals (2021- 2022) was conducted to ensure locating all the studies matching the study criteria. The journals searched included The Journal of Special Education, Learning Disability Research and Practice, Learning Disability Quarterly, Journal of Learning Disability, and Exceptional Children. The results of the hand search process were additional three studies. Then, an additional search on Google scholar for science reading comprehension students with disabilities was conducted for studies between year 2015 and 2022 and five related studies were found and included in the primary data. Inclusion Criteria Articles were screened and evaluated for inclusion in the study based on the following criteria (adapted from Filderman et al., 2022 and Kaldenberg et al., 2015) where 1) all selected articles were written in English, 2) empirical peer reviewed research (i.e., journals or dissertations), 3) participants included students with disabilities through pre k to 12, 4) the independent variable of studies is a reading comprehension strategy addressed reading comprehension of science texts and 5) the dependent variable of studies addresses science text reading comprehension, and 6) studies incorporate quantitative and mixed method designs. After reviewing the abstracts, 23 articles were found. Then, a review of the full texts was conducted and only 7 articles met the search criteria (United States= 5; Turkey=1; Greece= 1). The other articles were excluded for either not meeting the criteria of article genre (Breit-Smith et al., 2017), sample (Ardasheva et al., 2017; Ardasheva et al. 2019; Connor 2019, Stott et al., 2019), method (Dallasequa et al, 2019; Essex, 2020), or dependent variable (Curran et al. 2019; Duchaine et al., 2018; Greene & Bethune 2021; Kızılaslan et al, 2020; Peffer et al., 2015; Rowley et al. 2020; Thornton et al. 2015; VanUitert et al., 2020). None of the hand searched articles were included (Ford et al., 2017; Helman et al. 2022; King 2022; McMahon et al., 2016; O'Connor et al. 2022; Swanson et al., 2015; Wexler et al., 2016) for violating the dependent variable criterion (i.e., science text comprehension) or article genre (Poch & Lembke, 2018).

Results: The results of the search were two single case studies (Bilgi et al., 2018; Knight et al., 2018) and five group studies (Botsas, 2017; Connor et al., 2017; Kim et al., 2021; Sanders et al., 2018; Van Orman et al., 2021). The purpose of this question was to evaluate the current literature about science text reading comprehension for SWD based on effective interventions for SWD. The research questions guided the researcher through this process. Research Question1: Effective interventions for improving reading comprehension of expository science texts for SWD This review of recent literature indicates that interventions involving cognitive strategies (Bilgi et al., 2017; Botsas 2017), and mnemonic instructions (Sanders et al., 2018) are beneficial in improving science text comprehension for SWD (view Table 1 for results). These findings are in harmony with previous literature reviews (Gajria et al. 2007; Kaldenberg et al, 2015.; Mason & Hadin, 2011). Gajria and colleagues (2007) reported large effect sizes for cognitive strategy $ES = 2.07$ which incorporated mnemonics in their review. Therrien et al. (2011; 2014) also reported large effect sizes for mnemonic instructions for students with LD ($ES = 1.997$) and EBD ($ES = 1.258$). Furthermore, Kim et al., (2021) found that

multicomponent interventions had positive effects in improving science comprehension for young learners including SWD ($n = 45$) and EB ($n = 136$). The p values were significant, $p < 0.05$ for all measures, but the reported Cohen d effect sizes were positive and small for vocabulary knowledge depth ($ES = 0.30$), listening comprehension ($ES = 0.40$), and argumentative writing ($ES = 0.24$). In terms of effect size, these findings are inconsistent with Kaldenberg et al. (2015) where the estimated effect size for multicomponent interventions was larger ($ES = 0.64$). On the other hand, some findings supported interventions that are identified by empirical research for having less effectiveness. In Knight et al. (2018), the unstructured intervention, unscripted task analyzed lessons, had better results in terms of science text reading comprehension and efficacy of instructions compared with the organized one (i.e., scripted task analyzed lessons) while teaching science content for students with developmental disabilities. Further, teachers were in favor of the unstructured intervention. In fact, these findings contradict previous reviews of literature where scholars emphasized on the role of structured activities in teaching science (Gajaria et al., 2007; Therrien et al., 2011; Therrien et al., 2014). Interestingly, no difference reported in maintenance data between both interventions, which indicates the efficacy of both methods. This leads to suggest moderating effects of teacher experience or other factors contributing to this discrepancy in findings. Regarding the social validity evidence, the application concept is concerning for some scholars in the education field (Schwartz & Baer, 1991). The scholars argue because its application deviated from the original purposes. Therefore, Common and Lane (2017) suggest ongoing assessment of social validity that involves all stakeholders, which was not demonstrated in this study.

Research Question 2: The impact of vocabulary-based interventions on improving reading comprehension of expository science texts for SWD Based on this review, only one study addressed using vocabulary instructions for science text comprehension. Sample of the study were middle school students and included emergent bilinguals with disabilities (EB-SWD). Results indicate moderate to large gains in students' vocabulary acquisition and comprehension scores ($d = 1.83$; $d = 0.71$). These findings align with previous literature (Kaldenberg et al., 2015) that students with LD benefit from explicit vocabulary instruction ($ES = 1.25$) and previous research on the significance of vocabulary on reading comprehension (Bell & McCallum, 2008; Bryant et al., 2003; Wright & Cervetti, 2017). However, the researchers did not report the impact of the vocabulary intervention on SWD compared with students without disabilities.

Research Question 3: Effective instructions in current literature in improving reading comprehension of science texts for culturally and linguistically diverse SWD Research that addresses the needs of ELL-SWD is limited (O'Connor et al., 2022; Sáenz et al., 2005). Through the review of literature, Van Orman et al. (2021) was the only study that addressed improving science text comprehension for EB including EB-SWD. Most recent studies involve using vocabulary instructions for vocabulary acquisition (Kennedy et al., 2020; Kennedy et al., 2022; O'Connor et al., 2022; VanUitert et al., 2022). Other studies investigated science comprehension with reference to EB without disability (Ardasheva et al., 2017; Ardasheva et al. 2019). In terms of efficacy, the overall results across all studies that included linguistically and culturally diverse students (Connor et al., 2017; Kim et al., 2021; Van Orman et al., 2021) indicate effectiveness of interventions for all participants. However, these studies did not compare performance with culturally and linguistically diverse SWD with their nondisabled peers.

Limitation There are two main limitations for this study. First, the number of studies included in this review is small ($N = 7$) due to the lack of research in existing literature on science comprehension instructions for SWD. Further, disability specific literature is also limited where only four studies specifically address science text comprehension for participants with specific disabilities (i.e., Bilgie et al., 2018; Botsas, 2017; Kim et al., 2021; Sanders et al., 2018). Also, only three studies reported effect sizes (Connor et al., 2017; Kim et al., 2021; Van Orman et al., 2021) which hinders comparing science comprehension instructions across other reviews. This review also reported findings without calculating effect sizes. Therefore, these findings could not be generalized.

Recommendation For Future Research Based on the study findings, future research needs to navigate science comprehension in the following areas of research: vocabulary instructions, EB-SWD, and developmental disabilities and emotional behavioral disabilities. First, impact of vocabulary instructions on science text comprehension for SWD (Kaldenberg et al., 2015) and EB at higher grade levels (Van Orman et al., 2021). More research should be dedicated for linguistically and culturally diverse students with disabilities such as EB-SWD (O'Connor et al., 2022). Finally, the areas of developmental disabilities and emotional behavioral disabilities are still in need for more science comprehension interventions (Kim et al., 2021; Sanders et al., 2018).

Conclusions Research on science text comprehension for SWD is a growing area of special education research. The findings of this review align with previous studies and extended the review by reviewing current literature across all disabilities. Interventions involving cognitive strategies, mnemonic instructions and vocabulary instructions proved to be effective for SWD. Little research addressed science text comprehension for EB-SWD and therefore more studies are required to target those unique learners.

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Thursday evening, Session A, Board 24A

Worked Problem Accuracy in 3 rd Grade Students with Mathematics Difficulty

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Introduction: Rationale & Aims: Cognitive Load Theory suggests that novice learners benefit when learning is decoupled from problem solving, thereby lowering cognitive load during learning (Renkl & Atkinson, 2010). Worked problems show the problem set-up and solution, eliminating the need for problem solving while learning. Mathematics-related research on worked problems focuses on interventions incorporating worked problems with older students and those not identified with math learning disability (MD) (Barbieri et al., 2023). Limited studies examine worked problem assessments and how young students with MD approach worked word problems (e.g., can they accurately identify whether the worked problem is correct or not). Understanding student approaches to worked problems, especially for complex skills like math word problem solving, can help improve instruction that incorporates worked problems. Using data from a large-scale word problem solving intervention study with third grade students with MD (Powell et al., 2020) we examined performance on a researcher-made worked word problem measure.

Method: 154 3 rd grade students with MD were shown nine worked word problems (three total, three difference and three change schema problems) at both pre- and post-test. Students were randomized to receive either word problem solving intervention or business as usual. Of the three problems for each schema type, one problem was completely correct, one with incorrect schema but correct arithmetic and one with correct schema but incorrect arithmetic. Students were asked to identify if the worked problem was correct or incorrect and were then probed by the examiner on why they said the problem was right or wrong. The current analyses examined response accuracy and student explanations across the nine worked problems at both pre- and post-test for trends across schema types and schema-arithmetic correctness.

Results: Preliminary findings suggest that at both pre- and post-test, response accuracy is highest when the arithmetic is wrong but the problem is set up correctly and lowest when the arithmetic is correct but the problem is set up incorrectly, suggesting that young students with MD are better at detecting incorrect arithmetic than identifying schema-based errors (i.e., if a word problem is set up incorrectly). Student explanations for their answers support their strong focus on arithmetic rather than problem set-up. Additional analyses for test-retest reliability and validity are being conducted, and differences between pre- and post-test performance will be described. **Discussion:** For third grade students with MD, our findings suggest that they rely on identifying correct arithmetic to decide whether a worked problem is correct or not. Based on the pre-test and post-test findings as well as the quality of student explanations, we make recommendations for the design of worked problem assessments for young children with MD. We also use the findings to discuss whether and how worked problems might be combined with schema-based math word problem solving instruction for young children with MD.

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Thursday morning, Board 9

POWER of Perspective and Persuasive Writing in Social Studies

Introduction: The objectives of this study, embedded within high-quality literacy instruction, are to explicitly teach elementary students to suspend judgment and consider multiple perspectives, write persuasively, and identify how they can contribute to a more equitable present and future. Many Americans perceive our society as increasingly divided (McCoy & Somer, 2019; Svolik, 2019). Educators report a rise in racism, cultural insensitivity, and bullying (Costello, 2016; Rogers et al., 2017). Addressing these issues may lie in fostering empathy and understanding diverse perspectives (Forgiarani et al., 2011; Todd et al., 2011). This study proactively equips students with perspective-taking skills through persuasive writing, which relies on being able to see beyond a singular point of view. Substantial research backs the Self-Regulated Strategy Development (SRSD) model as an effective method for developing writing strategies and self-regulation (Harris & Graham, 2012; What Works Clearinghouse, 2012). Persuasive writing techniques like STOP DARE have been shown to be effective and beneficial for students with diverse learning needs (De La Paz & Graham, 1997; Ennis et al., 2013; Kiuahara et al., 2012). Despite the importance of writing instruction, many students lack ample writing practice opportunities (Gilbert & Graham, 2010), even though more practice is linked to better writing outcomes (Graham et al., 2020). Thus, students need more opportunities to write across subjects, including social studies (Graham et al., 2020; Kellogg & Whiteford, 2009).

Method: In this mixed-methods study, we employed a concurrent triangulation design. This exploratory pilot study had a quantitative pre/post design, complemented by a qualitative component that validated inferences through data triangulation and offered deeper insights into participants' learning and program perceptions. Over six weeks, twelve 4th-grade students underwent 10, 50-minute sessions to learn the persuasive strategy. We introduced a persuasive method based on STOP DARE (De La Paz & Graham, 1997), and added reading source texts. To integrate the quantitative and qualitative findings, we analyzed data both at the class level and through multiple case studies. We chose five students, showcasing a range of learning characteristics (e.g., reading disability, attention needs, emotional/behavioral support).

Results: Initial findings indicate that there is strong evidence for using SRSD persuasive writing in inclusive elementary social studies settings. It also demonstrates potential efficacy for diverse student learning needs across various writing metrics. Finding One: Improvement of writing-related outcomes. All students exhibited growth in functional elements and word count. Additionally, there was an increase of use of social studies source texts throughout the study. Finding Two: Both students and their teacher found SRSD in social studies as highly valuable and important. On a researcher-devised scale meant to quantitatively gauge the significance of perspective-taking (rated from 1 to 10), students provided scores exceeding 10, with entries like 1,000,000 and 10^{673} (10 to the 673rd power). These sentiments were further echoed in focus group discussions and teacher interviews. The results will be presented as multiple case studies, contextualized by each student's unique learning requirements. We are in the process of finalizing this analysis, but it will be ready for presentation at the upcoming conference.

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Thursday evening, Session A, Board 25A

A Research Synthesis on Early Numeracy Assessments for Preschool through Grade 2

Introduction: Early numeracy skills (e.g., counting skills, number recognition, and magnitude comparison) predict later mathematics achievement and overall school performance (Duncan et al., 2007; Jordan et al., 2009). Additionally, early numeracy skills are a foundation for acquiring more advanced mathematics skills (Purpura et al., 2013). Of concern, students who fall behind in early numeracy compared to their peers develop their mathematics knowledge at a slower rate, and the achievement gap increases while they are in the later grades (Morgan et al., 2009; Nguyen et al., 2016). Given the importance of early numeracy skills and their predictive value, it becomes crucial for teachers and researchers to have efficient, reliable, and valid assessment tools that specifically evaluate early numeracy skills. Thus, the purpose of this synthesis is to review early numeracy mathematics screeners, pretests, posttests, and progress monitoring measures and synthesize the predictive validity and reliability of the common early numeracy assessments. With this synthesis, I asked the following research questions: 1. Which early numeracy screeners are used to identify students with mathematics difficulty (MD)? 2. Which early numeracy pretest and posttest measures are used to measure mathematics intervention effects for students with MD? 3. Which early numeracy progress monitoring measures are used within mathematics intervention for students with MD to determine growth? 4. What technical features (e.g., reliability and validity) of these measures are reported?

Method: For this synthesis, the following inclusion criteria are included: 1. Participants included preschool to Grade 2. 2. The studies included an intervention or treatment. Longitudinal studies were excluded if no interventions were implemented. 3. The studies included a screening test, pre- and posttest, and a progress monitoring test to determine the effectiveness of an intervention. Studies without pre-posttests but with screening and progress monitoring tests were also included. However, intervention studies were excluded if they did not demonstrate a screening test to detect MD. 4. Studies were peer-reviewed, and journal articles were available in English. I formally synthesized the literature and identified 12,970 studies via the Education Resources Information Center (ERIC), APA PsycINFO, Academic Search Complete, and Education Source, and after de-duplicating it yielded a total of 9,145 studies. The screening of the studies is ongoing but will finish by October 2023.

Results: In this poster, I will present the results and discussion of the synthesis.

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Thursday evening, Session A, Board 13A

Evaluating Approaches Accounting for Missing Responses: Implications for Instructional Decision-Making for Struggling Writers

Introduction: Teachers need instructionally useful data to make timely and appropriate decisions to support their students with intensive needs (Filderman et al., 2019). Many teachers continue to experience difficulty in instructional decision making in response to students' Curriculum-Based Measurements (CBM) data (Gesel et al., 2021). This difficulty may be due, in part, to the fact that data are primarily used to determine whether students require intensive needs based on level of performance may have limited direct use for teachers' instruction. The purpose of this study is to evaluate word dictation performance of elementary students who are struggling with writing using both a classical approach that considers writing accuracy only and an item tree model approach that considers both writing accuracy and speed. Further, I examine the extent to which the students' results differed by comparing the classical item response theory (IRT) approach, latent regression model (LRM) and item response tree (IRTree) model approach. Specific research questions are presented as follows: Research Question 1. Do the IRTree and LRM approaches exhibit better model fit indices than the classical IRT approach when considering not-reached items? Research Question 2. Do results derived from three different approaches provide different information about students' writing abilities? Research Question 3. Do results of the first form of Word Dictation derived from different approaches could be reliably replicated with the second form of Word Dictation?

Method: This current study will utilize data from a larger research project that evaluated the effectiveness of a professional development program designed to support elementary teachers in implementing data-based instruction for students who are struggling with writing. Participants were recruited in two sites in the Midwest in the United States of America. A total of 523 elementary students participated in the screening tests for determining eligibility for the larger program. CBM-Writing Word Dictation, used for screening tests, was designed to measure transcription skills at the word level by matching sounds and letters correctly to spell words. To perform the analysis for addressing the three research questions, Rasch dichotomous modeling will be conducted using flirt and mirt packages in R to model classical, IRTree model, and LRM approaches.

Results: The study results will examine whether the results from different approaches considering not-reached items (IRTree model and LRM) may yield different ranges of writing ability level, even though students have the same score evaluated by classical IRT approach. Ultimately, results of this study will inform how instructional approaches may differ based on the potential classification by different learner types (i.e., high speed & low accuracy, high speed & high accuracy, low speed & high accuracy, and low speed & low accuracy).

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Thursday morning, Board 10

The Scope of Work Related to Special Education Within Student-Run Peer-Reviewed Journals

Introduction: The purpose of this review was to identify trends in publications focused on special education within student-run peer-reviewed journals of education. Currently, student-run journals of education tend to primarily house papers written by scholars of educational policy and equity and are underused by scholars in the field of special education. This is regrettable because these journals contain valuable perspectives and narratives that may be excluded from publication in mainstream special education journals. Given the field's unfamiliarity with these journals, the present review illuminates oft-missed special education literature.

Method: A comprehensive search for student-run peer-reviewed journals of education yielded 11 journals containing a combined 1,105 records. All records were coded for title, publication date, author(s), affiliation(s), abstract, keywords, volume and issue, and call type. An abstract and keyword search for records that contained one or more of 46 words and/or abbreviations related to special education (e.g., disability, IEP) yielded 111 records with a special education focus. A full-text read was conducted to further code records for characteristics such as type of publication (e.g., intervention study, qualitative study, policy paper, review article) and specific focus on a disability category (e.g., learning disability, deafness, autism spectrum disorder).

Results: Descriptive statistics describing the publications on special education topics, the authors, their affiliations, and the journals in which they were published will be provided on the poster. Visual representations of the coded variables, particularly type of publication and disability category, will be focal. Additionally, several trends will be highlighted: (1) the majority of included records were policy papers and commentaries, (2) the corpus contained a disproportionate focus on low-incidence disabilities relative to mainstream special education journals, and (3) there is homogeneity in the affiliations from which authors published their work.

References (if any):

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Thursday morning, Board 11

The Past, Present, and Future of MTSS: What does the Research Say?

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Introduction: Recent data indicate that students, especially those with disabilities, are struggling to demonstrate the kinds of growth educators would hope to see. In fact, for students with disabilities, almost two thirds of fourth and eighth graders are lacking basic reading and math skills (National Center for Education Statistics [NCES], 2019). Such data are troubling, given that students' achievement at a young age is highly-predictive of future academic success (e.g., Cunningham & Stanovich, 1997). Schools are being pushed, often in the face of limited resources and staffing shortages, to impact outcomes for students with disabilities and students with increasingly complex needs in the post-COVID era. One approach used by educators to positively impact student-level reading outcomes is through the use of multi-tiered systems of support (MTSS). MTSS is a proactive, preventative framework that integrates data and instruction to maximize student achievement and support students social, emotional, and behavior needs. When implemented with fidelity MTSS allows educators to engage in data-based decision making, high-quality instruction and intervention, social and emotional learning, and the positive behavioral supports necessary to ensure positive outcomes for districts, schools, teachers, and students (MTSS Center, 2023). Since its inception in the early 2000s, implementation of MTSS in schools, districts, and across states has evolved significantly. A snapshot of implementation (Berkeley, et al. 2020) revealed while substantive progress towards developing approaches to MTSS have occurred over the last two decades, there remains wide variation in the role of tiered systems within schools, states, and districts. Further convoluting this issue is state of research on MTSS. While there is extensive research on the framework's individual components (e.g., progress monitoring, screening, intensification) there exists a lack of the research on MTSS as a comprehensive framework. As schools have implemented tiered systems of support over the last two decades or so, one thing has become clear: implementing MTSS within the infrastructure of authentic school systems is very challenging (Arden, Gandhi, Zumeta Edmonds, & Danielson, 2017).

Method: This systematic research synthesis sought to further explore the landscape of current research on MTSS to aid our understanding of the origins of MTSS and its evolution in the field of special education. To do this, we framed our investigation around three broad research questions:

- RQ1: What is the historic timeline of MTSS implementation?
- RQ2: What is the landscape of peer-reviewed manuscripts/publications on MTSS as a comprehensive system?
- RQ3: What is missing from the research and what does that mean for suggestions for future directions?

Results: This presentation will share findings from a systematic review and subsequent content analysis of over 1,600 peer refereed articles on MTSS spanning two decades. We will share timeline that outlines the evolution of MTSS implementation, identify findings from research on the framework's component pieces, highlight areas where research is lacking, and provide suggested implications for future directions of research and implementation of MTSS.

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Thursday evening, Session A, Board 26A

A Mathematics-Writing Synthesis: Kindergarten through 12th Grade Mathematics-Writing Efficacy and Instructional Methods

Introduction: The inclusion of mathematics writing in the classroom targets the development and assessment of student understanding of mathematical concepts (Powell et al., 2021). I define the mathematics writing in the classroom as written composition in the form of exploratory, informative, argumentative, and creative writing with a focus on mathematics (Casa et al., 2016). Although over half of educators report using some form of mathematics writing in the classroom at least once a week (Powell et al., 2021), little consensus exists on how to effectively support written composition within mathematics for students with and without mathematics difficulty (MD; Powell et al., 2017). In this synthesis, I examined studies focused on mathematics-writing instruction to answer the following research questions: 1.

What is the efficacy of mathematics-writing instruction for growth in mathematics writing or general mathematics? 2. What is the efficacy of mathematics-writing instruction studies focused on supporting students with MD? 3. What methods are used to practice mathematics writing during mathematics-writing instruction? 4. For the studies focused on students with MD, what methods are used to practice mathematics writing during mathematics-writing instruction?

Method: I conducted a systematic review of peer-reviewed studies, conducted since 2000, focused on instruction in mathematics writing in kindergarten to Grade 12. I included 23 studies with students with and without MD. I coded the 23 studies for study demographics, mathematics writing category, mathematics category, intervention characteristics, student outcomes, and study quality.

Results: To answer the first research questions, I examined overall efficacy for mathematics-writing and mathematics measures. A total of 75% of author teams reported significant effects on measure of mathematics-writing. Additionally, 33% of author teams reported significant effects on measure of mathematics. For the second research question, I examined efficacy for studies focused only on students with MD. Eight studies exclusively focused on students with MD in the treatment group. Two of these studies demonstrated significant effects and six demonstrated mixed effects. To address the third and fourth research questions, I measured the mathematics-writing instructional methods included across all studies and for studies focused on students with MD. Across all studies, the most common instructional practices included discussion and explaining problem solving with informative writing. For studies focused on students with MD, the most common instructional practices included discussion, attack strategies, and graphic organizers. In conclusion, this synthesis provides a review of the emerging literature on mathematics-writing instruction for students with and without MD. The results indicate that mathematics-writing instruction produces positive outcomes for mathematics-writing and can support mathematics outcomes. Additionally, students with MD can benefit from instruction in mathematics writing. Furthermore, the instructional methods included in the studies focused on mathematics writing aligned with those used in mathematics and writing instruction. Yet, the limited number of studies and the limited number of studies with high study quality indicate a need for future rigorous research on mathematics-writing instruction to provide a high-quality analysis of mathematics-writing instruction for students with and without MD.

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Presenter(s): Christy Austin, University of Utah (christy.austin@utah.edu)

Thursday evening, Session C, Board 10C

Integrating Math Language Instruction within High Frequency Word Reading Instruction in Kindergarten

Introduction: Accurate and efficient recognition of high-frequency words is critical, as the top 100. Most frequently used words make up approximately 50% of the words children encounter while reading. Young readers and students with and at risk for reading disabilities often exhibit challenges reading high-frequency words accurately and efficiently. These difficulties are further complicated by the irregular spelling of a large percentage of high-frequency words. Connectionist models hypothesize that readers use orthographic (spelling), phonological (pronunciation), and semantic (meaning) information to read words accurately and efficiently. However, the irregularity of high-frequency words makes it challenging for readers to decode these words using orthographic and phonological information alone. Additionally, many of these words have a relatively abstract meaning that makes them challenging to explain to young or poor readers.

Method: This within-subjects experimental design study examined the relative effect of integrating math language/vocabulary instruction within high-frequency word reading instruction compared to high-frequency word reading instruction alone on the high-frequency word reading accuracy, high-frequency word reading efficiency, high-frequency word spelling, and math language/vocabulary knowledge of kindergarten students. The top 100 most frequent words from Fry (1980) with meaning in early math instruction were targeted for instruction in this study. Half of the high-frequency words in each set were taught with high-frequency word reading instruction only and the other half taught by integrating math language/vocabulary instruction within high-frequency word reading instruction. A repeated measures analysis of variance (ANOVA) was conducted to assess if type of instruction (high-frequency instruction only vs. integrated math language/vocabulary instruction and high-frequency word reading instruction) resulted in differences in high-frequency word reading accuracy, high-frequency word reading efficiency, high-frequency word spelling, and math language/vocabulary knowledge immediately following each week of lessons for the words targeted instructionally that week and at posttest for all high-frequency words taught across the 4 weeks of instruction.

Results: Findings demonstrate that integrating math language/vocabulary instruction within high-frequency word reading instruction supports kindergarten students in reading and spelling high-frequency words. These findings suggest the benefit of considering theory in the design of word reading instruction for early or emerging readers. It is critical that early word reading instruction promotes reading words in context and builds students' semantic understanding of words to support strong word reading skills and facilitate comprehension.

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Thursday evening, Session B, Board 14B

Data-based individualization: relating professional development and implementation to teacher and administrator perceptions

Additional authors: Devin Kearns, PhD, University of Connecticut Meaghan McKenna, PhD

Introduction: Nationwide, 4th and 8th grade reading scores have not changed significantly since 1992 and have declined in most states compared to 2019 (NCES, 2022). About one third of students in Grade 4 and Grade 8 are considered below basic reading level. Research suggests that students who receive systematic, research-based intensive intervention can change their literacy trajectory (e.g., Fuchs & Fuchs, 2009; Fuchs & Fuchs, 2001; Vaughn et al., 2010). However, validated programs are not universally effective. Some students, likely 3% to 5%, need more help (NCII, 2013). Students with intensive needs often require 10-30X more practice than peers (Gersten et al., 2009). Data-based individualization (DBI) is a specific 5-step process of delivering intensive intervention involving instruction, progress monitoring, and adaptation (National Center on Intensive Intervention, n.d.). It is based on evidence from studies of data-based program modification and experimental teaching (e.g., Capizzi & Fuchs, 2005; Deno & Mirkin, 1977; Fuchs et al., 1984). The problem is that many practitioners might not know about DBI or how to implement it. Some research shows that professional development (PD) targeting DBI can lead to positive effects on teacher outcomes ($g = 0.57$; Gesel et al., 2021). The Connecticut Intensive Intervention Implementation Initiative (CONNi4) is a multi-year collaborative project between the UConn and the Connecticut State Department of Education to evaluate the implementation of DBI in CT public schools. UConn team leaders provide district PDs focused on how to practice DBI effectively. The purpose of this poster is to explore how PD on DBI affects teacher and administrator perceptions of students with intensive needs (year one) and how that relates to school retention (year two).

Method: PD trainings spanned two in the beginning of the school years. Day 1 was approximately 4.5 hours and provided (a) an overview of CONNi4, (b) the importance of intensive intervention and DBI, and (c) the steps of the DBI process. Day 2 was approximately 3.5 hours the three conditions needed for DBI success: (a) leadership, (b) capacity and (c) collaboration were addressed. Participants completed pre- and post-training surveys consisting of closed and open-ended questions pertaining to self-perceptions and beliefs related to DBI. The sample in Year 1 consisted of 6 schools across 4 CT districts (a total of 35 participants: 14 administrators, 21 educators). The current sample in Year 2 consists of 20 schools across 10 districts (totaling 174 participants: 41 administrators, 83 educators, 50 interventionists). We use a mixed-methods approach to examine changes in educator and administrator perceptions and how they relate to retention in Year 2.

Results: We collected quantitative data (e.g., likert scale items) and qualitative data (e.g., open-ended responses). Themes within open-ended questions were identified through content analysis (Coffey & Atkinson, 1996). The following research questions are addressed: (1) What type of perceptions do educators and administrators generally have about supporting students with intensive needs in literacy? (2) How do perceptions change after participating in DBI focused PD? and (3) How do perceptions relate to the continuation of DBI the following year?

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Presenter(s): Kristen D. Beach, University of North Carolina at Charlotte (kbeach4@uncc.edu); Miranda Fitzgerald, University of North Carolina at Charlotte

Thursday evening, Session C, Board 11C

Vocabulary Instruction for Students with Learning Disabilities: Synthesizing 50+ Years of Research

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Introduction: Nearly every model of reading comprehension includes vocabulary knowledge as a critical component skill that either directly or indirectly impacts reading comprehension. Furthermore, the Common Core State Literacy Standards emphasize the instruction of both general academic vocabulary and domain-specific vocabulary for students across grade levels (National Governors Association [NGA] & Council of Chief State School Officers, 2010). Students with learning disabilities (LD) in reading typically demonstrate lower levels of vocabulary knowledge compared to their non-disabled peers (Gilmour et al., 2019; Simmons & Kame'enui, 1990), and interventions studies have demonstrated that students benefit from vocabulary instruction. Many of these studies have been synthesized in prior research for students across grades 4-12 (Jitendra et al., 2004) and for middle and high school students (Bryant et al., 2003; Kuder, 2017). However, these syntheses were conducted prior to rigorous best practice guidelines for systematic reviews and meta-analysis and/or have limited scope in terms of (a) dates of publication; (b) inclusion of grey literature; and/or (c) ages or grades of students. Only one synthesis included meta-analysis (Jitendra et al., 2004). Thus, we aimed to complete an updated and comprehensive systematic review and meta-analysis of vocabulary research focusing on students with LD.

Method: Our search included seven electronic databases, hand-searches of 14 journals, and ancestral searches for all 35 studies included in our synthesis. Inclusion criteria were as follows: (a) published between 1970 and 2023, including both peer-reviewed and grey literature; (b) 50% or more of the sample diagnosed with LD; (c) participants in grades 3-8; (d) instruction targeted vocabulary (word meaning) knowledge; (e) availability of outcome data on vocabulary knowledge; and (f) not a secondary analysis. The initial electronic search procedures yielded 1,686 research studies with an additional three studies identified through hand or ancestral searches. Two researchers independently screened titles, abstracts and full texts using Covidence (2023) software. Out of the 1,686 studies, 135 were full-text-screened, and 35 studies met the inclusion criteria for the synthesis. We plan to complete a narrative synthesis of all the studies, and a meta-analysis for a subset.

Results: The 35 studies included 23 peer-reviewed articles, 6 dissertations, and 6 M.A. theses. Study designs were pre-experimental within group (n = 6); experimental or quasi-experimental group design (n = 17); or single-case design (n = 12). Analyses are ongoing and organized around the following key areas: (a) characteristics of the sample; (b) characteristics of the vocabulary instruction; (c) vocabulary outcome measurement; and (d) research design. Educational implications for instruction and research will be centered around promising approaches to instruction, strength of research designs, the quality of research, and areas for future research and development. We anticipate completing these analyses by December 2023.

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Thursday morning, Board 13

Impact of content-focused lesson study on teacher knowledge, collaboration, and MTSS instruction

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Introduction: General and special educators often do not have needed knowledge and skills or collaborative opportunities to implement coordinated, evidence-based instruction within an MTSS framework. Thus, students with reading difficulties often have incoherent learning experiences and insufficient opportunities to practice essential skills and strategies. To address this challenge, we used a randomized control design to examine the impact of Project Coordinate (PC), a professional development approach that incorporates online content modules and lesson study, on 4th grade general and special education teachers' knowledge, collaborative planning, and instructional practice in the literacy content area. This study was designed to add to a small body of research, mostly qualitative, that examined collaborative professional development for general and special educators working in an MTSS framework (Castillo et al., 2022), and to the emerging body of empirical research on content-focused, LS (Benedict et al., 2023). We hypothesized that general and special teachers who participated in PC would acquire the knowledge, instructional skill, and collaborative practice needed for providing effective, evidence-based reading instruction for students with RD. Our research questions included: What is the impact of participating in Project Coordinate on teachers' knowledge compared to participation in the control? What is the impact of participating in Project Coordinate on teachers' collaborative tiered practice compared to participation in the control? How do teachers in the treatment group change their effective implementation of evidence-based strategies (e.g., cognitive strategies for analyzing words and summarizing text) from the pretest to implementation phase?

Method: We employed a randomized controlled trial (RCT) with a pre- and post-intervention measurement research design to answer our research questions and test our theory of change. However, we had to pause the study during the last 2 months of school because of the pandemic and we could not collect post teacher observation data nor post assessment data from student achievement measures. We were able to collect implementation data for treatment teachers through video recordings of classroom instruction provided as part of the LS process. The participants of this study were 43 general and special education 4th grade teachers from 15 schools (8 treatment, 7 control), located across two urban, one rural, and one suburban school district in the southwest United States. Three different measures were used to evaluate the impact of Project Coordinate on teacher outcomes: the Project Coordinate Knowledge Survey (PC-KS), the Project Coordinate Collaboration Survey (PC-CS), and the Project Coordinate Observation Protocol (PC-OP). A one-way ANCOVA to examine changes in teacher knowledge; a Wilcoxon Signed Rank test, a Wilcoxon rank-sum test, and the one-way ANCOVA to examine changes in the frequency of tiered instruction, teachers' perceptions of collaborative planning; and a paired samples t-test to examine changes in the treatment teachers' instructional practice.

Results: Results from these analyses showed that PC teachers did not make significant gains in knowledge; however, these teachers did make significant gains on collaborative and instructional practice though the findings are complex. During our presentation we will discuss implications of these findings for structuring professional development that improves teachers' MTSS literacy instruction.

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Thursday evening, Session B, Board 16B

Effects of Explicit Peer-Assisted Instruction on Reading Skills of At-Risk Children in Iceland

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Introduction: Oral reading fluency is an essential component of skilled reading and an important ground for reading comprehension. Reading fluency and its foundations are highly teachable, and explicit and systematic teaching with frequent repetitions benefits all children but is essential for children at risk for reading problems. An effective approach to building reading fluency is systematic phonics-based instruction, emphasizing letter-sound relationships, phonological awareness, and decoding skills. One approach involving systematic phonics instruction and class-wide peer tutoring is Peer-Assisted Learning Strategies, PALS. PALS has been developed to teach early reading skills in Kindergarten (K-PALS) and 1st grade (First grade PALS). Research in the United States has found PALS to effectively support early reading progress of diverse student groups, but this study aimed to assess the effects of Icelandic versions of K-PALS and 1st grade PALS on reading skills of students in Iceland, with its distinct orthography and teaching practices in schools.

Method: This two-year study assessed the effects of reading instruction, including K-PALS and 1st-grade PALS, on at-risk students' early reading skills in 1st and 2nd grade. Eight elementary schools in Iceland's capital area were recruited, matched by neighborhood, school size, and teacher experience, and then randomly assigned to PALS group (with teachers receiving training in K-PALS and 1st-grade PALS) and wait-list control group. Participants were at-risk children ($n = 62$) selected from the larger study ($N = 311$). The risk of reading difficulties was determined through visual inspection of pre-test data, as Letter Naming Fluency less than 5 letter names per min and Letter Sound Knowledge less than 5 sounds total. Dependent variables were oral reading fluency, measured six times over the two years, and reading comprehension, measured three times. Data were analyzed by fitting a longitudinal mixed model to the data using the GAMLj module in Jamovi.

Results: Findings revealed that at-risk students who received PALS as part of their reading instruction in 1st and 2nd grade, showed significantly more growth across the two years than the control group on both reading measures ($p < .01$). Students receiving PALS showed an increase in oral reading fluency by 18 more words per minute across the two years ($d = .64$) compared to the wait-list control group. Similarly, reading comprehension increase was moderate ($d = .59$) for students receiving PALS. These findings indicate that including PALS as part of early reading instruction could be a more effective approach than reading instruction typically being used for establishing reading skills of 1st grade students at-risk for reading difficulties.

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Thursday evening, Session B, Board 27B

A Systematic Review of Mathematics Intervention Studies Incorporating Motivational Components

Introduction: Researchers recommend that tier 2 and 3 mathematics interventions incorporate strategies to promote students' motivation as one potential way to maximize student gains (Gersten et al., 2009). Such strategies can include praising students for their efforts, providing rewards, and having students set goals and chart their progress. While these recommendations are well-known, it is still not certain the extent to which tier 2 and 3 mathematics interventions in the literature have incorporated motivational components, nor how much value is added through implementing these strategies alongside those targeted to improve students' performance in mathematics. The purpose of this systematic literature review is to examine the research base on tier 2 and 3 mathematics interventions to determine 1) how many published research studies on mathematics interventions report implementing motivational strategies?, 2) what specific motivational strategies are reported?, and 3) how many published research studies on mathematics interventions report results on behavioral outcomes in addition to academic outcomes?

Method: This study is a systematic review to summarize the extent to which mathematics intervention research studies have reported incorporating strategies to promote students' motivation. First, I will conduct a search to locate mathematics intervention studies published from 2000 to 2023 using the following electronic databases: Academic Search Ultimate, Education Source, and ERIC via EBSCO Host. The following search terms will be used for each database: mathematics, math, math difficulties, arithmetic, computation, algebra, geometry, problem solving, motivation, behavior, goal-setting, self-monitoring, praise, reward, tracker, engagement. I will screen articles to determine which meet the following inclusion criteria: the study must be empirical research reporting the results of an intervention with mathematics outcomes as the primary dependent variable, the study must have been conducted in a school setting in the United States, and the study must have been conducted with students in grades K-12 or post-high. For the purposes of this review, an intervention is defined as supplementary (i.e., in addition to or a replacement for typically occurring mathematics instruction) mathematics instruction that targets a specific mathematics concept or skill. A researcher will code each study for the following characteristics: research design, grade level of participants, disability classification of participants, number of participants, targeted mathematics skill/concept, mathematics intervention/strategies implemented as part of the intervention, motivational and/or behavioral strategies implemented concurrently/as a component of the intervention, reported results for each dependent variable. Data will be analyzed using descriptive statistics and frequency counts. Descriptive statistics will be calculated to report the percentage of studies that incorporated a motivational component, as well as the percentage of studies that reported motivation/behavior outcomes. Frequency data will be provided for the types of mathematics interventions/strategies implemented, as well as for the types of motivational strategies implemented. A graduate student will conduct inter-observer agreement (IOA) for a minimum of 30% of the articles that meet inclusion criteria. IOA will consist of exact agreement for each item, and be calculated by dividing the number of agreements by the total number of agreements plus disagreements.

Results: Data collection and analysis is on-going (anticipated to be completed December 2023).

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Thursday morning, Board 14

Investigating the challenges and benefits experienced by parents of school-aged children with autism spectrum disorder (ASD) during COVID-19 online schooling.

Introduction: The COVID-19 outbreak caused a global pandemic and related restrictions of social distancing and quarantine that further exacerbated the need to provide education and interventions to students with ASD in an alternative or online setting (Stenhoff et al., 2020; Spain et al., 2021). In the USA schools were obliged by the United States Department of Education (2020) to provide individualized education programs (IEP) to students with disabilities during the pandemic through distant education (online; Stenhoff et al., 2020). The Individuals with Disabilities Education Act (IDEA) strongly supports the importance of family-school collaboration (2004). Parents themselves emphasized the importance of regular and productive communication with teachers and school (Garbe et al., 2020). The unprecedented time of the COVID-19 pandemic even further demonstrated the importance of parents' involvement and school-home collaborations (Hurwitz et al., 2021; Garbe et al., 2020). The studies conducted during the time of pandemic showed that parents and caregivers of students with ASD were critical partners in providing high-quality instructions and interventions in the context of distant and virtual learning and pandemic (Hurwitz et al., 2021; White et al., 2021). The purpose of the study is to investigate the challenges and benefits experienced by parents of school-aged children with autism spectrum disorder (ASD) during COVID-19 online schooling. Research questions: 1) Were parents satisfied with special education services provided online during COVID to their children with ASD? 2) What are the challenges and benefits experienced by parents of students with ASD in online schooling? 3) What are parents' suggestions for a more satisfactory online schooling experience for their children with ASD? 4) Is there a correlation between family income and level of education with the satisfaction with online schooling?

Method: An electronic survey was distributed to parents via email and social media network. The survey was developed based on the literature review and feedback from the team of experts and parents. The IRB approval was secured before conducting the survey. A total number of 53 parents participated in the study. Most of the respondents were mothers (86%) who have bachelor's degrees (34%) with an average family income of \$45,000- \$75000 (44% of respondents). All of the respondents had a child with ASD in the family and 80% of those children received special education under the Autism category at school. 90% of participants experienced online learning during the Covid-19 pandemic. The responses were analyzed in both quantitative (descriptive statistics) and qualitative (thematic analyses) manner.

Results: Research question 1: Most of the parents (65%) disagreed that they were satisfied with the quality of online schooling. However, some of the parents (27%) agreed that online interventions can be supplemental to in-person education. Research Questions 2: The following challenges were highlighted by parents such as technical difficulties, the child refusing to participate in online classes, distractions in the environment, lack of social skills to participate in an online setting, and attention/focus challenges. The following were the benefits of online learning: increased skills in using technologies, flexibility, no travel time, connection and communication with teachers, the opportunity to observe a child's learning from home, smoother transition in the morning, reduced social anxiety due to bullying/teasing at school. Research question 3: Suggestions from parents were provided for online schooling and interventions: recorded lectures would help students to listen again and/or pause, create social groups so students can meet and interact, have shorter synchronous sessions, training for parents should be provided, smaller class size, more choices in tasks and activities, regular and efficient parent-teacher communication, and suggestion to implement a hybrid model for online learning (in-person plus online). Research question 4: There was a small positive correlation between family's income and satisfaction with online schooling $r(53) = .19, p = .281$. There was a small negative correlation between level of parent's education and satisfaction with online schooling $r(53) = -.16, p = .367$.

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Thursday evening, Session A, Board 27A

Improving Expository Text Comprehension in Adolescent Spanish-English Bilingual Learners with Learning Disabilities

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Introduction: Reading comprehension is arguably the most important skill for children to develop as they progress through their formal education. However, many adolescent bilingual students with learning disabilities (LD) struggle with reading comprehension in the late elementary and middle grades as they encounter different text structures (Lesaux & Kieffer, 2010, Li, et al. 2020) and the demand for more complex oral language skills, vocabulary, and background knowledge increases (Farnia & Geva, 2013). Although there is a great need for research-based reading comprehension interventions for bilingual students with LD, there are few studies with this population of students. We identified several studies that reported positive reading comprehension outcomes for bilingual learners and students with disabilities (Vaughn et al, 2009, 2010, 2011; Wanzek et al., 2011). These studies incorporated multiple components that looked to improve reading comprehension. Within the components, a common tool included in these "packaged" interventions was the use of graphic organizers. The purpose of this study was to evaluate whether the use of a funnel map graphic organizer improved the reading comprehension of bilingual learners with LD when they were reading descriptive expository texts. The intervention lessons were directly aligned with Common Core State Standards (National Governors Association, 2010) literacy strands within content area standards. The intervention utilized explicit instruction to teach students to use a graphic organizer as a notetaking tool to aid in the comprehension of descriptive texts. We hypothesized that the use of the funnel map would enable students to better comprehend expository texts because it helps readers focus on key concepts and how they relate to other concepts in the text and reduce the need to hold information in working memory. The research questions were: 1. Are students able to independently draw and correctly label a funnel map within 10 sessions? 2. Does explicit instruction on the use of the funnel map increase expository comprehension in students who are bilingual learners with LD? 3. Does explicit instruction on the use of a funnel map have a bigger effect on students' ability to answer literal vs inferential questions? 4. Do students perceive the usefulness of the funnel map to support reading comprehension?

Method: Using a single case design, we followed the What Works Clearinghouse Handbook 4.1 Single Case Design guidelines (2020) to ensure that the study met standards without reservations. The study consisted of three phases: baseline, intervention, and maintenance and had five baseline data points, 10 intervention data points, and two maintenance data points with three replications. Due to COVID-19 restrictions, all baseline, intervention, and follow up sessions were delivered via Zoom in a 1:1 format with a trained research assistant.

Results: Each participant learned to create an accurate funnel map within four sessions. Text comprehension scores began to increase within three sessions. Results showed the positive effect of using the funnel map for improving comprehension of expository texts. Individual TAU effect sizes (.81-.92) and overall, TAU-U effect sizes (.86) and a Between Case-Standardized Mean Difference (BC-SMD) of 1.87 showed the intervention to be highly effective.

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Thursday morning, Board 15

Exploring Virtual Professional Learning Pathways for Self-Regulated Strategy Development

Introduction: It is important to explore a variety of modes of mediums through which professional learning can effectively take place. Given the constraints on time and resources for teachers, an online self-paced professional development course, coupled with virtual coaching sessions, may be a suitable alternative to in-person PD. In this study, the goal is to explore the utility of these formats in order to refine the online course and design a larger experimental study. The PD is focused on SRSD (Harris & Graham, 2009) for opinion writing. Given the persistent gaps in writing achievement for U.S. students (National Center for Education Statistics, 2012), and the ever-increasing demands on educators in post-Covid classrooms, it is important to consider nascent ways to improve teachers' preparedness for evidence-based writing instruction. This study seeks to answer two research questions: RQ 1: Is an online, asynchronous professional development for SRSD effective at building core SRSD and instructional knowledge for K-5 teachers and facilitators, as measured by their scores on six post-PD knowledge assessments over time? RQ 2: To what extent are teachers successful at implementing SRSD after the asynchronous PD and synchronous virtual coaching sessions, as measured by post-instruction surveys on instructional progress, self-efficacy for teaching writing, and reported student outcomes after one semester?

Method: Across 10 partner schools, teachers (n = 35) and their facilitators (n = 15) from grades K-5 took the online PD course in the summer of 2023, and began virtual coaching sessions in Fall 2023. They completed a knowledge measure for each stage of SRSD during their self-paced asynchronous learning experience. At the conclusion of the Fall 2023 semester, teachers and facilitators will complete surveys to measure their instructional progress, self-reported fidelity, and self-efficacy for teaching writing with SRSD.

Results: Data from the knowledge measures will be analyzed as raw scores and correct percentages by individual and by school. Data from the post-semester surveys will be analyzed descriptively and compared with pre-determined goals set by teachers and facilitators. From these data, findings will be reported as they pertain to research questions one and two. As this research is exploratory, directions for future experimental research will be proposed.

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Presenter(s): Hugh W. Catts, Florida State University (hcatts@fsu.edu)

Thursday evening, Session C, Board 13C

Computer adaptive word and nonword reading measures for the primary grades

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Introduction: The ability to recognize and/or decode printed words is a fundamental skill for school success. Some children gain word reading skills with great ease while others struggle to learn to read and require additional accommodations. Differences in word reading ability have been measured by standardized tests and progress monitoring tools. Standardized tests have the advantage of normative data but often require that numerous items be administered. Progress monitoring tools have the advantage of multiple forms for repeated testing but often lack normative data. Both forms of assessment are generally built using item-level analyses for selection of test items. This is done at the group level and all students are tested with the same items. Computer adaptive measures also use item-level data, but item presentation is based on students' performance on a given item. This paper describes the development and validation of computer adaptive measures of word/nonword reading for K-3 students.

Method: In the developmental phase, data were collected to determine item-level CAT parameters for each of the measures. Items from large banks of words and nonwords were administered to a total of 1086 K-3 students using a partial longitudinal design. To reduce the testing time, subsets of approximately 200 students were employed to determine the difficulty and discrimination of individual items. To link items across subgroups, a small set of items was repeated for each subgroup assessment. Two-parameter logistic (2PL) Item Response Theory models were then used to determine each item's level of difficulty and discrimination. In the validation phase of the project, we ran a series of simulations to configure the CAT tasks. Utilizing an online tool, we determined the maximum and minimum number of items, initial items, and the Standard Error threshold to terminate each task. Next, the concurrent and predictive validity of the measures was examined in a large sample of 1st grade students (see below). In this portion of the study, 1st grade students' performances on CAT word/nonword reading measures administered during the fall, winter, and spring were compared to their performances on the Letter/word Reading and Nonsense Word Decoding subtests of the Kaufman Test of Educational Achievement (KTEA), which was administered during similar time points. For testing and data storage, we employed a two-device system linked to each other and a central cloud network.

Results: Analyses showed a sufficient range of item difficulty and discrimination. Validation testing indicated near normal distributions and appropriate means/SD as well as growth across 1st grade for both measures. We further assessed the concurrent and predictive validity of each of the measures with the corresponding subtest from the KTEA. Results showed high concurrent (.84-.88) and predictive correlations (.83-.86) between our CAT word reading task and KTEA (letters/words). CAT nonword had a more moderate correlation with KTEA (nonsense word, .69-.75). This appears to be due to strong floor effects in the KTEA nonsense word measure but near normal distributions in our CAT nonword task.

References (if any):

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Thursday evening, Session A, Board 3A

A Meta-Analytic Review of Spelling Interventions for Students with or At-Risk for Learning Disabilities

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Introduction: Proficient literacy skills are associated with higher educational attainment and improved health outcomes (DeWalt & Hink, 2009). Unfortunately, many students in the United States struggle with reading and writing acquisition. Longitudinal data suggest that only 37% and 24% of 12th-grade students met proficiency in reading and writing, respectively (National Center for Educational Statistics [NCES], 2019; 2011). For students with disabilities, that percentage plummets, with only 13% proficient in reading and 5% in writing. Proficient writing is dependent on spelling (Berninger et al., 2003) and spelling instruction has also been shown to improve reading skills (Graham & Hebert, 2011; Graham & Santangelo, 2014); therefore, it is imperative that students with and at-risk for learning disabilities (LD) are provided with effective interventions to support development of spelling skills. Previous systematic reviews and meta-analyses have reported that spelling interventions improve both spelling (Wanzek et al., 2005; Williams et al., 2017; Williams et al., 2018) and reading (Galushka et al., 2022; Graham & Santangelo, 2014) outcomes for students with and at-risk for LD. However, no previous systematic review has meta-analyzed spelling intervention studies employing both group design and single-case design (SCD). Further, no review has included unpublished dissertations and theses. Although previous reviews (e.g., Galushka et al., 2022) have explored how spelling approaches moderated reading and spelling outcomes, this review will include studies with proximal, researcher developed outcome measures as well as standardized measures. Thus, the present meta-analytic review sought to address the following questions: (1) What are the effects of spelling interventions on the spelling and reading outcomes for students with and at-risk for LD in kindergarten through 12th grade? (2) How do these effects differ based on characteristics of the participants (e.g., grade level), intervention (e.g., dosage), and study (e.g., design, measure type)? (3) Does the instructional approach used for spelling moderate effect?

Method: A comprehensive electronic database search was conducted for research, including dissertations and theses, published in English between 1975 and December 2022. Studies were considered eligible for inclusion if they included: (a) students with and at-risk for LD in kindergarten through 12th grade; (b) at least one primary outcome related to spelling or reading; (c) a spelling intervention in at least one condition that consisted mostly of tasks (>50%) that aimed to increase spelling proficiency in English; and (d) experimental, quasi-experimental, or single-case design. The initial database search yielded 3,916 results; titles and abstracts were reviewed for potential inclusion. Next, 205 studies underwent full-text screening and 59 studies met inclusion criteria. Studies were coded and data extracted to identify (a) study design features, (b) participant characteristics, (c) intervention characteristics (e.g., spelling approach), (d) outcome measures, (e) theory alignment, and (f) effect sizes. Meta-analytic techniques will account for dependencies within nested data (Hedges et al., 2010). For studies employing group designs, standardized mean difference effect sizes will be calculated between intervention and comparison conditions (e.g., control or alternative-treatment control). For SCD studies, between-case parametric effect sizes will be calculated to account for variance within and across phases. Additionally, between-case standardized mean differences (BC-SMD) will be calculated for applicable designs as the between-case effect size index. Moderation analyses will be run with robust variance estimation random effect-models. Implications of spelling interventions in the context of theories of writing and reading development will be discussed.

Results: Data analysis is underway and will be complete by January.

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Thursday evening, Session B, Board 23B

Examining the Effects of Cross-Age Peer Tutoring

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Introduction: Cross-Age peer tutoring refers to a model that pairs an older student (the tutor), with a younger student (the tutee). Demonstrating academic and behavioral benefits for tutors and tutees, it presents a cost-effective and powerful tool for schools to implement. This meta-analysis investigates the effects and characteristics of cross-age tutoring.

Method: The study included peer-reviewed articles in English, requiring sample sizes of at least two classrooms per group. It analyzed experimental or quasi-experimental studies with an academic focus. The research concentrated on non-reciprocal and non-professional cross-age tutoring within the school context. To capture a wide range of studies, a search was conducted through online databases ERIC, APA PsychInfo, and Education Source. Search dates included 2016, when the last meta-analysis of cross-age tutoring occurred (Shenderovich et al., 2016), to May 2023. A hand search of relevant journals and table of contents search will also be conducted.

Results: By calculating effect sizes for meta-analyses, we will determine the effects of cross-age tutoring on academic performance for both school-aged tutors and tutees and the characteristics of the intervention (e.g., duration, length of session, structure, tutor age/skill, dyad characteristics) related to academic outcomes. Finally, implications for researchers and teachers regarding cross-age tutoring will be highlighted.

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Presenter(s): Trelani Milburn Chapman, University of Alberta (trelani@ualberta.ca)

Thursday evening, Session B, Board 18B

Efficient Oral Language Screening to Identify Risk in Kindergarten to Second Grade

Additional authors: Lesly Wade-Woolley University of Alberta; Suzanne Adlof, University of South Carolina

Introduction: Purpose: Universal screening for oral language is a necessary part of a Response to Intervention (RTI) protocol in schools. This enables schools to identify students who have Developmental Language Disorder (DLD) or other language learning needs but who have no prior diagnosis nor previous referral for speech-language pathology services. Group-administered language screeners can be efficient for screening whole classrooms simultaneously; however, few exist and, of those that do, research is needed to ensure the validity and reliability of their use to correctly identify students who are at risk. As such, the current study examines the validity and reliability of a group-administered oral language screener with kindergarten, first-, and second-grade classrooms in Alberta, Canada. This study investigates factor structure, item function and bias, and establishes whether the items function similarly for students across grades. Also, students' results will be examined in relation to standardized tests of literacy.

Method: Universal oral language screens were group-administered by school personnel in schools in one district in Alberta for kindergarten (N= 318), first-grade (N= 325), and second-grade (N= 310). The district informed us of all students who were already identified and the nature of their diagnosis and/or language learning needs. Using regional data, we established local benchmarks along with three levels of risk (i.e., 1 SD below the mean, 1.5 SD below the mean, and 2 SD below the mean) for each grade.

Results: Confirmatory factor analysis (CFA) indicated that the 21 items represented a single construct of language with acceptable fit indices for each grade; however, one or two items did not load significantly on the factor for each grade but these differed from one another. Item response theory (IRT) analysis is underway to evaluate items. Measures of literacy were regressed onto the language screen factor with mild to moderate relations between language and literacy factors indicating that literacy screening is insufficient alone for ensuring that students who are at risk for reading-related learning disabilities are identified and receive remediation as early as possible. **Conclusions:** Universal oral language screening is a necessary part of Tier 1 support in RTI and can support identification of students who are at risk, instructional planning, and researcher-school district partnerships for reduction of risk. (Note: Two additional regions will be included in the analysis at the time of the conference).

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Thursday morning, Board 3

Comparing the Impact of COVID-19 on Reading Performance for Students With and Without Disabilities

Additional authors: S. Blair Payne, The University of Texas at Austin Tim T. Andress, The University of Texas at Austin

Introduction: One of the most important academic skills for children to develop is reading proficiency. Yet, a lot of children struggle to acquire proficient reading skills (Gustafsson, 2021). The COVID-19 pandemic caused an unprecedented disruption in education reality due to extended school closures, the abrupt shift to online learning, and the substantial social and emotional challenges raising concerns about the impact that it had on students learning (UNESCO, 2021). In the U.S., the pandemic's impact on education unfolded uniquely. By March 2020, public schools were shut down, and a variety of learning methods-from in person instruction to online learning and hybrid models-were adopted to face the challenges of school closures (Centers for Disease Control and Prevention, 2020). Approximately two years of learning were interrupted in varying degrees, and achievement distributions varied between school districts, subject areas, and student demographics (Goldhaber et al., 2022). Questions have been raised about how the pandemic's disruption affected reading outcomes, particularly for students with disabilities, who were already struggling with literacy challenges before the pandemic (Stanovich, 2009). Using NAEP data, this study aims to give a thorough review of how the COVID-19 pandemic affected the reading scores of fourth and eighth-grade students, both with and without disabilities. The following is our research question: How do the NAEP reading scores for all the students, and for the subgroups of students with and without disabilities, compare before and after the pandemic?

Method: This poster presents the key findings from a comprehensive study conducted by Chatzoglou et al. (2023). It is a secondary descriptive analysis of data about reading collected by NAEP in 2019 and 2022. The data analysis was conducted using the NAEP Data Explorer (National Center for Education Statistics, 2022). Descriptive statistics and significance tests for three groups (all students, students with disabilities and students without disabilities) were calculated for a large sample of students (n = 219,500) in two grade levels (Grade 4 and 8).

Results: The results indicate that the reading performance of fourth and eighth grade students significantly decreased from 2019 to 2022. While the decrease of reading outcomes of students without disabilities were statistically significant, the reading scores of students with disabilities did not show a significant decrease. The difference in the reading scores between students with and without disabilities were statistically significant before and after the pandemic, with students with disabilities constantly underperforming in reading students without disabilities. It is imperative need to provide effective support in reading to students with disabilities. Improving the quality of teaching and services for students with disabilities may contribute to decrease the literacy gap between students with and without disabilities. As the school districts might receive funding to support students after the pandemic, we recommend intensifying the support for the students with disabilities.

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Thursday morning, Board 16

Comparing Linguistically Diverse Students' Academic Growth in Schools with/without Response to Intervention

Additional authors: Kristen McMaster (University of Minnesota Twin Cities) Moon Young Savana Bak (University of Minnesota Twin Cities)

Introduction: The dominant discourse surrounding the academic achievement of multilingual students has centered around the students' characteristics such as language and disability (Kangas, 2021). Yet, to comprehensively understand the challenges faced by students with linguistically diverse backgrounds, researchers must examine factors beyond student characteristics and investigate system-level mechanisms, such as learning opportunities. Response to Intervention (RTI) is crucial in providing a framework for planning and delivering these learning opportunities. Although researchers have suggested positive effects of RTI on academic outcomes of students with linguistically diverse backgrounds (Burns et al., 2005; Choi et al., 2012), less is known about its longitudinal effects. Understanding the longitudinal impact of RTI implementation on student outcomes, particularly among multilingual students, is crucial as these students' English proficiency and familiarity with the US education system evolve over time, influencing language development and academic achievement (August & Shanahan, 2006). This study aimed to examine the developmental trajectories of reading and math from kindergarten to fifth grade and explore differences, if any, in the trajectories between linguistically diverse students from schools with RTI and their peers from schools without RTI. Our primary research question was: Does the growth trajectory of reading and math among multilingual students and English-fluent monolingual students from schools that implement RTI differ from those that do not, when controlling for the effects of students' English proficiency, disability status, and English proficiency-disability interaction?

Method: Data were drawn from the Early Childhood Longitudinal Study Kindergarten Class of 2010-2011 (ECLS-K: 2011). We used four different analytic samples: (1) multilingual students from RTI-implementing schools (N = 467); (2) multilingual students from non-RTI schools (N = 1,758); (3) English-fluent monolingual students from RTI-implementing schools (N = 1,220); and (4) English-fluent monolingual students from non-RTI schools (N = 4,987). We used students' reading and math Item Response Theory (IRT) scale scores from kindergarten through fifth grade as outcome variables and included disability status, English oral proficiency, the interaction between disability and English proficiency, and school poverty level as covariates. We used mixed-effects modeling and applied a quadratic model to each student sample.

Results: Analysis of math development among multilingual students and reading and math development among English monolingual students revealed a common trend: students from RTI-implementing schools showed faster growth in assessment scores compared to their peers with the same linguistic background attending non-RTI schools. However, the reading growth of multilingual students showed a different pattern, where reading scores of students from non-RTI schools initially increased at a faster rate. In terms of the covariates, disability status had a significant association with academic achievement and growth, regardless of language status, RTI condition, or academic domains. English proficiency was a significant factor in explaining initial status in all samples in both reading and math. The interaction between disability and English proficiency was generally not significant. Based on these findings, we discuss the implications and future research directions, highlighting the need to support schools in implementing RTI practices that effectively serve the needs of multilingual students, particularly in reading development.

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Thursday evening, Session B, Board 1B

How predictive are oral reading fluency scores of literacy screener risk-status for different groups of learners?

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Introduction: In the fall of 2023, over 191,975 public school students in Virginia across Grades 1-3 will participate in new state-supported screening system, the Virginia Language and Literacy Screening System (VALLSS). Subtests on the VALLSS include those that assess both code based and language comprehension skills. As part of state-mandated reporting, all students receive a score along a band of risk, derived from a scaled score created by performance on several of the code-based subtests on each grade level screener. The subtests included in this band of risk include: letter-sounds (Grade 1 only), phoneme segmenting, real-word decoding, pseudoword decoding, and encoding. Students also participate in 2 one-minute ORF subtests, scored by correct words read per minute (WPM). Currently, the ORF score is not factored into the band of risk score. Analyses for this presentation will determine the extent to which ORF score is predictive of band of risk score for Grades 1-3 students and whether or not differences exist for typical learners and those labeled English Learners, receiving Special Education services, or as Economically Disadvantaged.

Method: Sample: Data for this study will come from the Fall 2023 administration of the new Virginia Language and Literacy Screening System (VALLSS). Over 191,975 Virginia public school students in Grades 1-3 will participate in the assessment. Measures: Measures used for the classification of risk status include the following code-based tasks: letter-sounds (28 items; Grade 1 only), phoneme segmenting (10 items), real-word decoding (15 items), pseudoword decoding (15 items), and encoding (16 items). Scores on the individual code-based tasks are combined to create a composite score of overall code-based skill, and this composite score is then compared to a cut-point to identify children at risk for reading difficulties. Students with scores below the cut-point are identified as at risk. In addition to the code-based tasks, students are administered an oral reading fluency measure, which is not included in the overall code-based composite score used for risk classification. Statistical analysis: Multilevel logistic regression analysis will be used to evaluate whether risk status is associated with ORF, and whether the association differs for typical learners and those labeled English Learners, receiving Special Education services, or as Economically Disadvantaged. Risk will be modeled as a binary outcome using a logit-link function. To account for the nesting of students within classrooms, a multilevel modeling approach will be used. Classroom-level predictor variables of ... will be included in the model. Results of logistic models are reported using odds ratios (ORs), where a statistically significant OR greater than 1 indicates a positive association with the independent variable and a higher likelihood of being classified as at-risk. All analyses will be conducted in R.

Results: Results are not yet available. Data has just begun being collected and will be completed by the middle of October, with analyses taking place in October and November.

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Thursday morning, Board 17

Exploring Assessment of Rational Number Sense of 6th Graders With Math Difficulties

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Introduction: The development of rational number sense, the ability to engage in part-whole thinking using numbers in fractions, ratios, proportions, percentages, and decimals, is critical for establishing successful trajectories in mathematics (Hansen et al., 2017). Developing reliable practices to identify and ameliorate mathematics difficulties (MD) related to developing rational number sense is essential for addressing concerns related to mathematics outcomes. This study explores the utility and validity of: 1) Algebra Readiness Progress Monitoring (ARPM), a CBM composed of three measures of students' ability to manipulate whole numbers, rational numbers, and integers related to key algebra readiness knowledge and skills; and 2) PAR (Promoting Algebra Readiness) Proximal Assessment, which assesses conceptual understanding and procedural fluency of the content in Grade 6 CCSS. Previous studies have demonstrated differential outcomes across distal and proximal measures (Clarke et al., 2020). It is important to investigate whether the PAR Proximal Assessment could be used as a screening tool to more accurately identify specific skill deficits for students at risk for rational number difficulties when compared to the ARPM, a CBM designed to focus on rational number content (ARPM).

Method: The PAR pilot study included 112 students identified as at-risk for MD from four schools in Oregon. It examined the efficacy of a Tier 2 6th grade mathematics intervention that addresses knowledge of fractions, key fractions concepts, and application of fraction understanding to procedures and problem-solving aligned with the CCSS for Mathematics. Internal consistency of the ARPM across measures ranges from .92 to .97 (Ketterlin-Geller et al., 2015). Alpha coefficients of the PAR Proximal Assessment were reported as .71 at pretest and .86 at posttest (Clarke et al., 2020). The following research questions will be addressed: What is the concurrent and predictive validity of these measures? Which measure shows greater classification accuracy when compared with state testing results at pre-test? How do outcomes on ARPM and PAR Proximal Assessment differ in relation to gains demonstrated at post-test?

Results: Results from this study will include an examination of concurrent and predictive validity of ARPM and PAR Proximal Assessment, correlations of Oregon state assessment (OAKS) results and results on the CBMs, and a regression analysis of differences between gains on the general measure and gains on the PAR Proximal Assessment. PAR Proximal Assessment and OAKS will be used as criterion measures. Implications for future research will be discussed in relation to the quality of outcome measures and usage in educational decision-making.

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Thursday evening, Session A, Board 9A

Kindergarten Teacher Self-Efficacy for Providing Reading Instruction to Students with Reading Difficulties

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Introduction: In the teaching context, self-efficacy is the extent to which teachers believe they can influence a student's performance through their instruction (Khan et al., 2015; Tschannen-Moran & Johnson, 2011). Bandura's (1977; 1997) Social Cognitive Theory suggests that to provide effective early reading instruction, teachers need to believe they have the necessary knowledge and skills. When a teacher believes that they have the capacity to provide effective reading instruction, it increases their ability to engage in behaviors that are in alignment with that goal. Empirical research supports this argument, demonstrating positive associations between reading teachers' self-efficacy beliefs and the quality of reading instruction they provide, as well as the reading achievement of students in their classrooms (Guo et al., 2012; Varghese et al., 2016). However, teacher survey data suggests that teachers have lower self-efficacy for providing instruction to students with RDs (Bos et al., 2001; Washburn et al., 2011). The purpose of this study was to extend the existing body of knowledge related to teacher self-efficacy for teaching reading by administering surveys and conducting semi-structured interviews with teachers. We asked the following research questions: How do kindergarten teachers describe their self-efficacy in providing reading instruction to students with RDs? How does self-efficacy for teaching students with RDs relate to ratings of sense of efficacy for providing literacy instruction generally? How does self-efficacy for teaching students with RDs relate to knowledge to teach reading? What factors do kindergarten teachers perceive as barriers to and facilitators of self-efficacy in teaching students with RDs?

Method: Fifteen kindergarten teachers participated in semi-structured interviews and completed surveys related to sense of efficacy and knowledge for teaching reading. Interviews allowed us the flexibility to explore teachers' self-efficacy beliefs when providing reading instruction to students with RDs. In particular, during these interviews, we were able to have conversations with teachers that allowed us to better understand the barriers to and facilitators of their self-efficacy beliefs. Interviews were analyzed using a thematic analytical approach. The use of the surveys allowed us to further explore our findings related to teachers' self-efficacy. In particular, surveys enabled us to examine the relations between teachers' verbalized self-efficacy beliefs related to providing reading instruction to students with RDs and their sense of efficacy and knowledge for teaching reading. Survey data were analyzed descriptively.

Results: Findings indicated that kindergarten teachers experience a moderate to high level of self-efficacy in providing reading instruction to students with RDs. In fact, teachers often reported feeling more confident teaching students with RDs than teaching their typically developing or above-average peers. However, several themes that emerged from the data focused on barriers to, rather than facilitators of, teacher self-efficacy. In particular, teachers often discussed (a) student behaviors, including a lack of attention abilities, engagement, or motivation; (b) gaps in their own knowledge and skills; (c) not having resources and time; and (d) emotional challenges of working with students with RDs as barriers to their self-efficacy.

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Presenter(s): Alisha N. Demchak, University of Virginia (and3u@virginia.edu)
Samantha Vann, University of Virginia (gyx3jm@virginia.edu)
Thursday morning, Board 18

Predictiveness of Pseudoword Versus Real Word Decoding on ORF Across Grades

Additional authors: Emily Solari, University of Virginia Carlin Conner, University of Virginia

Introduction: Well-developed literacy skills are essential for learning and thriving in a language rich and productive society. Literacy proficiency is a recognized determinant of later health outcomes, social connections, and vocational success. Therefore, it is important to efficiently identify students who may have reading difficulties to inform instruction. Literacy screening tools are designed to identify children at risk for future reading and writing difficulties by assessing and analyzing specific skill domains. Student performance on screening tools is compared to an established benchmark, which allows for identification of students who are potentially "at risk" of future reading and writing difficulties. As part of a new state-supported screening system, in the Commonwealth of Virginia, during the fall of 2023, students will partake in various subtasks in both language and code-base domains. Two of the code-base subtasks include real word decoding and pseudoword decoding. Gaining a better understanding of the predictive ability of real word decoding and pseudoword decoding, at various time points in a student's reading development, could improve the screening and identification procedures for children at risk for reading difficulties.

Method: The purpose of this study is to examine the difference in predictive power of real word decoding and pseudoword decoding on ORF in first and third grade. Analysis for this presentation will attempt to answer the following: To what extent do real word decoding and pseudoword decoding predict performance on a one-minute ORF passage? Does the predictive power differ in first grade and third grade? Does the predictive power differ for students with a designation of English Learning or learner receiving Special Education services in first and third grade?

Results: Data will be finished being collected in October and will be analyzed by December.

Presenter(s): Andres F Dorado Solarte, University of Alberta (adorados@ualberta.ca)
Trelani Milburn Chapman, University of Alberta (trelani@ualberta.ca)
Thursday evening, Session B, Board 19B

Looking Beyond Shared Book Reading for Quality of Parent Child Conversations

Additional authors:

Introduction: Parent-child conversation is an interpersonal context expected to contribute to children's early language and literacy learning and socioemotional development. Shared book reading (SBR) enables parents to engage children in conversation related to stories. Dosage of book reading moderates the effects of parents' abilities on children's language learning (Dowdall et al., 2020); however, book reading requires a tool (i.e., the book) and a focused time and context for joint attention to the book. For many families, book reading occurs at bedtime when conversation might be minimal. Few studies have examined the linguistic quality of parent-child conversation during SBR relative to other conversations. Studies indicate that some parents use a more elaborative style during reminiscing share past event than in everyday conversation (e.g., adjectives; Fivush, 2007). This elaborative style has been positively associated with children's language, autobiographical memory, and theory of mind (e.g., Waters et al., 2019). Similar to reminiscing, when parents and children engage in retelling and talking about stories they previously read together (without the book), they collaborate to recall the facts and events of the story. Importantly, both types of conversations give children more agency and they do not require a tool (i.e., the book) so they can occur more frequently or in multiple contexts compared to SBR. This foundational study describes within-subject differences in the quality of conversations. **Research Questions:** Are there significant differences in parents' style of language use and strategies to engage their children in reminiscing and co-construction of a story previously read together compared to SBR? Also, are there significant differences in the children's language use and engagement during these three types of conversations?

Method: 72 parent-child dyads (Mean age of the children = 52.9 months, SD=3.8; female = 42) met examiners over two days. On Day 1, dyads read a storybook together and then they engaged in reminiscing about a shared past family celebration. On Day 2, each dyad worked together to retell and talk about the story that they read the previous day. There was no time limit. Video-recorded interactions were transcribed and coded for features of literate language (i.e., elaborated noun phrases, adverbs, subordination, tier 2 words, multi-morphemic words, and mental state verbs) as well as microstructure elements (e.g., mean length of utterance, number of different words, etc.). Inter-rater reliability was acceptable.

Results: Repeated measures ANOVAs (accounting for multiple comparisons) were conducted to identify within-subject effects and pairwise comparisons. Length of conversation differed within- and between-dyads so analyses used rate per minute (i.e., RPM) to compare quality. Parents used significantly higher RPM for statements, questions, tier 2 words, mental state verbs and greater lexical diversity during reminiscing and co-construction of a story compared to SBR, with no significant differences between the two. Children used significantly higher RPM for statements, questions, tier 2 words, mental state verbs and greater lexical diversity during reminiscing compared to both co-construction of a story and SBR. **Implications:** Educators and clinicians can promote reminiscing and co-constructing familiar stories as forms of parent-child conversation in addition to SBR.

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Presenter(s): Jake Downs, Utah State University (jake.downs@usu.edu)

Friday morning, Board 2

Exploring Stretch Text Interventions for Dysfluent Readers: Two Matched Sample Studies

Introduction: The advent of the Common Core State Standards ushered in an era of heightened attention to text complexity. However, the impact on students performing below benchmark on measures of oral reading fluency remains less clear. One recent review reported that less skilled readers' rate and accuracy decreased concomitantly with increases in text complexity (Amendum et al., 2018). Vaughn et al. 2022 indicated there was moderate evidence to support the use of stretch text for intervention with students grades 4-9, however, this analysis did not review fluency as an outcome domain. More research is needed on the oral reading fluency outcomes for students who struggle to read on grade level. This poster session reports a pair of intervention studies using at and above grade level text with readers not meeting proficiency in grade level fluency assessments.

Method: Study 1 • Participants: The study involved 388 third- and fourth-grade students identified as below or well below benchmark on mid-year Acadience Oral Reading Fluency (ORF) data. • Matching: Participants were matched using logistic regression with key covariates, resulting in a one-to-one match without replacement, with a distance caliper of 0.15 standard deviations. • Text Selection: Researchers selected 50 texts across eight genres, assessing complexity post-hoc using the Flesch Kincaid readability formula ($M=5.3$, $SD=3.81$). • Intervention: The intervention group ($n = 160$) engaged in 50 sessions of repeated reading using the selected texts, employing various reading techniques. The control group followed the school district's standard third-grade direct instruction intervention curriculum (Engelmann et al., 2008). Study 2 • Designed using results from Study 1 • Participants: A different sample of third-grade students participated. • Matching: The same matching protocol as Study 1 resulted in 56 students in both the treatment and control groups. • Intervention: The treatment group ($n = 56$) received explicit instruction in multisyllabic word reading using sample words from the text, followed by repeated reading using the same protocol as Study 1. The control group ($n = 56$) followed the same intervention curriculum as in Study 1.

Results: In Study 1, the treatment condition outperformed the control condition on measures of ORF, with effect sizes (Hedge's g) of 0.84 for the treatment group and 0.56 for the control group. The same pattern was observed in Maze scores (Treatment $g = 1.38$; Control $g = 1.05$) and Acadience Composite measures (treatment: $g = 1.06$; control: $g = 0.83$). Post hoc analysis also revealed strong outcomes for multilingual learners in Acadience Composite (Treatment $g = 1.71$; Control $g = 0.61$). In Study 2, the treatment group also outperformed the control group in ORF, Accuracy, and Composite measures, with effect sizes of 0.95, 0.51, and 1.19, respectively. These data endorse the effectiveness of incorporating complex texts into intervention programs for students who struggle to read on grade level. Specifically, students who encounter difficulties reading grade level text fluently are most likely to excel with well-designed scaffolds.

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Presenter(s): Jaclyn Dynia, SproutFive's Center for Early Childhood Innovation (jdynia@sproutfive.org)

Thursday evening, Session C, Board 16C

Associations Among Literacy Ability, Autism Traits, and Quality of Life

Additional authors: Chandra Lebenhagen, University of Calgary

Introduction: This study sought the self-reported perspectives of autistic adults on their literacy abilities to explore the associations among self-reported literacy ability, autism traits, and QoL. The following questions were asked: (a) How do autistic adults rate their literacy ability?; and (b) Whether and to what extent does autistic adults' literacy ability (level) relate to autism traits and QoL? To the best of our knowledge, this is the first study to investigate the significance of perceptions of literacy ability and QoL in autistic adults. We hypothesized that a heterogeneous literacy profile would be observed based on previous literature, with some individuals reporting strengths and others reporting challenges. Finally, we hypothesized that QoL domains would be predicted by literacy ability and autism traits.

Method: Participants were 163 autistic adults who completed measures of their literacy-related abilities, autism traits, and QoL. Participants were recruited via listservs, professional organizations, social media, and Amazon's Mechanical Turk to complete the survey online. Inclusion criteria were: (a) 18 years or older and (b) identified as autistic. The overall literacy ability score was calculated by summing the Likert responses (1: poorly - 5: excellent) of four literacy ability questions: (a) How well do you understand text when it's read to you, (b) How well do you understand text when you read it yourself, (c) How would you rate your current ability to read, and (d) How would you rate your current ability to write. This resulted in a scale from 4 to 20, which showed excellent internal consistency (Cronbach's alpha = .81). Autism traits were measure with the AQ-10 (Allison et al., 2012), a short screener for adults, including 10 items for a maximum score of 10, with higher scores indicating more autistic traits. QoL was measure by the World Health Organization Quality of Life (WHOQOL)-BREF.

Results: Descriptive statistics for the overall total literacy ability score revealed diversity in autistic adults' perception of their literacy skills with a tendency to view them positively, as demonstrated by the top 75% of participants reporting an overall literacy ability of 12 and above. All four domains of QoL were positively correlated ($r_s = .48$ to $.67$). Literacy ability significantly positively correlated (small to moderate) with each of these QoL domains: Physical Health ($r = .22$), Psychological Health ($r = .26$), Social Relationships ($r = .16$), and Environment ($r = .38$). Four multiple regressions were conducted to further understand the relations between literacy ability and QoL: one per QoL domain. Using a forced entry method, literacy ability, age, and autism traits were entered into the model as predictors of QoL. Each model was significant, capturing between 6 and 14% of the variance in QoL. Literacy ability was positively related to three of the four domains: physical health, psychological health, and environment, while autism traits were negatively related to physical health and social relationships. Age was not related to any aspect of QoL.

Presenter(s): Patrick Ehrman, Purdue University (pehrman@purdue.edu)

Thursday evening, Session C, Board 19C

Profiles of Early Mathematics Learners

Additional authors: Sarah Eason, Purdue University Rob Duncan, Purdue University David Purpura, Purdue University

Introduction: Previous work has established that multiple academic and cognitive skills can contribute to difficulty with mathematics (Purpura et al., 2017; Schmitt et al., 2017). However, minimal work has been done on how using both domain-specific (i.e., numeracy) and domain-general skills (i.e., executive function (EF), language, vocabulary) can help to identify children at risk for mathematics difficulties. Given that an estimated 3% to 8% of children are diagnosed with a math-related disability (Desoete et al., 2004) and more children experience difficulties with mathematics, it is imperative to understand how both domain-specific and domain-general skills, along with key demographic factors, can be used to identify children at risk for future mathematics difficulties.

Method: The analytic sample for this study consisted of 674 children (52.3% male) from three cohorts. At Time 1 (Fall of preschool), children were four to five years old (M_{age}=4 years, 10 months; SD = 3.8), and the sample was 43.0% Black or African American, 31.8% White, 13.4% Hispanic or Latino, 10.6% Multiracial, 0.7% Asian, and 0.4% other. We used a latent profile analysis to generate profiles of early math learners using children's early numeracy, math language, executive function (EF), literacy, and vocabulary skills. Then, child age, child gender, parent education, and parent income were used to predict profile membership. Lastly, profiles were used to predict end of preschool, kindergarten entry, and end of kindergarten mathematics performance.

Results: Based on the model fit statistics and interpretability, a six-profile solution emerged from the data. Profile 1 (N = 68) was characterized by low performance across all assessments. Profile 2 (N = 173) was characterized by low-average performance on math and language measures but low performance on EF measures. Profile 3 (N = 91) was characterized by average math, high-average language, and low EF. Profile 4 (N = 110) was characterized by average math and low-average language but high EF. Profile 5 (N = 112) was characterized by high math and language performance but average EF. Profile 6 (N = 120) was characterized by high performance across all assessments. Younger children who had parents with fewer years of education were significantly more likely to be in Profile 1 and Profile 2 compared to Profile 6. Children with parents with fewer years of education were more likely to be in Profile 4 compared to Profile 6. Children in Profile 1 performed worse than every other profile in mathematics in the spring of preschool and the fall and spring of kindergarten. Profile 6 performed significantly higher in mathematics than all other profiles in the spring of preschool and kindergarten and significantly better than all profiles except for Profile 5 in the fall of kindergarten. Domain-specific skills did not differentiate performance at the low end of performance but did for higher performing profiles. For example, children in the lowest performing profile were low across all skills. Children in the two highest performing profiles differed on EF performance, and the profile with the higher EF performed better on future mathematics.

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Presenter(s): Christine Espin, Leiden University (espinca@fsw.leidenuniv.nl)

Thursday morning, Board 1

Universal Instruction in Literacy (UIL): An online tutoring intervention for struggling readers

Additional authors: Jochanan Veerbeek, Marianne van Dijken, Marijke van der Liende, Marit van Delft, Leiden University

Introduction: The COVID pandemic has led to concerns about students falling behind academically, especially students with learning difficulties (The Netherlands Inspection of Education, 2022; U.S. Department of Education, 2021). In response to the educational challenges stemming from COVID, we developed the UIL (Universal Instruction for Literacy), an online, supplemental, reading tutoring intervention for students with reading difficulties. The UIL draws upon evidence-based methods for improving reading (e.g., Carnine et al., 1990; Therrien, 2004; Palinscar & Brown, 1984) and is designed to be easy to learn, efficient, and adaptable. At last year's PCRC (22-23), we presented the results of a small-scale RCT study in which we compared the effects of the UIL to a read-along (RA) control condition in which tutors read along with the students. The UIL and RA represent two contrasting approaches to improving reading. The UIL uses explicit, direct instruction techniques (see Rosenshine, 2012) to address word reading, fluency, vocabulary, and comprehension. The RA focuses on helping children to read more (e.g., Allington & McGill-Franzen, 2012). In this poster, we present the results of a follow-up RCT in which we compared the effects of the UIL to both the RA and a no-treatment control condition. We examined effects on students' reading performance, reading enjoyment and self-perception, and opinions about the interventions.

Method: Fifty-four 5th-grade students from eight schools in the Netherlands were randomly assigned to the UIL, RA or a wait-list control condition. Participants in the UIL and RA groups received eight 25-30 min tutoring sessions over a period of 4 weeks. For all three groups, reading performance (word reading, fluency, and comprehension), reading motivation and self-perception were tested at pre- and posttest. In addition, satisfaction with the online tutoring was measured at posttest.

Results: Initial analyses revealed that students in the UIL and RA group made greater improvements in word reading, fluency and comprehension than students in the no-treatment control condition, but effects were seen only on measure proximal to instruction. No differences were found on distal (transfer) measures. Further, although improvements on the proximal measures were greater for the UIL than for RA students, differences were not significant (or only marginally significant). Reading motivation and self-perception improved for students over time, but no group x time differences were found. Finally, students rated both the UIL and RA reading interventions positively, with average ratings of 4 on a 5-point scale. Data collection is continuing this year.

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Presenter(s): David Fainstein, Seattle University (dfainstein@seattleu.edu)

Thursday evening, Session A, Board 28A

Training on Relationships in Tutoring: Preparedness and Instructional Effectiveness for Novice Tutors

Introduction: Recent calls for academic instructional support in the form of tutoring is widespread throughout the United States (Jordan, 2022). These calls stem from the literature base that highlights tutoring as an effective intervention that is remarkably powerful for K-12 students (Nickow et al., 2020). Scholars who suggest tutoring as a method to combat academic skill gaps stand on an evidence-base of highly variable tutoring practices. More specifically, implementing tutoring can take many different forms broadly (e.g., peer-assisted versus high-low skill dyads, small group versus one-on-one) and narrowly (e.g., within a 20-minute lesson, instructional delivery could be standardized per a script within a packaged intervention versus freeform with minimal teacher direction). The variability of tutoring practices is not a negative; instead, one could argue that it is advantageous to have tutoring practices that are as variable as the classrooms where tutors work. However, this does present a challenge for tutor training: how does one provide an impactful, useful, and relevant training to tutors who enter a wide variety of instructional settings? Large-scale projects from ongoing research at the National Student Support Accelerator (2023) indicate that many research questions focus on student academic gains, fewer on tutor-student relationships, and fewer still on tutor-teacher relationships. We hypothesize that tutor-teacher relationships are highly relevant to all instructional settings, and training tutors to establish and maintain this relationship is critical to the sustainability of student skill growth.

Method: This proposed study seeks to delve into the multifaceted relational impact of community-based tutors working in public schools, unraveling the intricate connections they foster between K-12 students and their educators. More specifically, this first phase of a broader research program on community-based tutoring seeks to answer two questions: (1) does explicit training on forming and maintaining relationships with teachers improve preparedness for tutors entering classrooms? (2) do tutors improve their feelings of instructional effectiveness immediately after training or at one-month follow up? The author team is partnering with a community-based tutoring agency who works with a large school district in the Pacific Northwest. We anticipate an n = 25 novice tutors who will receive our training and complete immediate and delayed surveys. In addition, we are aiming to collect data from tutors (n = 15) with at least one year of experience who did not receive our training to serve as a contrast group. Our survey instrument collects qualitative and quantitative data that amalgamates validated measures (e.g., Teacher Efficacy Scale), a measure from the National Student Support Accelerator (2023), and researcher-developed questions that are contextually relevant to this community-based tutoring agency. The data we collect will point to feasibility, acceptability, perception, and implementation results that will serve as preliminary findings towards a broader research program of tutor training.

Results: Our study is ongoing, and results are not yet available. We anticipate initial analyses to be completed in November 2023. In addition, we will make training materials, procedures, anonymized data, and preliminary analyses available through the Open Science Framework throughout the lifecycle of this research project.

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Presenter(s): Nick Feroce, Lexia Learning (nick.feroce@lexialearning.com)

Thursday evening, Session C, Board 17C

Impact of a blended English language learning tool with dually classified SPED/EL students

Additional authors: Rajendra Chattergoon, Lexia Learning

Introduction: Research shows that blended learning tools, which combine classroom-technology integration and teacher-led instruction, can improve the language and literacy outcomes of cognitively and linguistically diverse elementary-age students, including English learners (ELs) and special education students (SPED) (e.g. Hurwitz & Vanacore, 2022). Despite this, there is scant research which evaluates how such tools can improve the learning outcomes of dually classified SPED/EL students. To this extent, we present findings from a quasi-experimental study comparing the English language and literacy outcomes of SPED/EL students who used a blended English language learning program or did not during the 2021-2022 school year. The blended learning program, Lexia English, aims to improve the academic English language skills for ELs in grades K-6 by providing targeted speaking and listening practice via structured conversational interactions. Students complete listening and speaking activities around topics related to math, science, social studies, general knowledge, and biographies. The program was designed in line with English language instructional practices that research has shown to be effective for both SPED and non-SPED students, including explicit systematic instruction and development of oral language skills (Hall et al., 2019).

Method: We examined student scores on two standardized assessments of English language proficiency and English language arts. Data come from 1321 EL students in grades 3-5 in 1 US school district (n=13 schools) who were enrolled in structured English immersion programs and were using Lexia English to supplement their designated English language development instruction. Approximately 19% of students (n=214) had a classified primary disability, with the most frequent classifications being specific learning disability (50%), speech-language impairment (19%), and autism (13%). Crucially, we compared outcomes of students who used the program (SPED treatment: n=190; non-SPED treatment: n=961) to those who did not (SPED control: n=24; non-SPED control: n=146).

Results: Results from multilevel linear regressions showed that, after controlling for student demographic characteristics and school variability, SPED treatment students showed significantly larger English language proficiency gains compared to SPED control students (effect size, ES: 0.36). Additionally, while non-SPED control students made larger gains than SPED control students (ES: 0.54) SPED and non-SPED treatment students made similar English language proficiency gains (ES: 0.07). For the literacy assessment, SPED treatment students who used the program with fidelity scored higher than SPED control students (ES: 0.62). Overall, these findings contribute to several understudied areas of research for dually classified SPED/EL students, including effective approaches for upper-elementary students, the role of focused oral language instruction, and how blended learning tools can facilitate the broader literacy development of such learners.

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Presenter(s): Beth Feuer, The University of Texas at Austin (efeuer@utexas.edu)

Thursday evening, Session C, Board 20C

Exploration of Differences in Goal Setting and Attainment by Race/Ethnicity and Disability

Additional authors: Jessica R. Toste, The University of Texas at Austin Karrie A. Shogren, University of Kansas

Introduction: Students with disabilities continue to experience disparate outcomes as compared to their peers (Mazzoti et al., 2021). These disparities are further exacerbated for students from racially and ethnically diverse backgrounds (Trainor & Robertson, 2022). The Self-Determined Learning Model of Instruction (SDLMI; Hagiwara et al., 2020; Shogren et al., 2019) is an evidence-based intervention, tested across multiple experimental studies. An essential feature of the SDLMI is facilitating students' self-directed goal setting. Progress is assessed through Goal Attainment Scaling (GAS) by students and teachers. Shogren and colleagues (2021) found that there was alignment between students and teachers in ratings of goal attainment in 49.85% of cases. It is possible that there are differences in goal setting and/or ratings of attainment across racially and ethnically minoritized students; it has been argued that some groups of students may operationally define self-determination and goals focused on familial interdependence over independence (Shogren et al. 2012; Shogren & Wehmeyer, 2017). If differences were found, it is possible that ratings of goal attainment may not align with teachers, who are predominantly White (Kozleski et al., 2014). To date, there has not been an examination of whether the essential feature of the SDLMI-goal setting and attainment-differs for racially and ethnically diverse students and their White peers, and by disability. This study sought to address four research questions: 1. Do the types of student-selected goals differ across groups of secondary students identified as racially and ethnically minoritized and White students with and without disabilities? 2. What is the range of student and teacher ratings of goal attainment outcomes for these student-selected goals? Are there differences in student GAS ratings based on student race/ethnicity crossed with disability status? 3. Does the degree of alignment between student and teacher ratings of students' goal attainment outcomes differ based on student race/ethnicity crossed with disability status? 4.

To what degree does student-teacher alignment on ratings of goal attainment predict end-of-year self-determination outcomes, and does this association differ based on student race/ethnicity crossed with disability status?

Method: We conducted a secondary analysis of data collected in three-year multisite randomized controlled trial of the SDLMI (Raley et al., 2021). My analytic sample included 2,322 students with and without disabilities. Approximately 20% of the sample were students with identified disabilities. Participants identified as Black (n = 954; 41.08%), White (n = 913, 39.13%), Hispanic/Latinx (n = 255, 10.98%), Multiracial (n = 96; 4.13%), Asian 3.05% (n = 71; 3.05%), Native American/American Indian (n = 13; 0.55%), and Native Hawaiian or Pacific Islander (n = 4; 0.17%) and unspecified (n = 16; 0.68%).

Results: The types of goals set were coded using qualitative inductive analysis. Descriptive analyses were conducted on the types of goals set across student groups. Percentages and ranges of teacher GAS scores were calculated. To identify if differences existed in student GAS ratings based on race/ethnicity crossed with disability status, an ANOVA was run. Bayes multi-level modeling was used to analyze the degree to which student-teacher alignment on goal attainment predicted self-determination outcomes.

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How Are We All Doing? Teacher Stress, Coping, and Satisfaction

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Introduction: Teacher stress and attrition have featured prominently in the news and research and policy briefs in recent years (e.g. Barnum, 2023; Gabryel, 2022; Levy & Schultz, 2023) as pandemic-related changes and cultural shifts have placed them more and more in the spotlight. Though there is evidence that the problem is not as bad as is it sometimes perceived (Goldhaber & Theobald, 2023), the questions of how stressed teachers are and how they are coping, as well as what factors contribute to that stress and might be leveraged to lower teacher stress levels, remain salient. We looked at responses to a large nationally representative survey to answer two research questions: 1. How do teachers rate their levels of stress, success in coping with stress, and satisfaction with teaching as a career? 2. Are teachers' ratings of stress, coping, and satisfaction associated with their roles and school environment (access to sources of information about students with disabilities, program continuity, classroom disruption, curriculum consistency, and principal support), after accounting for teacher, classroom, and school characteristics?

Method: We used data from the 2022 Learn Together Surveys, surveys of the American Educator Panels by RAND Corporation. The American Educator Panel consists of teachers across the United States recruited from K-12 public schools using probability sampling. We excluded teachers who reported that 0% of the students they taught had disabilities, resulting in an unweighted sample of 3,255. We focused on three variables to describe teachers' affect and satisfaction in RQ1, which then act as the dependent variable in RQ2: teacher levels of stress, coping with job stress, and satisfaction with teaching. We included the role of the teacher in supporting students with disabilities, access to informational sources about students, school environment, curriculum consistency, and principal support as independent variables. We also looked at variables related to teachers' backgrounds and the characteristics of the schools and classrooms in which they worked. To address our first research question, we reported the means, medians, and standard deviations of teachers' reported levels of stress, their coping with stress, and their satisfaction with teaching. To address the second research question, we used a series of regression models.

Results: Teachers reported high average levels of stress, moderate levels of coping, and moderate levels of satisfaction with teaching. General educators across all service delivery models reported lower average levels of stress, higher average coping, and higher average satisfaction with teaching than special education teachers teaching a special education classroom or resource room, though nearly all of these associations were not statistically significant. Notably, service delivery model explained less than 1% of the variation in the outcomes we studied. Program continuity, curriculum consistency, and principal support were associated with lower levels of stress, higher coping, and higher satisfaction with teaching. Classroom disruptions, both related to behavior and technology, were associated with high levels of stress, lower coping, and lower satisfaction with teaching. Teachers' ratings of their access to sources of information about students with disabilities was not associated with reporting coping or satisfaction. However, a one unit change in ratings of access to sources of information about students with disabilities was associated with a statistically significant -0.04 unit change in stress, an association that increased to -0.05 after we included additional control variables in the models. The percentage of students with disabilities teachers' taught was not associated with any of the dependent variables. Teachers with less than 10 years of experience reported lower coping and satisfaction than experienced teachers. Teachers in middle schools and high schools rated their stress lower than elementary school teachers. Similarly, teachers in middle schools and high schools rated their coping higher than elementary school teachers.

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Thursday evening, Session C, Board 21C

Closing the Gap: Science Success and Multilingual Learners in U.S. Elementary Schools

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Introduction: Despite a heightened focus on nurturing students' science achievement in the U.S. (Committee on STEM, 2013), a significant proportion of students fail to exhibit science proficiency (NCES, 2019). Furthermore, disparities in science trace back to kindergarten (e.g., Morgan et al., 2016), underlining the imperative for increased attention to early science education. Remarkably, empirical research specifically targeting science achievement among multilingual students in the early elementary grades is largely absent in the U.S. Drawing from domain-general theories (Vygotsky, 1962; Pascual-Leone & Johnson, 2021), recent investigations have shown that English language proficiency and executive functioning (EF) predict science across early elementary school for multilingual and English monolingual students in the U.S. (Foster et al., 2022). However, Foster et al. (2022) exclusively examined development from kindergarten to third grade, leaving questions about growth trajectories unanswered. To gain deeper insights into science and its underpinnings, this study extends Foster et al. (2022) by exploring science growth from kindergarten through fifth grade, including additional factors thought to support science success, which are informed by the culturally adapted bioecological model of development (see Velez-Agosto et al., 2017).

Method: The current study used the ECLS-K: 2011 dataset, encompassing both multilingual (n=1,023) and English monolingual (n=12,329) children. Science was measured annually in the spring, spanning from kindergarten to fifth grade. Predictors of science, also assessed in the spring of kindergarten, included English language proficiency, EF, math and reading achievement, parental engagement in science and math activities, classroom science content coverage, and SES.

Results: Consistent with Morgan et al. (2016), multigroup latent growth curve models indicated that multilinguals exhibited lower science knowledge in kindergarten. This disparity likely arises from multilingual students' diverse cultural backgrounds, resulting in less familiarity with U.S. normative scientific concepts. Nevertheless, multilinguals demonstrated accelerated science learning during early elementary school compared to their monolingual counterparts, with no disparities in science scores observed between the groups by fifth grade. The associations between language proficiency, EF, math, and reading with science performance, paralleled findings from prior studies (Foster et al., 2022; Maerten-Rivera et al., 2010). Language proficiency predicted science growth for both groups, while math only predicted science growth for multilinguals. Conversely, reading exclusively predicted growth for monolinguals. Math and reading proficiency may have functioned in a compensatory capacity for students in cases where their science knowledge was less developed (O'Reilly & McNamara, 2007). Surprisingly, contrary to the hypotheses of others (Bauer & Booth, 2019; Anthony & Ogg, 2019), and our own, EF did not appear to facilitate the acquisition of science-related knowledge and skills when accounting for other child characteristics. Finally, findings concerning parent-engaged science and math activities in relation to initial science levels or growth were mixed. The present results challenge the prevailing belief that multilingualism in the U.S. correlates with poorer academic performance. They also underscore the critical need to invest in interventions that affirm the cultural and linguistic identities of multilingual students to bridge early science disparities. Emerging research suggests that integrated science curricula may be a solution (Cabell & Hwang, 2020; Cervetti & Wright, 2020).

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Online Professional Learning for Early Career Special Educators: The EXPERT PLC

Introduction: To meet the needs of students who require intensive academic interventions, special educators must develop expertise beyond pedagogy and content—they must also be able to proficiently use student progress data to inform the ongoing intensification and individualization of interventions (Brownell et al., 2010). Developing expertise, however, is of little benefit if these educators do not remain in the classroom. At present, there is consistent reporting about the record numbers with which special educators are exiting the profession, leaving schools staffed largely with newly trained educators, many of whom are alternatively- or emergency-certified (Billingsley & Bettini, 2019). This critical situation contributes to poorer academic outcomes reported for students with disabilities compared to their non-disabled peers (Gilmour et al., 2019; National Center for Education Statistics [NCES], 2022). Thus, there is a need to develop a professional learning model that is feasible for and acceptable to early career special educators while addressing two critical areas—building expertise in using student progress data to deliver intensive academic intervention and providing supports for special educator well-being to reduce the risk of burnout and attrition.

Method: The professional learning model examined in the present study is an online PLC which combines two existing programs: the EXPERT Program (Toste et al., 2022) and Social Emotional Learning for Teachers (SELF-T; Lang et al., 2020). By integrating the research-supported approaches of these two programs, the "EXPERT PLC" aims to improve educators' knowledge of data-based instruction (DBI) and their reported job satisfaction. The purpose of this study is to provide a controlled test of the feasibility and effects of the EXPERT PLC wherein approximately 50 early career special educators will be recruited and randomized to one of two conditions: EXPERT PLC or waitlist-control. This mixed methods study of the EXPERT PLC seeks to address four overarching aims: (1) to measure changes in early career special educators' DBI knowledge, job satisfaction, perceived stress, and self-efficacy after participating in the EXPERT PLC; (2) to describe special educators' job satisfaction during participation in an online PLC; (3) to merge qualitative and quantitative findings to achieve a more comprehensive understanding of the impact of professional learning on early career special educators' DBI knowledge, job satisfaction, perceived stress, and self-efficacy; and (4) to assess feasibility of the EXPERT PLC as a viable professional learning model. To address these research questions, I will integrate quantitative data collected through pre-posttest survey measures, and qualitative data derived from transcripts of the EXPERT PLC meetings.

Results: Data collection will occur in fall 2023.

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A Deep Dive Into the Effectiveness of Mathematics Interventions: A Meta-Analysis

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Introduction: Mathematical proficiency is fundamental for academic success and everyday life, yet a significant subset of students, including those with learning disabilities, grapples with MD (Geary, 2011). While evidence-based interventions have shown promise in enhancing the mathematical performance of students with MD (Gersten et al., 2009; Fuchs et al., 2022), the extant literature has not fully addressed the potential moderating variables that could influence the efficacy of these interventions. This research proposal aims to address this gap by conducting an exhaustive meta-analysis to elucidate the variables that can be fine-tuned to enhance the effectiveness of interventions for students with MD. Our research questions are: (1) What is the estimated average effect of mathematical interventions on mathematical performance for K-12 students with MD? (2) To what extent does the efficacy of mathematical interventions vary based on grade level, content area, dosage, group size, publication year, design, measure type, fidelity, and study quality?

Method: In an expansive literature search from January 2005 to December 2020, the authors examined peer-reviewed journals and gray literature to identify studies focusing on mathematics interventions for K-12 students with mathematics difficulties. In a systematic search, 32,101 abstracts were identified. After screening abstracts and title, 286 experimental studies from 223 reports remained. To be included studies had to use an experimental design, target students with mathematics difficulties, and implement a mathematics intervention. All reports were coded to extract salient variables about research design, participants, and intervention methods. A standardized mean difference was calculated for each mathematics outcome (i.e., hedges' g and between-case standardized mean difference). Multi-level meta-analytic models estimated average effect sizes. We used a meta-regression to explore heterogeneity sources.

Results: Our analysis of 286 studies involving 56,477 participants with mathematics difficulties revealed an average effect size of $g=1.29$ ($g = 0.63$ excluding outliers). After excluding outliers, our model demonstrated several moderating variables. The following content areas were significantly different from fraction interventions: (a) early numeracy ($B = -0.427$), (b) operations ($B = -0.387$), and (c) word problems ($B = -0.325$). Compared to higher dosage interventions, outcomes of low-dose interventions were significantly lower ($B = -0.22$). Single-case designs were significantly higher ($B = 0.49$) than RCTs, and commercially developed measures had lower outcomes ($B = -0.13$) than researcher-developed measures. Lastly, studies that reported adherence fidelity had significantly lower outcomes ($B = -0.26$) than those that did not. Implications for research and teaching will be presented.

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Virtual Manipulatives and Older Students with MLD: Status of the Evidence

Introduction: The purpose of this systematic review analyzes literature, emphasizing virtual manipulatives (VMs) in mathematics interventions for middle and high school students with mathematics learning disabilities (MLD). Mathematics is a fundamental content area and a gateway to improved postsecondary outcome. Despite these affordances, a significant number of U.S. students in middle and high schools have difficulty mastering mathematical skills at key grade levels. Results from the eighth-grade 2022 National Assessment of Educational Progress (NAEP) mathematics assessment corroborate such opportunity gaps. Recognizing these difficulties, the necessity of providing mathematics intervention to middle and high school students who struggle with mathematics is paramount. In response to these challenges, some scholars have proposed the implementation of VMs as way to build students' conceptual understanding (Shin et al., 2017). VMs are designed to facilitate visualization of abstract mathematical concepts. While a host of research studies have focused on VMs, only a handful of systematic reviews summarizing the impact of these instructional tools on student mathematics outcomes have been conducted. Findings from these reviews suggest the promise of VMs for enhancing students' conceptual understanding. Surprisingly, the impact of VMs for middle and high school students has yet to be summarized. Given this void in the empirical literature, the purpose of this systematic review was to examine the efficacy of VMs for middle and high school students with MLD.

Method: To assess the impact of VMs on the mathematics achievement of this target demographic an exhaustive database search was conducted, applying a priori inclusion criteria. After eliminating duplicates, abstracts and titles from an initial pool of 457 search outcomes were reviewed, resulting in (n = 83) studies qualifying for full-text assessment. The inclusion criteria encompassed studies conducted with students between sixth and twelfth grades, published in English peer-reviewed journals between January 2002 and January 2023, due to the advent of VMs in 2002. Additionally, the studies needed to imply single-case designs, report effect sizes, incorporate VMs, and assess at least one mathematics outcome. The sole inclusion of single-case designs was considered for a targeted analysis, as this design is apt for assessing interventions' effects on specific groups, such as those with MLD. A total of 13 single-case design studies were identified that employed VMs in teaching mathematics to targeted group. An ancestral search yielded an additional two studies. In all, a total of 15 studies single-case design studies met the established criteria.

Results: Results suggest that middle and high school students with MLD exhibited improved mathematical performance following interventions involving VMs (PND = 30% to 89%). Findings also indicated that multi-representation and tutorial VMs were the most commonly used. Moreover, outcomes were notably favorable when explicit instruction was integrated with the implementation of VMs. The poster presentation will focus on providing a comprehensive perspective on the advantages and limitations associated with the integration of VMs to enhance mathematics interventions for middle and high school students with MLD. Attendees will gain practical strategies from the literature for using VMs to enhance the mathematical learning journey of older students with MLD.

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Mixed Methods Analysis of "Under What Conditions" Modified Schema Based Instruction "Works"

Additional authors:

Introduction: Federal legislation requires special education teachers to use evidence-based practices (EBPs) when teaching students with disabilities. As a result, researchers have spent the past two decades identifying EBPs considering "what works for whom and under what conditions." One such EBP for teaching students with developmental disabilities (DD) mathematical problem solving skills is modified schema based instruction (MSBI). While MSBI is an EBP, there is limited evaluation of "under what conditions" it is most effective. Rigorous evaluation of social validity and fidelity of implementation can answer this question. Wolf (1978) defined social validity of an intervention as three constructs: the goal, procedures, and outcomes. While one of the fundamental questions within the EBP movement is "Does it work?", additional questions must be asked to better understand why, how, and "under what conditions" instructional practices work. The fidelity of implementation (Century et al., 2010) framework explicitly evaluates established critical intervention components to help define "for whom" and "under what conditions." The fidelity of implementation may be influenced by variables outside of the practice (Century et al., 2010). Providing an in-depth description of anticipated outcomes, implemented, and influential variables helps to define "what works" for "whom," "under what conditions."

Method: This dissertation employed an embedded experimental design (Creswell & Plano Clark, 2011) to evaluate the effectiveness of teacher- and paraprofessional-delivered MSBI on problem solving skills of transition-aged students with DD as well as explore "under what conditions" MSBI "works". A single-case research design was used to evaluate the existence of a functional relation. Quantitative experimental data were primarily analyzed using visual analysis with effect size estimates to augment interpretation. Qualitative data was used to facilitate in-depth, rigorous investigation of social validity (Wolf, 1978) and fidelity of implementation (Century et al., 2010). Thematic and descriptive analysis was used in the inspection of qualitative data sources using provisional and open coding. Data integration occurred across multiple points in time during design, methods, and analysis (Fetters et al., 2013). Additional mixing of the data followed an inductive approach called "following a thread" (Moran-Ellis et al., 2006). **Participants:** Participants included eight transition-aged students with developmental disabilities, one teacher, and one paraprofessional. Students ranged from 17 to 28 years old and represented a range of ethnic backgrounds (e.g., hispanic, black, white, multiracial). The teacher was a white female with two years of teaching experience. The paraprofessional was a hispanic male with one year of experience and no formal teacher training.

Results: Results of the single-case research design indicate a functional relation between MSBI and problem solving behaviors. Visual analysis was supported by a between-case standardized mean difference of 7.4 at 95% CI. The instructors were able to deliver the intervention consistently with high fidelity (i.e., average of 95%). The instructors perceived MSBI as feasible, acceptable, and favorable; additionally they viewed the intervention as flexible, tailoring to the needs of the students. Integration of qualitative themes into quantitative data resulted in the discovery of a range of variables (e.g., instructor enthusiasm) that influenced the fidelity of implementation by instructors.

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Predicting bilingual children's first grade reading achievement from kindergarten oral language

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Introduction: Multilingual children experience both under- and over-identification of language and learning disabilities (Samson & Lesaux, 2009). Screening young multilingual students for learning disabilities represents a significant challenge for educators and other practitioners, as there is significant heterogeneity among multilingual children in the degree to which they are exposed to and have experience using each of their languages (Goodrich et al., 2023). However, multilingual children should have similar overall language exposure and use as monolingual children, with exposure and use distributed across their two (or more) languages. It is well established that early oral language development is important for reading for both monolingual (e.g., Storch & Whitehurst, 2002) and multilingual children (Gottardo, 2002). Because multilingual children come to school with some level of oral language proficiency in each of their languages, it is possible that screening oral language skills could help identify risk for future reading difficulties. However, what is currently not known are the specific oral language skills in the first and second language that accurately predict future reading development. Therefore, the purpose of this study was to identify kindergarten oral language skills that reliably predict reading achievement at the end of first grade among Spanish-English bilingual children.

Method: Approximately 250 bilingual children across Texas and South Carolina enrolled in this project in the fall of kindergarten. Children completed assessments of oral language skills, including measures of vocabulary knowledge, morphosyntax (sentence repetition), phonological awareness, and rapid letter naming in English and Spanish in the spring of kindergarten. Additionally, children were followed for one year and completed assessments of real and nonsense word reading, reading comprehension, and reading fluency in English and Spanish in the spring of first grade. We used dominance analysis to identify the kindergarten oral language skills that were the best predictors of Spanish and English reading in first grade. Data were analyzed separately for Spanish and English, and CFAs were conducted to obtain a single first grade reading outcome variable in each language.

Results: For predicting Spanish reading, results indicated that Spanish phonological awareness, Spanish vocabulary knowledge, and English letter naming were the strongest predictors, with all predictors explaining a combined 29% of variance in Spanish reading outcomes. However, no predictor emerged as one that was dominant over others in predicting Spanish reading. For predicting English reading, results indicated that Spanish phonological awareness, English phonological awareness, and English vocabulary knowledge were the strongest predictors, with all predictors combined explaining 39.3% of the variance in English reading outcomes. Although Spanish and English phonological awareness and English vocabulary dominated some other predictors in the model (e.g., English and Spanish sentence repetition), they were not dominant over each other. These results have important implications for target skills to screen when attempting to predict future reading development of young Spanish-English bilingual students. Additionally, these results provide support for theoretical models of cross-language transfer, as Spanish phonological awareness in kindergarten was the strongest predictor of English reading outcomes in first grade.

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Understanding specially designed instruction: A pilot survey

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Introduction: Specially designed instruction (SDI) is central to the definition of special education, "specially designed instruction, at no cost to the parents, to meet the unique needs of a child with a disability" (IDEA, 300.39 (a) (1)). However, given the increasing number of students with disabilities (SWD) who receive 80% or more of their instruction in general education classrooms, there is a confusion about what SDI is (e.g., Friend, 2015) and whether it is being delivered (e.g., Weiss et al., 2019; Wexler et al., 2018). Upon review of SDI as used in professional literature, most authors defaulted to the IDEA definition, without example or description (Rodgers et al., 2021). Though authors have addressed the need for specially designed, intensive, and individualized instruction for SWDs (e.g., Zigmond & Kloo, 2017), significant confusion exists as to SDI in practice.

Method: We conducted a survey among participants of three workshops centered on the topic of Specially Designed Instruction (SDI) held in school districts across the Mid-Atlantic. Each session spanned approximately three hours, predominantly addressing the legal dimensions of SDI. The researcher-created survey asked participants to scale responses from "definitely not" to "Yes! I think so," to seven statements such as: • "I can define what specially designed instruction is and can identify it in the classroom." • "The administrators in my school or division understand what SDI is." Of 36 workshop attendees, 24 responded. Their roles included: six district-level administrators, eight building-level administrators, nine special education teachers, and one self-identified as "other." 15 held their current roles fewer than three years. The same number, 15, dedicated less than three hours weekly to instruction or intervention on behalf of SWDs. Survey administration occurred prior to the workshop. Without time constraints, most finished in under five minutes. Survey access was provided via projected link directing to a Qualtrics form. All data was stored and analyzed within the Qualtrics system.

Results: Key findings: • Nine participants expressed confidence in defining SDI and recognizing it in schools, while an equal number felt unsure. • Seven participants felt capable of elucidating SDI and offering examples, whereas an equal number felt they couldn't. • 10 participants believed their school or district administrators lacked a clear understanding of SDI. • Among responses, only two participants provided genuine examples of SDI. Others either expressed uncertainty or mistakenly presented an accommodation as an example. • In terms of sourcing information on SDI: 15 opt for web searches, 11 consult district or state documents, and eight refer to professional journals. Conclusion: Survey results shed light on the varying levels of understanding and confidence among educators and administrators regarding Specially Designed Instruction (SDI). A significant portion of the participants displayed uncertainty or misconceptions about SDI, emphasizing a clear need for enhanced training and resources. The preference for web searches as a primary source of information underscores the importance of ensuring that accurate and comprehensive online resources about SDI are readily available. To better serve students with disabilities, continuous professional development and clearer communication on the topic of SDI within educational institutions are vital.

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Thursday evening, Session A, Board 16A

Friendships of Students at Risk for Emotional and Behavioral Disorders

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Introduction: Positive peer experiences provide students with the opportunity to practice social emotional skills and are linked to academic achievement, school liking, motivation, and engagement (Rawlins, 2017). Students with or at risk for EBD are particularly susceptible to elevated rates of social difficulties (Sturaro, et al., 2011). Teachers can play an essential role in facilitating the peer relationships of students at risk for EBD by monitoring, facilitating, setting the tone for social interactions, and modeling appropriate relationships (Farmer et al., 2018). Teachers' use of these practices are based, in part, on their attunement to the classroom social context (Gest et al., 2011). Teacher attunement is the extent to which teachers can accurately identify (i.e., align with student reports) features of the classroom peer context (e.g., who is friends with who; Ahn et al., 2014). Attunement is central to managing classroom social dynamics and allows teachers to appropriately direct children's peer experiences. Teacher attunement is also connected to student outcomes; students' educational experiences improve when teachers are attuned to classroom social dynamics (Gest et al., 2014). Given the value of teacher attunement, the objective of this study is to examine the alignment between teacher reports of peer interaction frequency and quality and student reported friendship ties in a sample of students at risk for EBD. Findings will highlight the extent to which teachers are attuned to the peer experiences of students at risk for EBD and may signal a need to help teachers learn about the peer experiences of these students.

Method: We will test this question in a sample of 416 kindergarten children (220 boys, 186 girls) and their 21 teachers from four schools in the Mid Atlantic region of the United States. Students had a racial/ethnic breakdown of 61% White, 18% Black, 10% Latinx, and 11% other or mixed race. To measure student behavior, we asked teachers to nominate students who exhibited challenging behavior and were disruptive to the classroom environment and/or instruction and complete the School Social Behavior Scales-2 (SSBS2). We considered students who were nominated by teachers and identified by the SSBS2 as at risk for EBD. To assess friendship ties, all students in the class identified up to three best friends using peer nomination methods. Teachers reported on the frequency (1 never to 6 multiple times a day) and quality of interactions between each dyad in the classroom (1 mostly negative to 5 mostly positive).

Results: We will use hierarchical latent space models (Sweet, 2016) to estimate the relations between teacher reported frequency and quality and friendship formation. HLSMs are multilevel extensions of the latent space model, which models individual ties between actors (in this case, friendship nominations between students in a classroom) by positioning actors in a latent space. Students with higher likelihood of a tie are closer together in this space, and those with lower likelihood are further apart.

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Thursday evening, Session B, Board 20B

Ecologically Valid Implementation of Morphological Awareness Approach to Enact Sustainable Change in Classroom Instruction

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Introduction: There is emerging evidence that students with dyslexia have a strength in semantic processing (Mimeau, et al., 2018). We have empirical support for this from research conducted in our lab (Lukic et al., 2023) and specifically identified a semantic strength in the student population of one of our partner schools that primarily serves students with dyslexia. In an effort to use an asset based pedagogical approach to literacy we collaboratively selected Structured Word Inquiry (SWI; Bowers & Kirby, 2010), a morphology-based instructional approach, to draw upon this semantic strength when teaching students to read and spell multimorphemic words. SWI is a word-study intervention that has been shown to improve students' phonemic awareness, phonology, encoding, morphology, vocabulary, and reading decoding skills (e.g., Bahr et al., 2020; Colenbrander et al., 2021, Bowers & Kirby, 2010; Murphy & Diehm, 2020; Ng et al., 2022). For this study, we translated research findings to practice through an ecologically valid implementation of the intervention with the goal of fostering a sustainable change in the teachers' instructional practice. Focusing on implementation, we recognized the barriers that may exist, such as the requirement of time and effort and a deep level of language expertise that not all teachers have (Smolkowski et al., 2019).

Method: Our research team partnered with school faculty to implement a morphology-based instructional approach over a three year period. The first year a speech-language pathologist (SLP), literacy coach, two teachers, and our lab's educational research specialist participated in an online Structured Word Inquiry training led by the program's developer. Because speech-language pathologists have expertise in language and morphology and can collaborate with teachers to positively affect student outcomes (Collins & Wolter, 2019), we selected the school's SLP to support the teachers in implementing the approach in their classroom over the next two academic years. The third year, the SLP and literacy coach developed a series of training modules and coaching sessions to train 11 additional teachers who implemented the approach for all 84 fourth and fifth graders. Teachers completed biweekly training videos and readings that corresponded to implementation lesson guides. The SLP and coach provided in-class coaching and teaching demonstrations during instruction and led monthly professional learning sessions for the teachers. The research specialist met with the SLP regularly to support the quality of student instruction and the fidelity of the study.

Results: Positioning school faculty as implementation leads proved successful in achieving an ecologically valid adoption of a morphology-focused instructional approach. By leveraging the language and literacy expertise of select personnel, the school introduced a new instructional program that was taught by teachers with variable linguistic background knowledge to students in preexisting class cohorts. Teachers demonstrated a sustained commitment to the adopted approach by incorporating it into upper-elementary instruction for three consecutive school years, including across multiple contexts (i.e. small group, humanities, etc.). At the end of year three, teachers returning the following school year committed to continued use of the intervention with decreased guidance and support, with the long-term goal of further tailoring instruction to their students' individual characteristics.

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Math Screening Accuracy Across English Language Proficiency

Introduction: Despite recent advances in math screening among English learners (ELs; e.g., Brafford et al., 2023; Hall et al., 2022), research has not sufficiently addressed whether math screening accuracy is invariant to ELs' English language proficiency (ELP). This represents a major limitation in the literature given the ongoing questions of equity in ELs' instructional access (Robinson-Cimpian et al., 2016) and special education identification (Harris et al., 2023). Evidence for variability in math screener accuracy across ELP levels for predicting math risk would necessitate closer scrutiny of math screening processes among ELs to ensure equitability in risk identification (Albers & Martinez, 2015). In the present study, we address the following research questions: 1. To what degree does universal math screening predictive accuracy vary as a function of ELP? 2. Does this differ between English and Spanish versions of the same universal screener? This work is primarily exploratory, although we assume screening in English is likely least accurate at lower ELP.

Method: Participants We used data from 1,817 students in grades 3-8 in 2018-19 from a large midwestern school district. The sample was 69% Hispanic/Latino, 12% received special education, 69% receive free/reduced-price lunch, and 44% were female. Measures Screener. Measures of Academic Progress Math Growth was administered in August to September of 2018. Spanish-speaking students identified as not English proficient by the district took Spanish MAP (47%). ELP. We used ACCESS for ELLs scale scores as the ELP measure. ACCESS scores were from the previous spring (i.e., Spring 2018). Criterion math performance. The criterion outcome variable was spring 2019 state math assessment performance levels, which range from 1 (lowest performance) to 5 (highest performance). Analysis We used Bayesian multilevel ordinal generalized additive modeling (GAM; Wood, 2017) with grade and school random intercepts and demographic covariates (race/ethnicity, home language, free/reduced lunch eligibility, special education status). GAMs estimate nonlinearities in interaction terms but can be compared to traditional linear models. Our Bayesian priors in this study range from weak to informative given prior research and assessment norms. We standardized all continuous predictors within grade to $M=0$, $SD=1$.

Results: We found that models allowing an interaction of MAP, ELP, and MAP language fit best (based on Bayesian fit; Vehtari et al., 2017), but there was limited evidence for nonlinearity. MAP was moderately predictive of state math performance level ($b[\log\text{-odds}] = 2.02$, $SD = 0.22$), and this coefficient decreased as ELP decreased ($b[\log\text{-odds}] = -0.27$, $SD = 0.12$). Spanish MAP's coefficient was smaller than English MAP ($b[\log\text{-odds}] = 1.50$, $SD = 0.27$), but it did not vary across ELP ($b[\log\text{-odds}] = -0.10$, $SD = 0.19$). This suggests that, across grades, the ordinal classification accuracy of English MAP Math decreases as ELP decreases, but Spanish MAP accuracy is mostly constant across ELP. Additional attention to screening accuracy among ELs is needed, particularly when using multiple languages of assessment. Future research should address how ELs' constellation of first and second language as well as math-specific skills interact in predicting risk for math learning difficulties and disabilities.

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Thursday evening, Session A, Board 30A

Examining Classroom Discourse and Teacher Beliefs about Transitional Kindergarten and Kindergarten Writers

Introduction: This descriptive, qualitative study is situated within one transitional kindergarten (TK) classroom and four kindergarten (K) classrooms in the San Francisco Bay Area. Building on both Graham's (2018) writer(s)-within-community (WWC) model of writing and Holland's (1998) concept of "figured worlds", writing instruction is undeniably a sociocultural act in which both students and teachers are concurrently engaged. The context of writing as a highly social act, in combination with the malleable nature of young writers' self-beliefs and therefore writer identities (Unrau et al., 2018), adds up to a high risk, high reward landscape in early elementary classrooms, such as TK and K.

Method: The purpose of this study is to explore TK/K teachers' beliefs about TK/K writers and writing instruction. Within the figured world of the writing community in a classroom, teachers and students are co-constructing experiences as writers and collaborators. Teacher beliefs shape instructional choices, such as opportunities to write, the writing environment, and discourse. For the purposes of this study, teacher discourse with students during writing instruction and about them as writers in other contexts will also be examined. Literature on "smartness" by Leonardo & Broderick (2011) and Hatt (2012, 2016) will frame the analysis of both interview transcriptions and excerpts of classroom discourse. The concept of smartness uplifts the normative center of schools (Baglieri et al., 2011), and it sets into motion a habit of comparison, by which students are compared to one another. Through that comparison, value may be assigned and opportunities may be extended to some but inherently not all (Leonardo & Broderick, 2011). Given the constant social positioning that can and does take place through classroom discourse, the highly social nature of writing, and finally, the context of the TK/K classroom in which students are building critical self-concept as writers, it is prudent to learn more about teachers' experiences and beliefs in the TK/K writing community. Participants include one TK teacher and four K teachers from public schools in the San Francisco Bay Area. During the 2023-2024 school year, each teacher will participate in three semi-structured interviews: an initial interview (40 minutes), a mid-year interview (20 minutes), and a reflective interview at the close of the school year (40 minutes). Classroom discourse will be collected via observation and field notes, as well as video recordings during writing instruction. Transcribed interviews and discourse are analyzed through a thematic analysis approach, which allows for flexibility in thematic coding that employs both inductive and deductive approaches (Braun & Clarke, 2006).

Results: Results will be reported at the time of presentation. Implications for teacher education and professional development are anticipated.

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Thursday morning, Board 2

Efficacy of a Literacy Intervention for Third Grade Students: Preliminary Data

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Introduction: A significant number of elementary students struggle to successfully read and understand grade level text in third grade and beyond. However, there is very limited information on effective reading interventions, particularly intensive implementations, that may be needed for students with reading difficulty or disabilities (RDD) in the intermediate elementary grades. The purpose of this study was to examine the efficacy of a multi-component literacy intervention designed to provide strategies for accessing print, gaining understanding, interpreting text, and interacting with the text to advance deep understanding for third grade students with RDD. We examined immediate (end of third grade) and long-term (beginning of fourth grade) effects of the intervention.

Method: We will present findings from a randomized controlled trial conducted during the 2022-2023 school year in nine elementary schools in two regions in the United States. Third grade students with RDD were identified through a screening process with all students in the participating schools with disabilities struggling with reading and at-risk, low achieving students with similar profiles to the students with identified disabilities selected. Students scoring at or below the 30%ile on a standardized reading comprehension measure were identified for the study. Students with RDD were randomly assigned to the treatment or business as usual. During implementation, daily 45 min small group sessions were provided to 69 3rd grade students identified with RDD for 24 weeks, compared with 72 similar students who continued with business as usual. This sample included students with a wide range of demographic characteristics, including students with disabilities (n = 35), English language learners (n = 33), and students eligible for free or reduced-price lunch (n = 60).

Results: Preliminary findings from the first phase of the study (one year of intervention) will be shared. Data from individually and group-administered standardized measures were collected at pre- and post-test as well as follow-up including reading comprehension, word recognition, word attack, word reading fluency, phonemic decoding fluency, and oral reading fluency. We will also explore possible variability in findings related to students' initial reading achievement and student behavioral and attentional variables. These analyses will allow a more detailed description of how implementation of the intervention may interact and impact the outcomes. While these data are part of a much larger study, which will examine two cohorts across two years, we will share data from the first year to provide initial results, considering the limited research base on intensive interventions for intermediate grade students with significant reading difficulties or disabilities.

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Thursday evening, Session B, Board 4B

Investigating the influence of study selection criteria on results

Introduction: Randomized control trials (RCTs) are often used to examine the effectiveness of interventions for particular populations of students. Within RCTs, researchers screen students to identify a target population theorized to benefit from the tested intervention. Identification of students with specific learning disabilities (SLDs) involves using a screening measure (or measures) with a specified cut point for eligibility. Common criteria in special education research include: scoring "at-risk" as categorized by the test developer, scoring at or below a percentile of all screened, or the lowest scoring students per classroom. Eligibility criteria is not the same from study to study; the selection of which screener to use or what cut point method to implement can vary between studies. Eligibility criteria are study specific decisions that are often influenced by other factors such as budget or power. Although results of randomized controlled trials (RCTs) provide important implications for what the field decides is effective for a population of students with SLDs, estimates of the effectiveness of interventions may be influenced by differences in selection criteria. This present study investigates whether and the extent to which estimates of effect sizes are related to different commonly used selection criteria.

Method: To investigate the primary research aim, we simulated a dataset representing an efficacy type research study where children are recruited from classrooms (total $n = 5,000$). We simulated variables representing a pretest and posttest (correlated at .6). Condition assignment was random; posttest scores were adjusted for observations assigned to the intervention condition assuming the intervention had an average effect size of $d = 0.3$. To examine the influence of different selection criteria on estimates of the true effect, we considered the pretest to be the study screener. We selected three samples from the 5,000 cases using three different selection criteria (1) scoring within a range that is reflective of receiving a score of "some risk" (0.25 SD below the mean), (2) scoring at or below the 25th percentile of all screened, and (3) selecting children who receive one of the lowest four scores in their classroom. Four regression models were run: one using the full dataset to represent the true effect, and three using the three respective samples. For each of the three samples, parameter estimates and percent biases were compared against the model that included the full 5,000 observations.

Results: Recall that the data were simulated to represent an intervention with a true effect size of $d = 0.3$. Results of each regression showed that each selection method underestimated the size of the effect to varying degrees. For the "Some risk" method, the effect size was $d = .277$ (underestimated by 3%). When cases were selected for inclusion using the cut point of the 25th percentile, the estimated effect size was $d = .260$ (underestimated by 9%). Finally, for the method selecting the lowest four performers in each classroom, the estimated effect size was $d = .20$; underestimated by 29%. Overall, results indicate that the criteria used for selecting samples influences study results.

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Thursday evening, Session A, Board 2A

Development of the EXPERT Monitoring Tool to Support Teachers' Data-Based Decision-Making

Additional authors: Jessica R. Toste, The University of Texas at Austin David F. Furjanic, University of Denver

Introduction: To best meet the intensive instructional needs of students with reading disabilities (RD), special education teachers must engage in a systematic, ongoing process wherein they collect and use student progress data to determine when and how to intensify interventions. However, we have yet to engage teachers as experts in the data-based decision-making (DBDM) process. The practice of self-monitoring has been suggested as a support to enhance teachers' use of data. Self-monitoring techniques promote awareness, self-reflection, and critical thinking. One of the most promising avenues for improving data-based instruction (DBI) implementation is the development and testing of decision-support technologies. Technological supports could be used to direct teachers' attention to relevant features of graphs or to guide selection of appropriate instructional adjustments (e.g., Fuchs & Fuchs, 1989; Fuchs et al., 2021; Stecker et al., 2005). Teachers who use self-monitoring are more likely to make relevant and meaningful instructional changes (Allinder et al., 200; Fuchs et al., 1989) These findings support the use of self-monitoring as an effective method for improving teachers' DBDM. For this reason, the EXPERT Monitoring Tool was developed as part of a four-year Development & Innovation project, funded by the Institute of Education Sciences, focused on enhancing teacher expertise in DBI.

Method: The EXPERT Monitoring Tool automatically generates progress graphs based on student baseline data, their goal, data entered, and intervention adjustments so that teachers can observe the impact of their instruction on student progress. Each time a teacher enters a new data point, they navigate a user-friendly "decision tree" to guide their instructional decision-making. The first question posed: "Is the student making adequate progress toward goal?" The teacher continues to a branch of questions specific to the response provided. The EXPERT Monitoring Tool includes additional features that support teachers' viewing and interpretation of CBM graphs (e.g., trend line, individualized goal line, marked phase changes when an instructional adjustment is made) and pop-up text boxes throughout the decision tree that prompt reflection (e.g., "Pay attention to your student's rate of growth (trend line) compared to their expected rate of growth (goal line)"). Importantly, the tool serves to support teachers in their decision-making and does not dictate when or how an instructional adjustment should be made.

Results: The EXPERT Monitoring Tool can be used across grade levels and content areas. It is currently being used in a pilot study with teachers delivering intervention to students with or at-risk for reading disabilities in 3rd to 5th grades. This poster will detail the development process and present data collected in fall 2023 on teachers' use of the Expert Monitoring Tool and their engagement with student data via the tool. We will also report findings from an app usability survey that assesses teachers' impressions of the web-based tool using items that have been shown to be useful in development of apps and coaching support tools.

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Investigation of the Features and Effects of School-Based Trauma-Informed Interventions: A Synthesis

Additional authors: Jessica R. Toste, The University of Texas at Austin

Introduction: More than one in four students in American classrooms have experienced trauma (Duke et al., 2010), and students with disabilities are three times as likely to experience maltreatment as compared to their nondisabled peers (Jones et al., 2012). Thus, development and testing of classroom supports is a critical need in the field of special education. There has been increased research focused on investigating the impact of trauma on student outcomes. There is substantial evidence demonstrating that exposure to trauma is associated with academic achievement, mental health functioning, and positive development (Burke et al., 2010; Felitti et al., 1998; Marie-Mitchell & O'Connor, 2013). As this evidence has grown, researchers have begun to explore interventions that may mitigate the short- and long-term impact of trauma. Specifically, the use of trauma-informed practices in the classroom can reduce risk of re-traumatization, support ongoing skill development, and promote student success in and out of school (McInerney & McKlindon, 2014).

Method: The current systematic review and synthesis sought to address the three research questions: (1) What are the features of trauma-informed interventions that have been tested within K-12 school settings?; (2) What are the effects of trauma-informed interventions on the academic, social-emotional, or behavioral outcomes of K-12 students?; and (3) Are there differences in intervention effects based on characteristics of participants (i.e., grade-level, disability status) or interventions (i.e., school-wide vs. targeted supports)? A comprehensive database search of studies published in English between 2000 and June 2023 was conducted using Education Source, ERIC, PsycINFO, and ProQuest Dissertation and Thesis. Following screening, studies were considered eligible for inclusion if they met the following criteria: (a) students enrolled in kindergarten through 12th grade; (b) evaluated a school-based intervention focused on trauma-informed approaches as operationally defined by SAMHSA- interventions that took place across both school and home or community contexts were included as long as the majority of the delivery was in the school setting; (c) included at least one dependent measure of student outcome in the following areas: academic (e.g., achievement, school engagement), social-emotional (e.g., PTSD symptomatology, depression, anxiety), or behavioral (e.g., problem behaviors, disciplinary records, dropout risk); and (d) research design was either randomized controlled trial (RCT), quasi-experimental study, or single-case design. Identified studies will be used to conduct a further citation search and reference list search to identify additional studies for inclusion.

Results: The initial electronic database search yielded 19,001 records; titles and abstracts were reviewed for potential inclusion. Next, 145 are currently being reviewed full-text based on established inclusion criteria to identify the final corpus of studies. Studies will be coded for participant characteristics (e.g., grade, disability status), intervention characteristics (e.g., tier of support, dosage, key features), context (e.g., implementer, school type, location), study design, measures, reported outcomes, and effect sizes. Implications from these findings include a need for trauma-informed interventions address diverse needs of students and further evaluation of school staff training within these interventions.

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Presenter(s): Sara Hart, Florida State University (sahart@fsu.edu)

Thursday evening, Session C, Board 25C

Unlocking the power of data sharing and data reuse with LDbase

Introduction: As sharing data openly becomes more and more the norm, and not just because of mandates for federal funding, more special education and LD researchers are becoming interested in sharing data. Of all Open Science practices, data sharing is believed to be the least common and education researchers report rarely sharing data (Makel et al., 2019). It is possible this is due an unawareness of the many benefits of sharing data (Logan et al., 2021). Benefits for our research include increased collaboration, acceleration of knowledge through novel and creative research questions, and an increase in equitable opportunities for early career researchers and faculty at underresourced institutions (van Dijk et al., 2020).

Method: With this poster I will discuss the benefits of data sharing and data reuse, the "how to" of preparing data for sharing, and give a tutorial on how to use LDbase.org, a data repository made specifically for education scientists.

Results: Come on by and chat about data sharing and data reuse, and the resources available to help you achieve your data sharing goals!

Presenter(s): Johanna Hearn, Vanderbilt University (johanna.hearn@vanderbilt.edu)
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Thursday evening, Session C, Board 26C

Speech-Language Pathologists' Knowledge About Reading Skills in Children with Speech Sound Disorders

Additional authors: C. Melanie Schuele - Vanderbilt University

Introduction: Children with co-occurring speech sound disorders (SSD) and reading impairments face unique struggles in their quest to learn to read. Although a substantial corpus of research has demonstrated that SSD on its own is not a risk factor for reading impairment (eg., Catts, 1993; Lewis et al., 2000) the belief that speech deficits directly impact reading ability (eg., the false belief that if a child cannot produce a sound, that child cannot mentally represent that sound to accurately decode) exists amongst many who work with these children. This false knowledge often results in poorer reading services for this population. As the experts on SSD, speech-language pathologists (SLP) must collaborate with educational teams to ensure these children receive appropriate intervention. Unfortunately, many SLPs also possess incorrect knowledge about reading skills and abilities of children with SSD. The purpose of this project is to identify SLP knowledge as it relates to a) ability to learn to read, b) ability to read words with certain sounds, c) appropriate pre-literacy and literacy intervention target selection, and d) reading skill trajectory, in children with SSD. Ultimately, a better understanding of SLP knowledge in these areas will help us better understand how we can tailor education and better equip SLPs to advocate for these students.

Method: School speech-language pathologists (SLP) who are part of the Child Language and Literacy Lab listserve (approximately 1,200) will be invited via email to participate in a Redcap survey. We aim for 100 participants. To be eligible to participate, respondents must currently be or have historically been employed as an SLP in the public schools and have/had children on their caseload who are under age 18. Demographic information such as highest degree earned, credentials, current employment setting, and number of years as an SLP is collected. Participants are asked to answer questions on a sliding scale from 0 to 100, indicating how much they disagree (0) or agree (100) with the provided statement related to literacy and speech sound disorders. Each question has a "correct" answer, and questions are coded to indicate which end of the scale represents the correct answer. Mean, range, and standard deviation will be calculated for each response and aggregated by domain (as described in the research questions) to provide composite descriptive statistics across domains.

Results: We are currently collecting data and anticipate completing data collection in October 2023. We anticipate that on average, respondents will possess incorrect knowledge (mean score of < or > 50, depending on question) across each domain surveyed (ability to learn to read, ability to read words with certain sounds, appropriate pre-literacy and literacy target selection, and reading skill trajectory). We also anticipate that despite average scores indicating incorrect knowledge, a large range of scores will be present across each domain.

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Thursday evening, Session A, Board 17A

Reading Motivation and Emotions of Struggling Readers: A Mixed Methods Study

Additional authors: Sarah Reiley, Michigan State University; Rebecca Louick, Eastern Michigan University; Eunsoo Cho, University of California at Riverside

Introduction: Many students with reading difficulties in the middle grades exhibit low motivation and a lack of engagement in reading activities (Botsas & Padeliadu, 2003; Klauda & Guthrie, 2015). These motivational barriers can hinder student response to reading instruction and intervention, thereby compounding existing reading difficulties. Students' reading motivation is multidimensional, consisting of one's goals (achievement goals), values (intrinsic and utility values), and beliefs (self-efficacy/self-concepts and mindset beliefs) related to reading (Guthrie & Wigfield, 2000). We recognize reading motivation is intricately associated with emotional reactions to academic tasks that vary in two dimensions: valence (positive, negative) and activation (activating, deactivation) (Pekrun, 2006). We sought to better understand the reading motivation and emotions of fourth and fifth grade struggling readers and their relation to reading through a mixed methods design, utilizing multiple data sources (student interviews, survey questionnaires, and reading achievement).

Method: This study is a part of a larger intervention study, which aims to improve both reading and motivational outcomes. Prior to the intervention, 40 participating students, identified by schools as needing Tier 2 reading intervention, were surveyed and interviewed with questions designed to gain a better understanding of their goals, values, beliefs, and emotions. They were also assessed using standardized and researcher-developed reading assessments. We aim to privilege individual student's voices and gain insight from the student perspective about their reading motivation and emotion type. Qualitative analysis of interviews occurred in two phases. First, we developed a codebook based on the theoretical framework, randomly selected transcripts for training and determination of intercoder reliability of at least 80%, then systematically applied the codebook to the remaining transcripts. During the second phase of qualitative analysis we examined the corpus of data using pattern coding to identify themes and patterns. These themes and patterns are matched with quantitative analyses of reading motivation and achievement data. Descriptive statistics were used to summarize and compare individual students' reading achievement with qualitative measures of their motivation and emotions.

Results: Preliminary qualitative data analyses reveal a large heterogeneity in how students with reading difficulties in the middle grades view themselves as readers and their goals in learning and reading. Additional findings reveal many students' reading motivation is task and topic specific, and many recognized the importance of effort in becoming a better reader. Also, we identified commonly emerging emotional responses to reading challenges such as anxiety, as well as common sources of students' self-efficacy beliefs. Finally, students' reading achievement pre-intervention scores are evaluated alongside interview data in an effort to more fully understand the motivation and emotions associated with reading achievement.

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Thursday evening, Session C, Board 14C

Instructor Perceptions of Teaching and Supervising Preservice Teachers in Classroom Management

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Introduction: Given research demonstrating a clear link between implementing proactive classroom management practices and positive student outcomes (Brophy & Good, 1986; Cameron et al., 2008; Simonsen et al., 2008), it is important for general and special education teachers to develop strong classroom management skills during teacher preparation and learn to implement them prior to becoming full-time teachers of record. Further, without such proactive and preventive practices, teachers are more likely to utilize reactive disciplinary strategies (e.g., office discipline referrals) that can result in substantial loss of instructional time, frayed student relationships, and student suspensions (Gage et al., 2018). Thus, it is important to examine how teachers are prepared to enter the classroom to proactively support students' behavioral needs and implement preventive classroom management strategies. However little is known about faculty members' perceptions of practices related to teaching and supervising teacher candidates in the area of classroom management. Using a one-group pre-post research design, the following research questions (RQ) were addressed: RQ 1: Did participants report changes in their perceived confidence and usefulness of instructional and supervision strategies (related to classroom management) over the course of the institute? RQ 2: How did participants view the social validity of the 2-day faculty institute?

Method: In January 2023, we invited faculty members from both research and teaching institutions to attend a two-day institute. The institute was part of a larger ongoing study designed to test the impact of a multimedia, multicomponent pedagogical approach on teacher candidates' development and enactment of evidence-based classroom management practices. They were recruited to participate in the larger study through the professional networks of the first, second, and third authors and at professional conferences. Approval from the first author's institutional review board (IRB) was garnered prior to the start of the research activities. As part of the project, 29 faculty members from 27 universities attended a two-day (12 hours total, in-person) institute focused on innovative approaches for teaching and supervising teacher candidates in classroom management. On the first day of the institute, participants completed a survey on knowledge, enthusiasm, and confidence related to teaching classroom management, observing teacher candidates classroom management skills, and providing feedback on classroom management. The participants completed the same survey at the end of the second day of the institute. The survey contained 40 items. At the conclusion of the institute. The participants also completed a 10-item social validity questionnaire and provided feedback in focus groups (completed by an independent researcher).

Results: We are in the process of analyzing our data. We will statistically analyze the data to examine changes in the participants' perceptions from before and after the institute. In regards to the focus group data, the open-ended items will be reviewed and themes will be extracted. We will use structured codes to categories data (i.e., institute strengths, areas to improve).

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Presenter(s): Pei Jung Ho, Department of Special education, University of Texas at Austin (pj1031@utexas.edu)

Thursday evening, Session C, Board 27C

The influence of the Endrew ruling on of special education hearings

Introduction: Special education due process of hearings generally addresses disputes between parents and districts by examining whether free, appropriate public education (FAPE) is fulfilled. However, the standards of the FAPE test vary by the federal court region, and previous studies indicated that districts are more likely to prevail (Blackwell & Blackwell, 2015; Zirkel & Skidmore, 2014; Zirkel et al., 2007). The Supreme Court ruling of *Endrew F. v. Douglas County School District* (2017) has supported the higher standards for examining whether the districts meet FAPE. This paper aims to examine the two states that hold different FAPE standards-California had a lower standard, no standard, or a mixed standard of FAPE before the Endrew ruling, and Texas, one of the states in a circuit with a higher standard of FAPE before Endrew-changed along with the ruling of Endrew. Two hypotheses were tested in this paper. First, the frequency of FAPE issues and determination outcomes of special education due process of hearings would change after Endrew. The extent of the changes would be different due to the divergent standards of the FAPE test in California and Texas. Second, parents' prevailing rate would increase due to the Endrew rulings. Besides the two hypotheses, this paper aims to examine the factors that predict the outcomes of the hearings. Thus, three research questions in this paper are shown below. 1. Does the frequency of FAPE issues and determinate outcomes change after Endrew in California and Texas? 2. Would parents be more likely to prevail after Endrew than before in the two states? 3. What factors affect the determinate outcomes?

Method: This paper used descriptive statistics to answer research question 1 to illustrate the longitudinal trend of categories of FAPE violations and prevailing outcomes from 2015 to 2020 across California and Texas. Two-sample t-tests were used to see if there was a significant difference before and after the Endrew ruling. For research questions 2 and 3, this paper conducted logistics regression to predict the determination outcomes of the issues. The predictors are states, before and after the Endrew, categories of FAPE violations. Stata 15 was used throughout the data analysis process.

Results: The descriptive statistics show that after 2018, the trend of FAPE issue frequency was going down in California. On the other hand, the frequency in Texas during the six years is a flat trend. The models in this paper found that districts are still more likely to prevail, and the FAPE issue categories were effective predictors of determinate outcomes of special education due process of hearings.

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Presenter(s): Alexandra Hollo, West Virginia University (alex.hollo@hsc.wvu.edu)

Thursday evening, Session A, Board 31A

Metalinguistics in children's narratives: What stories tell us about language and behavior

Introduction: Students with (Hollo et al., 2014) or at risk (Chow & Wehby, 2018) for emotional and behavioral disorders (EBD) are highly likely to have undiagnosed language deficits in structural, social pragmatic, and higher-order language use as determined by standardized assessments and rating scales (Dall et al., 2022). To address limitations of these types of measures for analyzing and diagnosing pragmatic language impairments (Botting, 2002), the purpose of the current study is to use two narrative assessment tasks to compare language samples across three groups of school-age children: those with or at risk for EBD, those with developmental language disorder (DLD), and a group with no known disabilities (ND). Specifically, we ask how the groups differ in story organization (macrostructures), linguistic complexity (microstructures), and meta-linguistics (internal state language, or ISL).

Method: Participants will be 30-40 students ages 6-14 who are nominated by parents or teachers as having chronic and severe behavior problems in school. The comparison groups (DLD, ND) will be age- and gender- matched samples for drawn from extant databases. Inclusion criteria are intentionally broad; therefore, students are not required to have an IEP, behavior plan, or mental health diagnosis. Teachers will complete the Child Behavior Checklist to verify the types and severity of behavioral concerns. Exclusion criteria are presence of autism, intellectual disability, or hearing impairment. Students will complete a brief nonverbal IQ screener (KBIT matrices) and two narrative language assessments. The Test of Narrative Language (TNL-2) is a standardized, norm-referenced assessment that includes story comprehension and production tasks. Students will also complete a story generation task using a wordless picture book with ongoing monitoring of procedural fidelity to standardized elicitation procedures. We will transcribe and analyze all samples for story grammar elements, cohesive devices, productivity (lexical density, clausal density, total utterances, rate, MLU), and ISL, with ongoing reliability checks for scoring and data entry. We will analyze between-group differences using 2 (story generation and story retell tasks) x 3 (groups) ANOVA, with Bonferroni correction for post hoc pairwise group comparisons.

Results: Data collection and analysis is currently ongoing. To date, we have collected and analyzed data for six participants. Our preliminary, descriptive analyses indicate that the TD group produced more than twice as many words and utterances than the other two groups, as well as used more complex syntax and four times more mental state words. As hypothesized, the EBD and DLD groups do not appear to differ on any of the outcomes assessed during a story generation task (TNL-2 Alien Story). For example, the mean number of total words for the EBD, DLD, and TD groups were 74.17, 62.17, and 164.17, and the mean number of internal state words was 3.67, 2.17, and 11.67, respectively.

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Thursday evening, Session C, Board 28C

Pandemic Recovery in Special Education Math: Analyzing the STAIR 2.0 Approach

Additional authors: Smith, C., University of Missouri King, S. University of Texas at Austin Wiedermann, W. University of Missouri

Introduction: Many American students struggled with math long before pandemic-related school closures in 2020. However, as schools transitioned to virtual learning in the spring of 2020, with a hybrid of virtual and in-person learning throughout the 2020-21 school year, initial data from April 2020 related to the typical summer slide suggested students across Grades 3-8 experienced an even higher score decreases, especially in the area of math (Kuhfeld & Tarasawa, 2020). Our research, funded by the Research to Accelerate Pandemic Recovery in Special Education grant, aims to improve this decline. Our team works collaboratively with special education teachers with three goals in mind. First, to increase teacher knowledge about data-based decision making (Blumenthal et al., 2021; Espin et al., 2017; Wagner et al., 2017) through the use of a data-based individualization framework (Powell, et al., 2020). Second, to increase teacher use of evidence-based practices for math intervention (Jitendra et al., 2018; Powell, Mason, et al., 2021). Third, to increase the use of formative and diagnostic assessments to inform decision making (Ketterlin-Geller & Ellis, 2020; Lembke et al., 2016).

Method: In our pursuit to elevate post-pandemic math performance and to equip 6th-8th grade students with disabilities with the necessary skills for high school math, we launched Project STAIR (Supporting Teaching of Algebra with Individual Readiness) 2.0 in the 2022-23 academic year. In this study, teachers were randomly assigned to receive light or intense coaching, the difference being frequency of coaching and method of delivery. However, all teachers who participated received 12 hours of professional development and were supported in their use of progress monitoring and data-based decision making. During our first year of implementation, we collaborated with 26 teachers across 3 states, all of whom committed to two years of participation. Teacher data were then analyzed and participants were identified as responders and non-responders. Between Years 1 and 2, a SMART (Sequential Multiple Assignment Randomized Trial) research design was used to examine the effects of light versus intense coaching. The responders and non-responders were then randomly assigned to one of three varied STAIR conditions in Year 2. By the end of the first year, changing roles and building transitions left 14 teachers for the re-randomization process.

Results: During re-randomization, teacher pre- and post-assessment data were used to identify areas of growth across all measures. Participants that scored low in five or more areas out of 15 total were identified as non-responders. Preliminary results indicated that seven teachers from the light coaching group were categorized as responders, while seven teachers who received intense coaching were identified as non-responders. The purpose of this poster is to examine the process for identifying teachers as responders and non-responders. It will also outline the re-randomization procedures for Year 2.

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Thursday evening, Session C, Board 29C

The Role of Word Importance in Passage Reading Miscues

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Introduction: Accurate fluent reading predicts reading comprehension. Word-level characteristics such as word frequency have been shown to predict children's decoding miscues that hinder fluency. This study investigated whether another word-level feature known as Term Frequency- Inverse Document Frequency (TF-IDF) was predictive of word-reading miscues above and beyond word frequency. TF-IDF is an approach commonly used in text analysis to identify relevant or important words in a passage by comparing the frequency of a word within the target passage to its frequency across a provided corpus. For example, the word the would have a low TF-IDF because it occurs frequently in a text of interest, but also occurs frequently across all other texts. If TF-IDF predicts reading miscues beyond word frequency, it would support its inclusion in future models predicting reading comprehension. TF-IDF is of particular interest because of its ability to select keywords, which have been shown to have significant instructional support for reading comprehension and could provide instructional implications for decoding instruction and text previewing.

Method: 93 participants (mean age = 12.02) read a 305 word, experimenter-created passage out loud. The TF-IDF, standard frequency index (SFI), and decodability scores were calculated for each word in the passage. The TF-IDF of the passage words was calculated within the CLEAR corpus (Crossley et al., 2021). Participant recordings of passage readings were scored for miscues including mispronunciations, substitutions and omissions. R was used to run hierarchical mixed effects logistic regression models to predict probability of word reading miscue and determine best model fit.

Results: The model that included SFI, TF-IDF and the interaction between SFI and TF-IDF explained 24% of the variance and had an AIC of 9455.7, an improvement from models without the TF-IDF or the interaction ($r^2=.23$, AIC= 9497.5, $r^2=.24$, AIC=9466.9 respectively). In this model, SFI and TF-IDF were both significant negative predictors of the probability of making a miscue ($\beta = -0.29$, $p < .001$, $\beta = -0.96$, $p < .001$ respectively). The interaction of SFI and TF-IDF was a significant predictor of the probability of making a miscue ($\beta = -0.45$, 95% CI [-0.69, -0.20], $p < .001$). The importance of TF-IDF on the probability of making a miscue depended on the SFI of the word, with higher TF-IDF but lower frequency words being the most predictive. The significant interaction and improved model fit support the hypothesis that SFI and TF-IDF are not redundant and indicate that including TF-IDF as a word-level predictor for passage comprehension in future analyses is warranted.

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Thursday evening, Session C, Board 30C

Decreasing SES-Math Achievement Gap: The Influence of Student-Teacher Relationship and Cognitive Skills

Introduction: Many children in the U.S., particularly those from socioeconomically disadvantaged backgrounds, do not exhibit adequate mathematical skills (National Research Council, 2009). In this context, decades of research have investigated various factors that could be associated with the SES-math achievement gap. Previous empirical studies highlighted the relative importance of cognitive and noncognitive skills as mediators of SES. Despite several studies having analyzed the association of SES-Math achievement, further research, including contextual dimensions, is necessary to better understand this relation. Regarding contextual dimensions, there has been a particular emphasis on understanding how teachers' relationships with students are related to student outcomes (Pianta, 1999). However, our knowledge on how student-teacher (ST) relationship fosters children's math outcomes as well as their cognitive and social-behavioral skills are still fairly limited. Furthermore, although the review of the literature has consistently shown that children from different SES levels do not have equal access to comparable social capital (e.g., student-teacher relationship), only few studies have investigated whether the effects of ST relationship on academic outcomes varies by the level of children's SES. Therefore, researcher included ST relationship as a moderator for independent variable (i.e., SES) and mediators (i.e., cognitive skills, non-cognitive skills). Therefore, the purpose of this study was to deepen the understanding of the effect of ST relationship has on math performance, and how ST relationship and their cognitive and social-behavioral skills synergistically affect students' math outcome. Understanding the influence of student-teacher relationship on achievement disparities with can provide more precise targets for policies and interventions aimed at closing the achievement gap. Two research questions guided this study. First, is the relationship between SES and math scores mediated by executive function and learning attitude of students with LD at entry to kindergarten? Second, does student-teacher relationship moderates the association between SES EF skills, learning attitude, and math score? Furthermore, is the effect of student-teacher relationship differed by the level of each variable?

Method: This study used data from the Early Childhood longitudinal Study-Kindergarten cohort (2011). Analysis was carried out using SPSS 23. The PROCESS macro for SPSS (Hayes, 2018) was used to estimate the mediating effect of EF skills and social-behavioral skills on SES- math performance association (model 4). Moreover, model 7 of the same macro was used to test the moderating effect of the quality of student-teacher relationship in the tested mediation model.

Results: For research question 1, the results indicated that SES was positively associated with EF, which was positively related to math score. The total effect of SES on math score was statistically significant. The indirect effect of EF on math score was statistically significant, suggesting that EF mediated the positive association between SES and math performance. However, there was no mediating effect of learning attitude on the association between SES and math performance. For research question 2, despite SES and ST relationship being positively associated with EF, their interaction was negatively related to this outcome variable. In students with LD with low ST relationship, the association between SES and EF is stronger, suggesting that the quality of ST relationship is particularly important in students with LD from low SES background to predict their EF. Thus, ST relationship moderated the association between SES and EF, which mediated and positively predicted math performance.

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Thursday evening, Session B, Board 21B

Helping students with dyslexia find the "magic" in magician: implementation of a morphology intervention

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Introduction: Morphological awareness and related interventions have received increasing attention in dyslexia research (Bowers, Kirby, & Deacon, 2010; Deacon, Parrila, & Kirby, 2008). The implementation of morphological interventions has resulted in improvements related to literacy skills, particularly for students with reading and language-based disabilities (Goodwin & Ahn, 2010). For this study, we compared changes in literacy-related skills for students with dyslexia who received a morphology-focused intervention and those who received business-as-usual instruction. We specifically examined changes in real and pseudoword reading accuracy as well as changes in orthography and morphology ability. Our research question was: does morphology-based instruction impact literacy outcomes for students with dyslexia?

Method: Participants and Setting Participants in our study were 101 students diagnosed with dyslexia. Over a period of three years, 67 students were assigned to the intervention group in in-tact instructional groups, and received morphology-focused instruction (i.e., Structured Word Inquiry; Bowers & Kirby, 2010). Thirty four students were assigned to the control group and received business-as-usual instruction. All students were in Grade 4 at the time of the study and attended a specialized school for students with dyslexia. Methods To examine the effect of morphology-based instruction for students with dyslexia compared to a control group, we analyzed group differences on baseline measures to ensure we had equal groups. Next, we analyzed each group's change from pretest to posttest on each of the outcome measures and compared the group differences and associated effect sizes.

Results: Both groups made significant gains in single real and pseudoword reading and morphological processing, but the raw score gains made by the morphology-focused group were greater for all measures. The control group improved 4.56 (SD=6.7, $p<.001$) on the real word reading measure, 2.74 (SD=3.9; $p<.001$) on the pseudoword reading measure, and 2.13 on the morphology measure (SD=4.3, $p=.009$). The morphology-focused group improved 5.18 (SD=6.9, $p<.001$) on the real word reading measure, 5.05 (SD=6; $p<.001$) on the pseudoword reading measure, and 3.68 on the morphology measure (SD=5.9, $p<.001$). Importantly, the morphology-focused group additionally made significant improvement on orthography, obtaining an average raw score increase of 3.14 (SD=10.9, $p=.02$) whereas the control group did not with a raw score increase of 2.43 (SD=7.5, $p=.08$). We then analyzed the effect size of the intervention, after adjusting the model for baseline scores. There were significant group differences on the single word reading measure, orthography, and morphology. The morphology-focused group improved significantly more than the business-as-usual group on the pseudoword reading measure ($M=3.80$, $p<.001$, $\eta^2=0.14$) and the morphology measure ($M=4.33$, $p<.001$, $\eta^2=0.2$), with large effect sizes. The morphology-focused group improved significantly more than the instruction as usual group on the real word reading measure ($M=3.06$, $p=.03$, $\eta^2=0.05$) and the orthography measure ($M=5.22$, $p=.003$, $\eta^2=0.08$), with medium effect sizes. Our study provides evidence for the effectiveness of a morphological intervention for students diagnosed with dyslexia.

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Thursday evening, Session C, Board 31C

Exploring the Relationship Between Sentence Types and Writing Quality

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Introduction: One major process in composing a text is sentence generation. Writers need to transform ideas into written sentences that make sense and conform to the permissible syntax of the language. Because thoughts and ideas are communicated via varied sentence structures, it is expected writers use varied sentence types in their essays. Using a mixture of different sentence structures reduces repetition, adds emphasis to important points in the text, and grabs a reader's attention. In contrast, short and repetitive sentence structures create a staccato rhythm that makes writing sound choppy. Less-skilled writers struggle with this critical skill and produce less varied and less sophisticated sentences as they progress through grade levels (Saddler et al., 2018). To date, only two studies examined the use of varied sentence types in different genres (see Blair & Crump, 1984) and students with varying writing abilities (see Moran, 1981). However, it is unclear if varied, grammatically constructed sentences reflect good writing. Therefore, it is important to examine the use of sentence types between more skilled- and less-skilled writers to provide a more complete understanding of differences in their sentence construction ability. Three research questions guided this study: (1) What is the proportionate use of the four sentence types and the run-on sentences and sentence fragments in eighth-grade argumentative essays? (2) What is the difference in the proportionate use of the four sentence types and the run-on sentences and sentence fragments between long and short essays? (3) What is the difference in the proportionate use of the four sentence types between higher- and lower-scoring essays?

Method: Participants were 115 eighth-grade students who responded to argumentative prompts of a state-level Benchmark Writing Assessment System (BAS-Write), a web-based skills assessment tool. Descriptive statistics was done to compute the proportionate use of the four sentence types: simple, compound, complex, compound-complex, and run-on sentences, and sentence fragments. Next, the standard deviation of the four sentence types and run-on sentences and sentence fragments was calculated. The argumentative essays were then categorized as the top and bottom 50th quantile based of writing scores to determine if essays with higher- or lower-scores had a higher proportion of varied sentence types. The average percentage of the four sentence types was calculated. • Sentence type distribution across all essays and by essay length. • Average standard deviation of sentence types across all essays. •

Average standard deviation by essay length for all essays. • Correlation between the standard deviation (SD) and the writing scores to determine the relationship between use of different sentence types and writing scores.

Results: SD appears to be a good indicator to determine the proportionate use of different sentence types with lower SD implying more use of different sentence types. Complex sentences had the highest proportion of sentence types while compound sentences had the lowest proportion. This distribution is similar in both long and short essays. Essays with higher writing scores have greater proportion of simple, compound, complex, and compound-complex sentences. There are more run-on sentences compared to sentence fragments across all essays.

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Thursday evening, Session C, Board 3C

The Effects of English-Language Vocabulary Acquisition for English Learners Receiving Instruction in Their First Language

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Introduction: English Learners (ELs) are among the fastest growing K-12 student population in the United States and account for 10% of the total K-12 student population. Vocabulary acquisition is a noted deficit among ELs. Researchers have placed a specific focus on addressing these vocabulary deficits with emphasis on the language that ELs receive instruction. But while there are growing reports of first-language supplemental teaching instruction for ELs, many of these studies have not been evaluated in terms of internal and external validity nor have any systematic reviews focused on vocabulary acquisition as an outcome variable. This literature review addresses the following research question: is first-language instruction for English Learners an evidence-based practice for improving English vocabulary acquisition?

Method: The studies for this literature review were located using ProQuest and the Vanderbilt University Library Database. Studies were chosen based on the following inclusion and exclusion criteria: articles must have been (a) published in a peer-reviewed journal, (b) a targeted population of interest classified as ELs, (c) included some form of vocabulary instruction, (d) documented the main outcome as English vocabulary acquisition, (e) published within the last 15 years, and (f) use a randomized control trial research design. Studies must not have been (a) single case research design, (b) conducted in a country other than the United States, and (c) have less than $n = 10$. The search terms produced a total of 1,636 results. Following a title and abstract screening, four studies remained for this review.

Results: Due to mixed results in measures of vocabulary skills, we can conclude that supplemental instruction in an EL student's first language to improve English-language vocabulary acquisition is a potentially evidence-based practice. Three of the four studies identified first-language vocabulary instruction as an evidence-based practice for English-language vocabulary acquisition, but heterogeneity in outcomes still existed amongst studies that demonstrated positive results. Leacox and Jackson (2014) reported elements of the intervention that positively improved ELs' word learning (expressive definition gains), some that negatively impacted ELs' word learning (medium negative correlation for definitional word gains) and elements that did not significantly impact ELs' word learning (bilingual expressive definitions). For Méndez et al. (2015), children in the culturally and linguistically responsive group (CLR) demonstrated higher English and Spanish vocabulary acquisition than children in the English-only (ECR) group. Similarly in August et al. (2016), third- and fourth-grade EL students in the extended instruction condition (the condition where participants received supplementary Spanish definitions for cognate target words) were more effective at learning vocabulary words than students in the embedded vocabulary instruction condition who received English-only instructional support. In contrast, while participants in Roberts (2008) saw gains in vocabulary acquisition, the gains occurred because of the storybook-reading component of the intervention, rather than the particular language of the storybook. Recommendations for future research include conducting studies with a no-treatment control group and a focus on maintenance and generalization of skills. Practitioners are recommended to implement supplementary instruction with activities, classwork, and projects in a child's first-language that focuses on building English-language vocabulary.

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Thursday evening, Session C, Board 32C

Effects of Digital Literacy Intervention on Information Processing of Students with Disabilities

Introduction: The purpose of this study is to investigate the effects of digital literacy intervention on both information processing and academic engagement among students with developmental disabilities.

Method: Multiple-probe across subjects design was used. Three students with developmental disabilities participated in this study. The intervention included activities based on sub-categories of digital literacy, 'Understanding, Creating, and Communicating'. During the baseline phase, the students worked on tasks in information technology courses without any intervention. In the intervention phase, they worked on similar tasks while receiving targeted digital literacy instruction. The intervention was conducted three to four times a week. After each session, a researcher administered (a) information processing test and (b) academic engagement test.

Results: The study revealed that digital literacy instruction significantly improved the information processing skills of students with developmental disabilities. Mean test scores in both the intervention and maintenance phases were notably higher than those in the baseline phase, achieving an effect size of 100%. Additionally, the research identified noticeable improvements in academic engagement; students consistently scored higher during the intervention and maintained these gains in the maintenance phase. These results validate the notion that students with developmental disabilities have the ability to effectively collect, manage, and use information when provided with targeted interventions. Moreover, the findings indicate that such students are more actively engaged in learning in a digital educational environment.

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Thursday evening, Session B, Board 11B

Examining the Impact of Design-comparable Effect Sizes on the Analysis of Single-case Design in Special Education

Introduction: Single-case design (SCD) encompasses an array of arrangements (e.g., reversal, multiple-baseline designs; Ledford et al., 2018) and represent more than half of all experiments published in special education journals (Author et al., 2023). Researchers employing SCDs traditionally analyze experimental effects through the visual analysis of data displayed on a linear graph (Kazdin, 2021). Nonetheless, the push for quantitative alternatives grows due to the limitations of visual analysis. Critics note visual analysis does not provide a practical, universal metric of treatment magnitude (Browder et al., 1989; Riley-Tillman et al., 2020) and is applied inconsistently by observers (Author et al., 2022; Ninci et al., 2015). In recognition of these concerns, the What Works Clearinghouse (WWC, 2022)-the US Department of Education's research evaluation initiative-limited the role of visual analysis in evaluating SCD in favor of design-comparable effect sizes (D-CES). Benefits of D-CES include the aggregation of outcomes from both SCDs and group designs, which can facilitate a comprehensive assessment of intervention effects. However, the WWC (2022) limits the application of D-CES to multiple-baseline across participants designs or reversal designs and studies that replicate the effect across three participants or other units (e.g., classrooms, schools). The present study examines the compatibility of SCDs published in special education journals-specifically cross-categorical journals as well as publications related to developmental disabilities, emotional/behavioral disorders (EBD), and learning disabilities (LD)-with D-CES. Specific questions include: (1) What percentage of SCD are ineligible for quantification based on design, number of participants, and inappropriate replications; and (2) To what extent do SCDs otherwise compatible with D-CES possess potentially problematic characteristics (e.g., nonconcurrent designs)?

Method: We used a search strategy consisting of several steps to address the research questions. Articles in thirty-three special education journals were identified using databases and divided based on publication year. A random sample of articles was selected for each year between 1999-2021 and subsequently coded based on design. Of 14,071 selected articles, 1,425 were identified as SCD. Articles that did not meet D-CES compatibility for design, number of participants, or appropriate replications (e.g., same DV and IV across three participants) received exclusion codes. Additional codes pertaining to nonconcurrent designs and the number of data points in each phase were assigned to remaining articles. Interrater agreement (IRA) for article selection was 97.17%; IRA for coding was 93%.

Results: Application of exclusion retained 40.12% of the total sample. Journals with separate emphases, such as cross categorical (49.03%), EBD (45.07%), LD (65.96%) and developmental disabilities retained (36.85%) retained a varying number of articles. Of the remaining articles, most (75.91%) contained at least one case with five data points per condition; few articles would be excluded on the basis of using nonconcurrent designs (7.89%). Findings suggest significant portions of special education studies, particularly those concerning individuals with developmental disabilities, would be excluded from WWC reviews based on incompatibility with the D-CES. This contradicts earlier, more sanguine projections related to the application of D-CES and calls into question the applicability of the evidence-based practice movement to populations historically served by special educators.

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Thursday evening, Session C, Board 33C

Developing Pre-Service Teachers' Capacity to Implement Culturally and Linguistically Responsive Mathematics Instruction

Introduction: Prior investigations of teacher effectiveness supported this claim and identified the following essential characteristics of effective teachers: (a) a broad and connected understanding of mathematics content; (b) knowledge of the big ideas that are used to frame instruction; (c) the ability to intentionally connect to conceptual understanding across skills; (d) capability for integration of evidence-based practices in mathematics; and (e) capacity to acknowledge, understand, and respond to students' individual differences (Livy et al., 2019; Ma, 1999, 2010; Schoenfeld & Kilpatrick, 2008). Noticeably missing across much of the early research on teacher effectiveness is mention of the role of culture in mathematical instruction and learning. Yet, as the population of diverse students in U.S. schools continues to grow rapidly, there is a growing sense of urgency to develop pre-service teachers' awareness and understanding of how diverse students learn and operate within the mathematics classroom. Examining how pre-service teachers acquire knowledge of culturally and linguistically responsive mathematics practices is necessary for improving practitioner preparation programs and ensuring high quality instruction for all (Gay 2000, 2002).

Method: The current study investigated the impact of a culturally and linguistically responsive mathematics instructional module within the context of a pre-service teacher preparation program. The following research questions guided this examination: (1) Does pre-service teacher self-efficacy related to culturally and linguistically responsive mathematics practices change after receiving the CLR-MI module?; (2) Do perceptions of the impact of culturally and linguistically responsive mathematics instruction change after receiving the CLR-MI module?; (3) Does mathematical knowledge for teaching change after receiving the CLR-MI module?; and (4) Was the CLR-MI module a socially valid approach to building pre-service teacher capacity to understand and implement culturally and linguistically responsive mathematics practices? A total of 64 pre-service teachers across two university sites participated in this study. All participants were randomized at the individual level within each block, so that half received treatment (CLR-MI module) during the first half of the semester (Wave 1) and the waitlist control received it during the second half of the semester (Wave 2), following completion of data collection for the treatment group. The independent variable that served as the treatment for this study was the researcher-developed Culturally and Linguistically Responsive Mathematics Instruction (CLR-MI) online training module. The CLR-MI module was delivered on a Web-based application called EdApp Learning Management System and was a supplement to the core mathematics methods instruction all participants received during the course. Content delivered via the web-based module provided participants with background information necessary for supporting CLD students with mathematics difficulties and provided opportunities for application and practice. Topics covered in the modules included funds of knowledge, the language of mathematics, as well as implementation of culturally and linguistically responsive mathematics instructional practices.

Results: Results indicated significant gains for self-efficacy for Wave 1 ($p < .001$) and Wave 2 ($p < .001$) and for outcome expectancy with Wave 1 ($p < .05$) and Wave 2 ($p < .05$). However, pre-service teachers did not make significant improvements to mathematics knowledge for teaching. Additionally, it was determined that the CLR-MI module was a socially valid approach to delivering professional learning on culturally and linguistically responsive mathematics to preservice teachers.

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Thursday evening, Session C, Board 34C

Multilevel Coaching Support for Pre-Service Teachers During an Enhanced Clinical Experience

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Introduction: To prepare and support PSTs during clinical experiences implementing evidence-based practices, teacher preparation programs can provide PSTs with authentic experiences guided by expert feedback when intervening with students. Expert feedback can take the form of coaching support in multiple modalities, such as supervisory coaching (e.g., email feedback) or side-by-side coaching (e.g., in-the-moment modeling). In this study, PSTs received coaching support through a multilevel coaching framework responsive to their levels of fidelity of implementation.

Method: This study investigated the effects of multilevel coaching support on elementary education PSTs' fidelity of implementation of an evidence-based reading intervention. The research questions were: 1. What are the effects of multilevel coaching support on PSTs' fidelity of implementation of an evidence-based reading intervention? 2. What are PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention? The study design was a single case, multiple baseline across participants design replicated across dyads of PSTs. Six elementary education PSTs participated in the multilevel coaching intervention. The multilevel coaching intervention included three levels of coaching support. Level 1 was post-training. Level 2 consisted of supervisory coaching (i.e., email feedback based on video observations). Level 3 consisted of side-by-side (i.e., in-vivo modeling and prompting) plus supervisory coaching. If PSTs did not meet the criteria for fidelity, they received the next most intensive level of coaching support. In addition to investigating the effects of multilevel coaching support on PSTs' fidelity of implementation, this study also examined PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention via a social validity questionnaire administered at the conclusion of the study.

Results: Visual analysis of the 6-tier graph of PSTs' percentage of observed expected behaviors captured by measuring fidelity of Implementation indicated an increase in level from Level 1 to Levels 2 and 3 across all 6 tiers. Additionally, five of the six PSTs included in the study met the criteria for fidelity during Level 2, Level 3, or during both levels of support. Four PSTs required Level 3 support before their data indicated sustained and stable high levels of fidelity, and two PSTs required Level 2 support to obtain sustained and stable high levels of fidelity. The results of this study indicated that elementary education PSTs demonstrated improved fidelity of implementation after receiving multilevel coaching intervention support inclusive of supervisory or supervisory plus side-by-side coaching. A functional relation between the multilevel coaching intervention and PSTs' fidelity of implementation of an evidence-based practice in reading was established. Additionally, we examined PSTs' levels of fidelity of implementation related to structure and process dimensions of fidelity. The results of the social validity questionnaire indicated that PSTs held positive perceptions of the multilevel coaching intervention during their clinical experience and perceived the intervention as socially important and acceptable. Additionally, the results of the questionnaire suggested that PSTs held improved perceptions of their knowledge and skills to teach reading and of their instructional behaviors due to the multilevel coaching intervention support.

Presenter(s): Paulina Kulesz, University of Houston (paulina.kulesz@times.uh.edu)
David Francis, University of Houston ()
Thursday evening, Session A, Board 18A

Impact of Reader-Text Interactions on Reading Comprehension across Grades 3 - 12

Introduction: Although a growing number of researchers have been conducting reading comprehension research at the interface of the reader, text, and activity elements, empirical models examining the effects of reader-text interactions from the developmental perspective have been lacking. Component skills models of reading have focused researchers' attention on malleable characteristics of readers that affect comprehension across a broad grade span. Text-discourse framework of reading have focused on characteristics of the text that affect student reading and how text is organized to achieve an author's goals. Rarely have these frameworks been integrated in a comprehensive way in a developmental study of reading comprehension, and even more rarely have they been combined with a focus on the comprehension processes demanded by specific assessment activities. In the current study we comprehensively examined interactions among reader, text, and activity, the end product of which is reading comprehension. Our purpose was to understand and construct a developmental model of the factors that affect students' performance on the Gates-MacGinitie (GMRT) reading comprehension subtest across a broad grade span drawing on a secondary analysis of data collected through the RFU network. We were interested in illustrating which factors are most influential and which are least influential in impacting students' comprehension as measured across a wide-ranging grade span, and how those factors interact with students' component skills to develop the deepest level of text comprehension.

Method: Our total sample (N ~ 8,000) included students in three developmental periods, namely late elementary school (Grades 3 - 5), middle school (Grades 6 - 8), and high school (Grades 9 - 12). We began our examination with scaling the GMRT test forms corresponding to different grade levels. When items come from different test forms, performance is not necessarily comparable as test forms may vary in their difficulty, and distribution of students' ability may vary across test forms. Using scaled item difficulty, we examined reader-text interactions including reader characteristic (word reading, reading fluency, vocabulary, background knowledge, and working memory) and text characteristics (narrativity, average word frequency, average sentence length, word concreteness, referential and deep cohesion, comprehension processes engaged in providing a response to each item).

Results: The results suggested that vocabulary is the most important predictor of reading comprehension test performance across grades though amount of variance explained by vocabulary varied across grades. Basic level language skills played a bigger role for younger students. The processing demands of test items were not highly predictive of test performance. Rather, narrativity level was the most critical text characteristic affecting test performance across grades. Reader-text interactions were present, but were not pronounced. Together, our findings suggest that better understanding of malleable factors that affect comprehension may help in better alignment of reading instruction to the needs of students given their constellation of component skills and the specific developmental stage at which they are intervening.

Presenter(s): Jialin Lai, Texas A&M University (irenelaijl@tamu.edu)
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Thursday evening, Session C, Board 35C

Multilingual Kindergarteners' Cognitive-Linguistic Profiles: A Person-Centered Approach

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Introduction: The number of multilingual students in U.S. schools continues to grow year over year. Educational stakeholders have the responsibility to provide appropriate, high-quality instruction for an increasingly linguistically diverse population. However, there are unique considerations that are necessary to account for when assessing and evaluating multilingual students due to their simultaneous acquisition of multiple languages. Assessment and evaluation of performance is a key component of identifying students at risk for learning difficulties, such as reading difficulties. If multilingual students are unable to be accurately assessed for reading difficulties, early intervention cannot be provided; rather, multilingual students may only receive additional support when they have fallen significantly behind their peers. Thus, understanding how young multilingual students develop early literacy skills is necessary to develop and deliver accurate assessments of multilingual students' skills. Therefore, this study uses a nationally-representative dataset of multilingual kindergarteners to investigate the presence of profiles based on students' cognitive and academic outcomes (i.e., executive functioning, English language, and reading skills). Furthermore, additional analyses are conducted to investigate whether multilingual kindergarteners at risk for reading difficulties are more likely to be in one profile over the others.

Method: The current analytic sample was obtained from the national dataset Early Childhood Longitudinal Study, Kindergarten Class of 2010-11 (ECLS-K:2011), including 3,119 multilingual kindergarteners. Cognitive and academic outcomes were measured during kindergarten fall, on English oral language proficiency, English early reading skills, cognitive flexibility, working memory, inhibitory control, and attentional focus. The current sample was also measured on English reading achievement during the fall and spring of kindergarten. Those at risk for reading difficulties (n = 625) were at the lower 25th percentile in English reading achievement measures.

Results: Latent profile analysis indicated a five-profile model best fits the data. (1) Developing Language and EF (7.6%), (2) Average Language, Low Cognitive Flexibility (16.3%), (3) Average Language and EF (40.8%), (4) Developing Language, Average EF (7.7%), and (5) Good Language and EF (27.7%). Multilingual kindergarteners in Profiles (1) and (4) were more likely to be at risk for reading difficulties during kindergarten fall. However, multilingual kindergarteners in Profile (4) in kindergarten fall became less likely for reading difficulties in kindergarten spring, while those in Profile (1) still were more likely to stay in the at-risk group during the spring of kindergarten.

References (if any):

Based on preliminary analyses, multilingual kindergarteners tended to fall into one of five profiles based on their academic and cognitive outcomes. Some profiles (i.e., Developing Language and EF; Developing Language, Average EF) included multilingual kindergarteners who were more likely to be at risk for reading difficulties in English than kindergarteners in other profiles. Practical and theoretical implications will be discussed.

Presenter(s): Amelia Larimer, University of Iceland (ajl9@hi.is)

Thursday evening, Session B, Board 17B

Impact of initial performance and instruction on reading growth of Icelandic language learners across 1st grade

Additional authors: Auður Björgvinsdóttir University of Iceland Anna Lind Pétursdóttir University of Iceland Kristján Ketill Stefánsson University of Iceland Kristen McMaster University of Minnesota

Introduction: Iceland is following global trends of declining reading rates and increasing diversity within compulsory schools. Like other nations, Iceland's schools are grappling with the question of how best to instruct children in early reading within diverse classrooms. Children learning Icelandic as an additional language, referred to as Icelandic language learners in this study, represent a rapidly increasing proportion of children in Iceland's compulsory schools, from 4% in 2005 to 14% in 2022. While scientists continue to discover the specific impact language background has on early reading development it is understood that learning to read in a language you are also learning to speak and understand is challenging. Numerous factors are noted to influence growth in letter sound fluency and oral reading fluency of language learners in the early grades, including initial reading performance, type of instruction, gender, and birth month.

Method: This study aimed to identify how instruction and initial performance impacted the reading growth of Icelandic language learners ($n = 87$) in 1st grade with the use of a longitudinal sequential cohort design. The participants in this study were all children categorized as Icelandic language learners from two cohorts of 1st grade from the 2021-22 ($n = 48$) within eight schools and the 2022-23 school years ($n = 39$) within four schools. They were part of a larger research project to evaluate the impacts of a teacher-implemented evidence-based reading instruction program called Peer Assisted Learning Strategies (PALS) class-wide. Half of the schools were randomly assigned to the experimental condition with training in PALS and fidelity checks to ensure correct implementation. The other half were assigned as the control group and continued with Teaching as Usual (TAU) instruction. Teacher reports and data from direct observations were collected to describe reading teaching in the TAU condition. Predictive factors that were analyzed were initial performance, instructional method (PALS/TAU), gender and age. Outcome factors were children's growth on an oral reading fluency assessment, measuring correct words per minute on a leveled text, and a letter sound fluency assessment, measuring how many sounds children named correctly in one minute. Both measures were given three times across first grade. Given the repeated measures design, a multilevel linear mixed effects model (LME) was fit to the data in Jamovi with a restricted maximum likelihood estimator (REML).

Results: Initial performance was positively related to oral reading fluency growth, with a clear Matthew effect present ($r = .45$). The type of instruction did not have a significant impact on oral reading fluency growth but did have a significant impact ($p < .01$) on letter sound fluency growth, with children in the PALS condition growing close to half a standard deviation more across the year ($d = .50$). Gender nor birth month had a significant impact on oral reading fluency or letter sound fluency growth across the year. The results highlight the importance of providing this growing group of children with early intervention and evidence-based reading instruction.

Presenter(s): Danielle O. Lariviere, The University of Texas at Austin (danielle.lariviere@utexas.edu)

Thursday morning, Board 12

A Synthesis of Mathematics-Language Interventions for Students in Preschool Through Grade 12

Introduction: Mathematics-language knowledge predicts performance in several domains of mathematics including counting, computation, and word-problem solving (Peng & Lin, 2019; Powell et al., 2017; Turan & De Smedt, 2022). In this poster presentation, mathematics language refers to vocabulary terms with at least one mathematics-specific definition. This includes terms that are used only in the context of mathematics (e.g., integer) as well as terms with other generalized meanings (e.g., product; Rubenstein & Thompson, 2002). Given the role of mathematics language in mathematics proficiency, it is important to provide evidence-based, targeted instruction in this area (Riccomini et al., 2015). Mathematics-language intervention is particularly needed for students who exhibit mathematics difficulty (MD), because this population demonstrates limited understanding of mathematics language relative to their peers (Forsyth & Powell, 2017). Students may experience challenges with many aspects of mathematics language, including (a) distinguishing between formal and informal terms (e.g., rhombus vs. diamond) and (b) navigating terms with more than one meaning (e.g., round; Rubenstein & Thompson, 2002). Despite the need for targeted instruction and intervention in mathematics language, there are limited resources available that synthesize best practices in this area. In this synthesis, I aim to add to the literature base by asking the following research questions: 1. What are the effects of mathematics-language interventions on measures of mathematics language and mathematics performance? 2. What mathematics domains are addressed in mathematics-language interventions? 3. What instructional practices are included in mathematics-language interventions?

Method: To identify relevant studies for this synthesis, I conducted a systematic search of the following databases: Academic Search Complete, APA PsycInfo, Education Source, ERIC, and ProQuest Dissertations & Theses. Search terms included content on mathematics, language/vocabulary, and interventions. Initially, 2,155 results were obtained through the database search. After deduplicating initial results, 1,219 studies were screened for inclusion using titles and abstracts. Sixteen peer-reviewed articles were identified for inclusion through the database search. Screening of dissertations will be completed by September of 2023 and secondary search procedures (e.g., forward and backward searching) will occur by October of 2023. All studies will be coded for the following information by November of 2023: study characteristics (e.g., research design), participant demographics, intervention content, instructional practices, study quality, and effects. To be included in the synthesis, studies were required to meet several inclusion criteria. First, studies were required to employ a group experimental, group quasi-experimental, or single-case research design. Studies also had to appear in either dissertations or peer-reviewed journal articles. Additionally, studies had to be available in English. Interventions within the studies were required to focus on mathematics language. Study participants had to be students in Preschool through Grade 12. Finally, studies had to include measures of mathematics language and/or mathematics performance.

Results: For this poster presentation, I will present on the following: (a) intervention effects on measures of mathematics language and general mathematics, (b) mathematics domains addressed within interventions, and (c) instructional practices used within interventions. This project is ongoing and will be completed by the end of November of 2023.

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Presenter(s): Seulbi Lee, University of Oregon (blee3@uoregon.edu)

Thursday evening, Session C, Board 36C

Students in special education and technology-based reading interventions: A systematic review

Introduction: This systematic review aims to investigate the representation of students receiving special education in the literature on technology-based reading interventions. It focuses on three key research questions: (1) To what extent have technology-based reading interventions included students in special education? (2) When included, in what detail do they describe the population in terms of the number of participants and diagnoses and discuss in results? (3) When the effects are measured, what types of measures have been used to provide evidence of the effectiveness? And (4) Where effects are measured and what are they? To what extent do they include any moderators or disaggregated analyses?

Method: Educational Resources Information Centre (ERIC), Education Abstracts, and professional Development Collection from EBSCO will be searched related to the population and variables of interest. Studies will be included in the analysis through the coding process of abstract screening, text coding, and review of the current literature by a graduate student. The inclusion criteria encompass studies that focus on technology-based reading interventions in that they directly target the improvement of reading skills of Grades 2-8 students and measure reading skills as outcomes.

Results: Through a thorough review of the literature, it is expected to gain a better understanding of the limited representation of students in special education in technology-based reading interventions. While expecting to uncover valuable insights, it's clear that further research is needed to fully understand the potential benefits and limitations of these interventions for students receiving special education. Extending the research questions to other domains of reading will promote the inclusion of students with disabilities in research and disaggregated analysis in results.

Presenter(s): Adam Lekwa, Rutgers University (al928@gsapp.rutgers.edu)

Thursday morning, Board 4

Psychometric Qualities of Sentence Ordering as a Curriculum-Based Measure of Reading Comprehension

Introduction: Drawing on cognitive theory in reading comprehension (e.g., van den Broek & Espin, 2012), the Sentence Order Fluency (SOF) assessment is proposed as a CBM-style measure of reading comprehension. In SOF, students read narratives in which the order of sentences within paragraphs has been randomized. Students have 4.5 minutes to read groups of sentences (paragraphs) and write numbers to indicate the order of sentences they believe makes the most sense. Because this requires students to detect text cohesion and coherence relationships between sentences, scores from this timed task are expected to reflect the rate at which a student can form a coherent mental representation of the original text (e.g., Albrecht & Obrien, 1993; Rapp & van den Broek, 2005). Purpose Pilot SOF data collected from 119 4th, 5th, and 6th graders indicate that SOF may uniquely explain approximately 16% of the variation in comprehension after controlling for reading accuracy and fluency (AUTHOR et al., in preparation). The purpose of the current study was to build on this evidence by assessing the reliability of SOF data, as well as the potential utility of different scoring alternatives.

Method: A group of 63 students in the 6th grade at a charter school in the Mid Atlantic U.S. completed 9 alternative SOF forms in between April and June, 2023. By default, SOF is scored by counting the number of sentences placed in their original ranks ("Absolute Correct"), yet this might underestimate students' abilities to identify semantic relationships across sentences. Two additional scoring alternatives were explored: the count of sentences paired with original neighbors ("Pairs"), and a Levenshtein string similarity index ("Levenshtein"; based on the number of edits required to make one string equal to another; Zhang et al., 2017), in which the sequence of numbers produced by students is compared to that which would restore the original order of each randomized SOF paragraph. Nine alternative forms were created by randomizing sentences within each paragraph of nine easyCBM Passage Reading Fluency probes (Alonzo et al., 2009). Prior to administration of SOF, all students completed the Comprehension subtest of the Gates-McGinitie Reading Test, 4th Edition (GMRT-IV; McGinitie et al., 2000), which served as the criterion for reading comprehension in this study.

Results: Two-facet (students and SOF paragraphs) generalizability and dependability studies (e.g. Brennan, 1992) were conducted for SOF data using each of the three candidate scores. SOF scores reached levels of reliability acceptable for absolute and relative decisions (Ysseldyke et al., 2023) after about 9 paragraphs. Levenshtein string similarity scores were slightly more reliable than either the count of absolute correct sentence placements, or correct sentence pairs. Relationships with GMRT-IV comprehension scores did not vary substantially between score types. Results from this study of the SOF approach to measuring comprehension suggest sufficient promise to warrant further research and development. An agenda for future research will be discussed.

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Presenter(s): Taylor Lesner, University of Oregon (tlesner@uoregon.edu)

Thursday evening, Session A, Board 19A

Examining Patterns and Predictors of Response to Mathematics Intervention

Additional authors: Ben Clarke, University of Oregon Derek Kosty, Oregon Research Institute Jessica Turtura, University of Oregon

Introduction: Concerns about low mathematics achievement have created a push to increase national mathematics proficiency through research and policy. Efforts have largely focused on early mathematics intervention for students with or at risk for math difficulties (MD) within multi-tiered systems of support (MTSS) models, with promising results (Fuchs et al., 2021). However, a substantial minority of students do not respond adequately to generally effective intervention (Fuchs & Vaughn, 2012). Within MTSS models, important educational decisions are based upon instructional response. Meaningful categorization and prediction of student responsiveness to intervention is therefore paramount to support better outcomes for students with MD. Across research and practice, intervention outcomes are typically thought of as a binary, with students considered either responsive or non-responsive to intervention. However, defining responsiveness in this way can result in arbitrary distinctions, and disregards whether gains are maintained or fade over time (Fletcher & Miciak, 2019). Peng and colleagues (2020) proposed that categorizing responsiveness in more complex ways may reveal important differences between subgroups of students who exhibit distinct patterns of responsiveness over time, demonstrating the potential value of this approach in the context of an early reading intervention. The present study sought to replicate the approach of Peng and colleagues in the context of an evidence-based early math intervention by exploring patterns of response to intervention, and whether response profiles are predicted by student-level variables. This study addressed the following research questions: 1) Is student response to the ROOTS intervention best categorized by a binary response/non-response framework, or are there more than two distinct response patterns? 2) Do pre-intervention cognitive and math skills predict patterns of response to intervention?

Method: Participants included kindergarten students at risk for MD who were assigned to the ROOTS intervention condition (n = 880) during a randomized control efficacy trial (Clarke et al., 2016). Students received 50 20-minute, small-group ROOTS lessons over approximately 10 weeks. Measures of mathematics proficiency included Number Sense Brief, Assessing Student Proficiency in Early Number Sense, TEMA-3, SESAT, and ROOTS Assessment of Early Numeracy Skills. Patterns of response to the ROOTS intervention were explored through latent profile analysis, using composite scores derived from math performance at pretest, posttest, and 1-year follow-up. Regression analyses were then used to examine whether individual differences in pre-intervention cognitive or math skills predicted response patterns in the best-fitting model.

Results: Results indicated that variability in response to ROOTS was best captured by a more complex categorization framework encompassing four distinct response profiles: a moderate-risk, mildly responsive group; a moderate-risk, delayed response group, a high-risk, strongly responsive group; and a lower-risk, non-responsive group. Membership in each response profile group was predicted by pre-intervention performance on measures of both early mathematics and cognitive skills (visual-spatial, fluid reasoning, and working memory). On average, students with lower initial math skill and cognitive performance demonstrated stronger intervention response. Future directions for intervention research will be discussed, as well as implications for practice within MTSS in school contexts.

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Thursday evening, Session B, Board 5B

Early Childhood Language Gains, Kindergarten Readiness, and Grade 3 Reading Achievement

Additional authors: Shayne Piasta, The Ohio State University Kelly Purtell, The Ohio State University Robert Nichols, The Ohio State University Rachel Schachter, University of Nebraska

Introduction: Emergent literacy skills are developmental precursors to conventional reading acquired throughout the early childhood years (Whitehurst & Lonigan, 1998). Key among these are phonological awareness and letter knowledge, which support children's word recognition skills, and oral language, which supports children's comprehension and meaning-making skills. Intervention research shows that each of these key emergent literacy skills are also malleable - i.e., can be improved with instruction (National Early Literacy Panel, 2008). Accumulating research indicates positive effects of early childhood programming on children's emergent literacy skills outcomes. In the current study, we explore two aspects of this premise that, to our knowledge, remain untested. First, this premise pertains to children's development of these emergent literacy skills during early childhood. Research to date has established associations between phonological awareness, letter knowledge, and oral language in early childhood and later reading skills when these are measured at a static point in time (e.g., Hjetland et al., 2020; Lonigan et al., 2008); at issue is whether gains in these emergent literacy skills during early childhood are predictive of longitudinal outcomes. Second, we examine whether gains in a complex emergent literacy skill such as language continue to predict later reading outcomes after controlling for more basic emergent literacy skills. In doing so, we explore the idea that complex or trifecta skills may warrant greater attention in early childhood as a means of achieving lasting benefits. In the present study, we examined two research aims. In Aim 1, we examined the extent to which children's language gains during a year of early childhood education predicted emergent literacy skills at kindergarten entry and reading achievement in Grade 3. In Aim 2, we examined the extent to which language gains during a year of early childhood education predicted later skills relative to gains in other, more basic emergent literacy skills

Method: The current study involved a secondary analysis of data collected as part of the Assessing Preschool Professionals' Learning Experiences (APPLE) project (with data collected from 2010 to 2014; see Piasta et al., 2017, 2020). This confirmatory study was preregistered. We examined the aims of the present study using latent change score (LCS) models. This technique allowed us to capture changes in latent representations of children's skills across a year of early childhood education. We fit three latent change measurement models to the data, one for each of the three primary constructs (language, letter knowledge, and phonological awareness). With these established, we next fit structural equation models to the data, using both initial status and gain to predict kindergarten readiness and later third grade reading.

Results: We found that models generally fit the data well, and we were able to estimate change in all three key outcomes of interest. For the primary aims, we found that language gains significantly predicted kindergarten readiness when estimated in isolation (effect = 0.24 SDs, $p < .001$), but not when gains in letter knowledge and phonological awareness were also included. Gain scores were not predictive of third grade on any of the tested measures.

Presenter(s): Allison Lombardi, University of Connecticut (allison.lombardi@uconn.edu)
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Thursday evening, Session A, Board 32A

Pre-registered studies on transition planning, self-determination, independent living skills, and economic hardship

Introduction: We present a series of pre-registered studies using the National Longitudinal Transition Study-2012 that focused on transition planning, self-determination, independent living skills, and economic hardship of youth with and without disabilities. In addition, we examined intersections with race and ethnicity in order to inform culturally responsive transition planning. . Because this is a nationally representative dataset, we are able to study student characteristics such as disability, race, and ethnicity in ways that may be challenging with other data. For example, we incorporated both race and ethnicity into student groups (i.e., student who identify as Black and non-Hispanic, Black and Hispanic, multiple races and non-Hispanic, multiple races and Hispanic, etc.). We also prioritized economic hardship, which is important to consider as people with disabilities require an additional 30% more income in order to have the same living standard as a person without a disability (Morris et al., 2021). These studies model open science practices that can be followed by other researchers to promote openness and transparency in their research practices.

Method: The first study is a conceptual replication to create a latent construct of economic hardship (Murray et al., 2015). A confirmatory factor analysis (CFA) was used to update economic hardship construct. Items included were: household income, parent highest education level, parent employment status, participation in social programs, and household internet access status (Lombardi et al., 2022). The economic hardship construct provides a more holistic measure of adversity to gain a better understanding of the level of economic hardship endured by youth with and without disabilities. In the second study we examined transition planning and its relationship with economic hardship (Lombardi et al., 2023a). As with the previous study, this study also uses a CFA to determine the latent construct structure of transition planning. Items included were: youth and parent presence at the IEP meeting, whether the youth or parent met with school personnel to create a transition plan, the youth's role in the IEP meeting, whether youth received information about life after high school, and if staff agencies attended the IEP meeting. In the third study, a registered report, we will use a CFA to study the relationship between self-determination and economic hardship (Lombardi et al., 2023b). Twenty-one items across the three dimensions of autonomy, psychological empowerment, and self-realization were included to create the latent construct to examine differences among youth with IEPs, 504 plans, and students without disabilities. This study in progress.

Results: The results of the economic hardship study indicated that youth with autism faced the least hardship with the lowest economic hardship scores, while youth with intellectual disability faced the highest levels of economic hardship. Other student groups with low economic hardship scores included youth on 504 plans and White non-Hispanic youth, while other student groups with high economic hardship scores included youth with emotional disorders and youth of color. In the second study, there wasn't a meaningful relationship between the latent constructs of transition planning and economic hardship; yet there were differences in the youth's role in the IEP meeting depending on their disability. Specifically, youth with intellectual disability were the least likely to take a leadership role in their IEP meeting

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Thursday evening, Session A, Board 20A

Relations between externalizing behaviors and reading-related skills: Are there gender differences?

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Introduction: Externalizing behaviors are associated with early and persistent academic difficulties. However, substantial overlap among scales intended to measure different dimensions of problem behaviors complicates the understanding of the relations between externalizing behaviors and reading-related skills. Moreover, although there is evidence of gender differences in reading-related skills and behavior difficulties, little prior work has investigated the role of gender in the relations between externalizing behaviors and academic outcomes. Such investigation can highlight which children may have greater need for behavioral versus academic intervention, better evaluate the efficacy of interventions, and support the need for research into mechanisms through which gender may affect academic outcomes.

Method: Data for this study came from 5,119 kindergarten to third-grade children (K=1447, G1=1507, G2=1287, G3=878) that comprised roughly equal numbers of boys and girls in each grade. Most children were white (63%), and 30% were Black/African American. Children completed two measures of oral language, two measures of reading comprehension, and a decoding measure both near the start and the end of the academic year. Children's classroom teachers completed the Strengths and Weaknesses of ADHD-Symptoms and Normal-Behaviors Rating Scale, which includes 27 items corresponding to the diagnostic criteria for ADHD and Oppositional Defiant Disorder as described in the DSM-IV.

Results: Confirmatory factor analysis revealed that an S-1 bifactor measurement model that included a Specific Attention factor (IA), a Specific Oppositional/Defiant factor (OD), and a Hyperactivity/Impulsivity Reference factor (HI; all orthogonal) provided the best fit to the data and was invariant for boys and girls. Structural models including these behavior factors, children's age, and, for spring outcomes, children scores on the same measure in the fall were used to examine the relations between the components of externalizing behavior and children's reading-related skills. Separate parameter estimates for boys and girls were calculated, and WALD tests were used to determine if parameter estimates were statistically equivalent for boys and girls. For both the concurrent fall and longitudinal spring outcomes, IA was the strongest behavior predictor for all outcomes. HI was also a significant predictor of all outcomes, but OD was a weak/nonsignificant predictor. For fall outcomes, WALD tests indicated that the strength of most predictors were similar for boys and girls. There were trends for the strength of HI to differ for boys and girls for the language outcomes. For spring outcomes, WALD tests indicated that HI was a weaker predictor for the decoding measure for girls than for boys. For the Gates-MacGinitie reading-comprehension outcome, IA and HI were stronger predictors for boys than for girls, and OD was a stronger predictor for girls than for boys. **Conclusions:** These results indicate problems of both inattention and hyperactivity/impulsivity contribute to reading-related difficulties in elementary school. Although there was some evidence of differential strength of predictive relations based on gender, most predictive relations were similar for boys and girls. The notable exception to this pattern was for spring reading comprehension for which behavior predictors were weaker for girls than for boys, most likely because of higher stability of reading comprehension scores for girls.

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Friday morning, Board 3

Lexical effects on vocabulary of children who are deaf/ hard of hearing

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Introduction: Although overall vocabulary knowledge has been extensively studied in children who are deaf and hard of hearing (DHH) who use cochlear implants (CI) or hearing aids (HA), far less work has focused on the influence of lexical characteristics on vocabulary growth over time. Lund (2019) found that children with CI between the ages of 5 and 7 had lexicons with characteristics that matched younger, rather than same-age children. This is problematic because characteristics like neighborhood density and phonotactic probability influence later skills like phonological awareness (Lund, 2020), so vocabulary knowledge of DHH children may not support their early literacy development. The purpose of this study is to extend Lund (2019) to include longitudinal data in younger children and children who use HA to answer the following questions: (a) Do children who are DHH learn fewer words with matched density and phonotactic probability (e.g., high-density, high-probability) between age 4-6 than children with TH? (b) Do children who are DHH learn fewer words with unmatched density and phonotactic probability (e.g., high-density, low-probability) between age 4-6 than children with TH?

Method: This study included 40 participants. Ten were children who are DHH who use CI, 9 children who use HA, and 21 with TH. All children were tested at age 4 years, 0 months and again at age 6 years, 0 months. The experimental task included 60 words divided into four word lists: high density-high probability words, high density-low probability words, low density-low probability words and low density-high probability words. Words across lists had an age of acquisition that did not statistically differ. Pictures and the task were validated in Lund (2019).

Results: A repeated measures analysis of variance compared word knowledge across groups, with words identified as the dependent variable, group membership as a between-subjects variable, and time (age 4 or 6) and word list (high-high, low-low, high-low, low-high) as within-subjects variables. An initial comparison of the DHH groups did not reveal an effect of amplification type so children were combined into a single group. Analysis revealed a main effect of time and of group, and interaction effects of list x group, list x time, and condition x time x group. All children grew in word knowledge across categories from age 4 to age 6, and children who are DHH knew fewer words across all times than children with TH. Both groups demonstrated the highest rate of growth in knowledge of low density, low probability words but the TH group showed a faster rate of growth than the DHH group. This data provides initial evidence that low density vocabulary knowledge of DHH children grows more slowly over time than children with TH, and overall DHH children know fewer high- and low-density words. Extant evidence indicates children with TH perform phonological awareness tasks with high- and low-density words equally well, whereas children who are DHH struggle particularly to complete phonological awareness tasks with low density words (Lund, 2020). This study is an initial step towards determining why that may occur.

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Thursday evening, Session B, Board 29B

A Multicomponent Examination of Implementation Fidelity Within the Context of Mathematics Intervention

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Introduction: A recent review of the mathematics intervention literature published from 1990 to 2018 examined if mathematics intervention studies included implementation fidelity measures (Bos et al., 2022). Results revealed that while a large proportion (75%) of included studies included quantitative measures of adherence fidelity, few collected data on quality of implementation and student engagement. In the literature, adherence, quality, and student engagement have been identified as important components of implementation fidelity (Dane & Schneider, 1998). The purpose of the current study is to further explore the relationships between adherence fidelity, quality of implementation, and student engagement with each other, and with student mathematics outcomes within the context of an evidence-based first grade mathematics intervention. Additionally, the current study examines relationships between group factors (such as intervention group size), interventionist characteristics (prior experience and perception), and each fidelity component (adherence, quality, and student engagement). The following research questions will be addressed: (1) to what extent do different components of implementation fidelity (adherence, quality, and engagement) correlate with each other, (2) to what extent does each component of implementation fidelity predict gains in student mathematics outcomes, (3) how does intervention group size relate to each component of implementation fidelity at the group-level, and (4) how do factors such as interventionist experience and perception of the intervention relate to each component of implementation fidelity at the interventionist level?

Method: Data analyzed in the current study was collected across 4 first grade cohorts from The Fusion Efficacy Project (Clarke et al., 2016 - 2020). Participants were first grade students with mathematics difficulty that were either randomly assigned to a small group intervention condition (n = 194), a large group intervention condition (n = 485) or a business-as-usual control condition (n = 291). Both treatment conditions received the Fusion intervention which is a Tier 2 first grade mathematics intervention focused on teaching whole number concepts and skills. Previous examinations of the Fusion intervention have resulted in positive effects for students in the treatment condition when compared to a business-as-usual control (Clarke et al., 2014; Clarke et al., 2023). Measures of pretest and posttest mathematics performance, adherence fidelity, quality of implementation, student engagement, group size, interventionist prior experience and interventionist perception were collected and analyzed. Correlations were calculated to answer the first research question regarding the relationships between the multiple components of implementation fidelity. Three multilevel models were examined to determine relationships between fidelity and student mathematics gains. Lastly, t-tests and correlations were utilized to examine relationships between components of fidelity and group size, interventionist prior experience, and interventionist perception of the intervention.

Results: Results revealed strong correlations between adherence fidelity, implementation quality, and student engagement. Additionally, while there were no significant relationships between fidelity components and student gains, there were significant relationships with all three components of fidelity and student initial mathematics scores. Lastly, there were mixed results for the relationships between group size, interventionist experience, interventionist perception, and the three components of implementation fidelity. Results will be provided in more detail and discussed.

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Thursday evening, Session A, Board 12A

Unpacking Elementary Science Outcomes through Teacher Observational Data

Introduction: National data suggest that students, including those with disabilities, consistently struggle to reach science proficiency across the U.S. (National Center for Education Statistics, 2021). Equitably addressing science achievement requires evidence-based science programs tailored to meet the needs of a diverse set of learners. Beyond student outcomes, researchers also need to examine underlying factors that might impact science achievement to clarify the driving forces behind them, such as the quality of teaching practices. Thus, the goal of this study was to evaluate the effect of a Tier-1 second-grade science program on teachers' delivery of two fundamental science components - scientific investigations and science discourse.

Method: Eighteen second-grade teachers and 294 students participated in a cluster RCT investigating the effects of a science inquiry program (Doabler et al., 2021). We then examined observation data from all participating teachers' science instruction across three phases - baseline, treatment, and maintenance. To quantify scientific investigations, we used an observation tool used by Doabler et al. (2021) to monitor the presence of six key practices during science instruction: (a) demonstrations, (b) planning investigations, (c) executing investigations, (d) using models, (e) scaffolding learning opportunities, and (f) providing independent practice opportunities. Each activity was rated on a scale of 1 (low quality) to 5 (high quality). To quantify science discourse, we implemented an adapted version of the Science Discourse Instrument (SDI), originally developed by Fishman et al. (2017). The SDI focused on four teacher practices: (a) ask, (b) press, (c) link, and (d) feedback and three student practices: (a) explain/claim, (b) co-construct, and (c) critique. Each of these seven practices were rated twice across each observed science lesson. For each practice, we calculated mean values of all observation items within a given teaching practice for each teacher in each of the time periods. Next, we ran independent samples t-tests to determine the impact of the implementation of the science program across treatment and maintenance phases.

Results: Results suggest that treatment teachers significantly outperformed their comparison condition counterparts throughout the treatment phase in their use of scientific investigations ($g = 2.52$, $p < 0.001$). Additionally, we found an emerging trend-level effect for scientific investigations during maintenance ($g = 0.88$, $p = 0.071$). Further, while positive effects were found for scientific investigations, we found no significant differences between treatment and comparison teachers for science discourse. Implications for science professional development and pre-service teacher training with respect to improving teachers' use of scientific investigations and exploring ways to improve science discourse opportunities for both students and teachers will be discussed.

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Thursday evening, Session B, Board 28B

A Review of Quality Indicators of Middle-School Fraction Interventions

Introduction: To address concerns about fraction learning among students with mathematics difficulty, researchers have reviewed and identified effective instructional components to support fraction learning for this population (Misquitta, 2011; Shin & Bryant, 2015). Furthermore, Ennis and Losinski (2019) expanded these reviews by evaluating the quality of fractions-focused studies using the Council for Exceptional Children's Standards for Evidence-Based Practices in Special Education (CEC Standards for EBP; Cook et al., 2015). Ennis and Losinski (2019) determined that all studies ($n = 21$) met at least 14 of the 28 individual quality indicators. The present study updated Ennis and Losinski's (2019) review and examined only studies with middle school students with mathematics difficulty. I asked the following research question: What is the quality of fraction interventions for middle-school students with mathematics difficulty when studies are assessed using CEC Standards for EBP?

Method: To review the quality of fraction intervention studies, I conducted a systematic search process. Following database searches, de-duplication, title and abstract screening, and full-text screening using a set of inclusion criteria, I identified 21 studies. An additional 11 studies were included after I conducted ancestral searches. As a result, I included 32 peer-reviewed studies published between 2000 and 2023 in this review. I coded the 32 studies to assess methodological quality using the quality indicators in the CEC Standards for EBP (Cook et al., 2015). A study met a standard if it provided a description of the information respective to that standard. For example, if a study did not report participants' disability or risk status, then it would have not met quality indicator 2.2. The CEC Standards for EBPs contained a total of 28 sub-categorical quality indicators, of which 24 quality indicators applied to group design study and 22 quality indicators applied to single case study. A trained doctoral student independently coded 25% ($n = 8$) of the 32 studies. We compared codes to calculate interrater reliability, which was agreements divided by the sum of agreements and disagreements, multiplied by 100. The interrater reliability was 97.5%. We discussed and resolved disagreements to ensure 100% accuracy of coding.

Results: Across the 32 studies, two group studies satisfied all 24 individual quality indicators and two single case studies met all 22 quality indicators. Among the 15 group design studies, 12 studies met between 19 and 23 quality indicators. Out of the 17 single case studies, 13 studies met between 18 and 21 quality indicators. On the other hand, across the 28 quality indicators, only two quality indicators (i.e., socially important outcomes and outcome measurement) were met by all of the studies (i.e., 7.1 socially important outcomes and 7.2 outcome measurement). Four areas that had the least number of studies were baseline information (i.e., 6.2, 6.3, and 6.4), validity and attrition (i.e., 6.7, 6.8., 6.9, and 7.6), and effects (i.e., 8.3). These results indicate high quality for many of the middle-school fractions interventions.

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School Perceptions on the Usability of the Integrated MTSS Fidelity Rubric (IMFR)

Introduction: More information is needed about the usability of integrated MTSS fidelity tools. The Integrated MTSS Fidelity Rubric (IMFR) project seeks to develop and validate a fidelity rubric to measure the integration of MTSS in academics and social-emotional/behavior skills (Gandhi et al., 2022). This IES-funded study is overseen jointly with the American Institutes for Research (AIR) and the University of Missouri. As part of the larger validation work, our project team gathered information from key stakeholders related to the usability of the IMFR and feasibility of procedures. This poster will illustrate the qualitative findings from focus groups conducted with school teams during the final year of data collection. Analyses include school teams' perceptions of the tool's implementation process, rubric/materials, and score report as they relate to its usability. The primary research question for the focus groups was, "Did the benefits of the IMFR outweigh the cost of participating?" This question was posed to better understand how users of MTSS fidelity tools perceive the potential benefit of a fidelity tool relative to its cost in terms of time and effort.

Method: Researchers conducted focus groups via Zoom with a total of 56 participants across 17 school teams. Teams were comprised of administrators and educators. The researchers asked teams a series of questions about their views and experiences with the IMFR process as well as their school's IMFR scores and score report. Researchers reviewed transcripts from each focus group and coded for themes across three categories: 1) benefits and challenges of the IMFR process, 2) benefits and challenges of the IMFR score report, and 3) benefits and challenges of the IMFR rubric/materials.

Results: Overall, 12 of the participant school teams felt that the benefits of the IMFR outweighed the cost of participating, while 5 did not. With regard to the IMFR process, key themes related to the benefits of the IMFR included a thorough examination of their MTSS process, the opportunity to be reflective as a team, and a means to identify areas in need of improvement. Noted across school teams as challenges of the IMFR process were the time commitment required to participate and the lack of resources (e.g., time, money, and people) to make substantial improvements. Qualitative analysis of the IMFR score report provided to schools indicated that teams found it easy to follow and understand, and that it highlighted strengths and areas for improvement. Multiple school teams felt that the next steps provided in the score report were not specific enough to help raise their score, and that not enough resources were provided to establish next steps. Similar to the IMFR process, school teams described that they could use the IMFR and materials as tools for self-reflection and a chance to establish their strengths and weaknesses in I-MTSS. Challenges posed by the IMFR and materials included the IMFR being one of a multitude of rubrics that school members were asked to complete in a given year, and a perceived lack of guidance or professional development on the use of the rubric.

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Thursday evening, Session B, Board 30B

Individual and task differences in the neurocognitive demands of a number comparison task

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Introduction: Mathematical abilities require the integration of math-specific (e.g., numerical skills) and domain-general executive functions [EF; 1, 2, 3]. Neuroimaging studies consistently report intraparietal sulci activation during arithmetic tasks; however, activation of frontal brain regions associated with EF varies across studies [4, 5]. The discrepancies in the recruitment of EF during math tasks may be due, in part, to variations in individual differences and task demands. For instance, different task formats (i.e., symbolic, non-symbolic) may vary in EF demands [5]. Math ability is also associated with EF such that individuals with low math ability tend to exhibit poor EF [5-11], concurrently individuals using less automatic and efficient math strategies may rely more greatly on EF as a compensatory mechanism for poor math skills [3, 5, 12, 13] yielding a complex interaction between EF and math. To date, there is little known about the underlying mechanisms of EF that support math and the intricate relationship between EF and math ability [4]. The current study investigates how numerical magnitude processing in canonical math and EF brain regions is related to adolescents' behavioral math ability, processing speed, and EF.

Method: Adolescents recruited from the Colorado Learning Disability Research Center (N = 156; Age Range = 10-16) completed a behavioral battery, including measures of math ability [14], processing speed [15], and EF [16]. Participants also completed task-based fMRI paradigms including a (1) symbolic and (2) non-symbolic number comparison task. For each task, we examined the ratio effect of individual neural activations in canonical math and EF regions, and subsequently analyzed how activity was related to concurrent behavioral measures of math ability, processing speed, and EF.

Results: Findings revealed differential relations between math ability and EF on adolescents' ratio effect. For the symbolic number comparison task, only math ability was correlated with the ratio effect in brain regions associated with math, while math ability and processing speed were correlated with the ratio effect in brain regions associated with EF. In contrast, for the non-symbolic number comparison task only EF was correlated with the ratio effect in brain regions associated with EF, while math ability and EF were correlated with the ratio effect in brain regions associated with math. Results suggest that math ability, processing speed, and EF have unique relationships to adolescents' number comparison ability for symbolic vs. non-symbolic formats. These findings could inform researchers and educators on nuanced instructional strategies that support the development of math abilities, particularly for those who struggle with learning.

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Relations Between Internalizing Symptomatology and Reading Achievement for K-12 Students: A Meta-Analysis

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Introduction: Early academic skills and children's emotional health are critical to success in schooling and beyond. Children's emotional health has an influence on their ability to learn (Suldo et al., 2014) and academic achievement reciprocally affects emotional health (Burchinal et al., 2020). Low academic achievement of students with co-occurring difficulties is related to concurrent and subsequent negative outcomes, such as higher rates of school dropout and psychiatric disorders (Carroll et al., 2005; Sanford et al., 2011). Moreover, students with emotional and reading difficulties are less responsive to interventions (Otaiba & Fuchs, 2002), underscoring the need to understand the influence of internalizing symptomatology on students' reading achievement. As such, the present review sought to examine the relations between students' internalizing symptomatology and reading achievement. Moderators that may influence this relationship were examined (i.e., gender, grade level, reporter, type of symptomatology, reading skills). We sought to address three research questions: (1) Is there a significant relation between internalizing symptomatology and reading achievement for K-12 students?; (2) Does the magnitude of the relation between internalizing symptomatology and reading differ based on participant gender, grade-level (elementary or secondary), internalizing symptom domain (depression, anxiety, or general), reading domain (code, meaning, or general), and reporter (self, teacher, or parent)?; and (3) For studies with multiple measured timepoints, how are internalizing symptomatology and reading related to one another over time?

Method: Studies were identified using database and manual search methods. First, a comprehensive electronic search of PsycINFO, Education Source, and ERIC databases was conducted to locate studies published between 1980 and June 2022. The initial search yielded 14,140 articles. After duplicates were removed ($k = 1,699$), 12,441 remained for abstract screening. After reviewing relevant prior reviews and completing forward and backward citation search, 204 articles appeared to include correlations between measures of internalizing symptoms and reading achievement. Next, a full-text review was conducted and 156 studies were excluded as they did not meet inclusion criteria. The 48 identified articles were coded for general characteristics (e.g., publication type, study design, publication type), measures of internalizing symptoms, and measures of reading. Participant characteristics included sample size, sample type, age, grade, race/ethnicity, gender, socioeconomic status, and country of origin. Grade level was categorized as elementary (K-5) or secondary (6-12). Internalizing symptomatology was coded for measure and domain (i.e., depression, anxiety). Reading achievement was coded for measure and domain (i.e., general reading, code-focused, meaning-focused). All data were extracted to allow for calculation of effect sizes.

Results: Results of a random-effects metaregression model indicated a significant, moderate relation, $r = -0.19$, $p < 0.001$. Moderation analyses did not suggest significant influence on the relation between internalizing symptomatology and reading achievement, suggesting that this relationship remained stable over time. Analysis of effects from longitudinal studies indicated a unidirectional nature of the relation with earlier internalizing symptomatology predicting reading achievement at later timepoints, $\beta = 0.06$, $p = 0.04$. Internalizing symptomatology may compete with cognitive resources, thereby reducing academic engagement. Therefore, improving internalizing symptoms early on may free up cognitive resources that support the development of reading.

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Thursday evening, Session B, Board 22B

The Effects of Integrated Reading and Writing Instruction on Students' Literacy Outcomes

Introduction: Success in students' academic, social, and future professional lives are all linked to reading development (Graham & Hebert, 2011). Challenges impeding literacy growth have negatively influenced the reading and writing outcomes of students nationwide (NCES, 2022). To better support the literacy growth of all students, innovative approaches are needed. One promising model includes integrated reading and writing instruction. The shared model of the reading-writing connection suggests that reading knowledge is used to support writing, and writing knowledge is used to support reading (Shanahan & Lomax, 1986). Therefore, reading and writing processes are viewed to be bidirectional, as one informs the other (Shanahan, 2016). To explore the current methods focusing on literacy programs balancing reading and writing in preschool through grade 12 classrooms, this synthesis aimed to update and extend the work of Graham and colleagues' meta-analysis (2018). This synthesis provides further insight into the efficacy of integrated reading and writing programs, including the common features of effective integrated reading-writing programs.

Method: This synthesis included peer reviewed journal articles with a date range of February 2016-October 2022. An electronic database search was conducted (PsycInfo, Education Source, and ERIC), as well as a table of contents search, and hand-search of relevant journals. Inclusion criteria was maintained from Graham et al.'s (2018) meta-analysis: (1) Included students in PK-12 classrooms. (2) Tested a literacy program balancing writing and reading, with one not accounting for more than 60% of the instructional time. (3) Study used an experimental or quasi-experimental design. (4) Included at least one assessment measure of writing or reading that tested the impact of the writing or reading treatment. (5) Studies were available in English. (6) Studies contained data necessary to determine a weighted effect size (Graham et al., 2018). A final corpus of 12 studies were identified and included in this synthesis. The studies were coded for 18 features, as well as 12 quality features, according to Graham et al.'s criteria (2018). Studies were analyzed to determine if integrated reading and writing programs were successful in supporting students' reading and writing performance.

Results: Overall, programs balancing integrated reading and writing instruction demonstrate positive outcomes for students in both reading and writing. Included in studies across general and special education settings were a wide range of students, specifically, students with, or at risk for disabilities, as well as students who are emerging-bilingual learners. Particularly for outcomes of students with, or at risk for disabilities, balanced reading and writing programs served as one means to narrow the gap between them and typically developing peers (Collins et al., 2017; Felix et al., 2016). The updated findings of Graham and colleagues (2018) provided further reinforcement of the shared knowledge theory, as students experienced positive outcomes across reading and writing as a result of instruction through programs balancing reading and writing. Given the limits of instructional time and need for growth across areas of student literacy (NAEP, 2022), an integrated model presents an option that is both efficient and effective in supporting both reading and writing outcomes.

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Thursday evening, Session B, Board 31B

The Impact of Intervention Algorithms on Fourth-Grade Students' Conceptual Understanding of Fractions

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Introduction: Ketterlin-Geller et al. (2019, p. 20) express that young students' theoretical comprehension of fractions can have significant implications for their academic outcomes, ranging from "fraction problem-solving skills and advanced quantitative reasoning skills necessary for algebra" to their future mathematics performance in high school. Yet, students cannot effectively develop a strong conceptualization of fractions if their mathematics training does not clearly communicate "the algorithms that govern operations with fractions" and their "underlying mathematical rationale" (Ketterlin-Geller, et al., 2019). For students experiencing mathematics difficulties, it is even more pressing, as research indicates that there is a higher probability for these students to struggle in their upper-level mathematics classes, including algebra (Cirino et al., 2019; Dennis et al., 2016).

Method: As a subcomponent of a larger replication study, Scalability, Capacity, and Learning Engagement (SCALE), on Fraction Face-Off, we investigate an evidence-based strategy incorporated in the intervention: Strategic Prompt Cards. Fraction Face-Off is a Tier 2 mathematics intervention targeting fourth-grade students' measurement and part-whole interpretation of fractions. In the intervention, students are encouraged to use Strategic Prompt Cards, which consist of eight cards that briefly demonstrate the intervention's procedure for performing fundamental fraction operations (e.g., fraction ordering, fraction comparison, translating between mixed and improper fractions). The Strategic Prompt Cards were designed to serve as a visual representation for students to connect fraction operations to their theoretical understanding of fractions. The purpose of our study is to focus on the influence of the compare card, the specific Strategic Prompt Card depicting the intervention's algorithm for comparing two fractions. Our research questions consist of: 1. Do students transfer the compare card's algorithm, or procedure, for comparing two fractions outside the closed environment of the intervention? 2. For students who did not demonstrate a transfer of the compare card's algorithm, did they use a different procedure for fraction comparison? 3. For students who demonstrated usage of the compare card's algorithm, how does their conceptual understanding of fractions differ from those who did not demonstrate a transfer of the algorithm? We will investigate these questions by focusing our analysis on one of the student measures in the SCALE Project: Fraction Comparison Measure. The Fraction Comparison Measure is a pre- and post-test given to the student participants that evaluates their strategies for comparing the magnitude of two fractions. We will analyze the data collected from the Fraction Comparison Measure during the first year of the SCALE Project. The participants were fourth-grade students from 49 elementary schools, making up 9 school districts in Missouri and Texas. During our data analysis, students' work from the Fraction Comparison Measure will be coded by use and correctness of the compare card's algorithm. Students' work may also be coded for usage of an alternative procedure for fraction comparison not taught by the intervention. Through these analyses we will address our first and second research questions. We will examine our third research question, which focuses on the relationship between usage of the compare card's algorithm and students' demonstration of conceptual understanding of fractions, by analyzing students' pre- and post- scores on the Fraction Comparison Measure.

Results: Data analyses are underway and will be completed by December 2023.

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Thursday evening, Session C, Board 18C

Judo to Enhance Engagement in Reading Comprehension Instruction for Autistic Students

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Introduction: As many as 60% of children with autism display reading comprehension (RC) impairments which are associated with language, cognitive, and social communication challenges (McIntyre et al., 2017). In addition, they often display challenges actively engaging in classroom instruction, limiting the benefits of academic interventions (Sparapani et al., 2016). Systematic instruction is required and one such intervention is Collaborative Strategic Reading (CSR; Vaughn et al., 2014). CSR has strong research support for students with learning disabilities (Vaughn et al., 2011) and preliminary support in the ASD population when implemented by research staff (Reutebuch et al., 2015). There is increasing support for the use of physical activity (PA) interventions to promote learning and attention in autistic youth (Sefen et al., 2020). Mindfulness-based PA (e.g., yoga or martial arts) may be particularly beneficial for promoting self-regulation, and increasing social interactions, focus, and attention in autistic youth (e.g., Garcia et al., 2021). However, these studies have not examined the potential impact on academic success for autistic children. This community-based interdisciplinary study partnered with school personnel to examine (1) the feasibility and (2) preliminary efficacy of combining two evidence-based interventions: educator-led reading comprehension strategy instruction and mindfulness-based judo.

Method: This mixed-methods study consisted of 4 weeks of educator-led CSR, followed by 8 weeks of the multicomponent intervention (mindfulness-based judo + CSR) for a total of 12 weeks. Both CSR and judo occurred twice a week, with CSR immediately following judo sessions. Educators were trained in the CSR intervention and coached weekly by the research team via Zoom to ensure fidelity. Judo lessons were conducted by licensed judo instructors experienced in working with autistic youth.

Results: Ten students in grades 4-6 and two educators from diverse backgrounds participated in the study. Students did not have an intellectual disability (Raven's-2; $M=78.9$) and had receptive vocabulary (PPVT-5; $M=86.6$), sight word reading (TOWRE-2 SWE; $M=79.60$), and phonemic decoding (TOWRE-2 PDE; $M=83.5$) in the below-average to average range. Feasibility: Both components of the intervention were acceptable and feasible in a school setting, but educators provided valuable insight into further tailoring them. All children were willing to wear the Fitbit, participate in the judo sessions and wear the judo gi (uniform). All children were able to participate in the CSR lessons and the educators reported that CSR was feasible and acceptable for teaching reading comprehension to the students and planned to continue using it. (Detailed feasibility data will be presented). Preliminary efficacy: Reading comprehension scale scores at pretest (GORT-5; $M=4.0$) and grade equivalent (GE) scores ($M=1.6$) were far below same-age peers at pretest but rose at posttest (scale score $M=4.67$, $p=.11$; GE score $M=2.2$, $p=.003^*$). Weekly informal reading comprehension measures are currently being coded by trained coders and data will be available for the conference. Emotion regulation and productivity are currently being coded in Noldus Observer by a team of trained coders. Fitbit data are being processed in Fitabase by the research team and will be reported at PCRC.

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Friday morning, Board 4

Impact of the Pandemic on Reading Comprehension from First to Fourth Grade

Additional authors: Dana Fuentes Buigley

Introduction: The Purpose of this study is to examine the impact of the COVID-19 pandemic on Chilean students' reading comprehension on students from 1st to 4th grade, attending the same vulnerable schools, between 2018 and 2022. The pandemic caused by COVID-19 affected countries around the world adopting a series of sanitary measures to prevent contagion and its spread. In the educational field, the measure mainly resulted in the closure of schools, and consequently the suspension of face-to-face and class attendance, from March 2020 to December 2021 (Muñoz-Najar et al., 2021). According to the data provided by UNESCO (2020) the educational systems were closed for approximately 141 days on average between February 2020 through February 2022 worldwide. In Chile, this number was 259 days (147 days correspond to 2020, and 112 to 2021), placing it above the average for the region and the OECD member countries (OECD, 2022).

Method: This study employs a quantitative approach utilizing a school panel design to address the research question: What is the impact of a 2-year span of the COVID-19 pandemic on the reading comprehension skills of students in first, second, third, and fourth grades? Given the experimental nature of the study, there exists no concurrent control group unaffected by the pandemic's influence. Thus, a pre-pandemic sample of 1,588 students from 2018 is compared to a sample of students from the same schools and classes in 2022. The study leverages existing data from over one thousand children in grades 1 to 4 who underwent reading skills assessments, yielding specific results for the years 2018 and 2022. To address potential variations in sample composition, a multilevel modeling approach was employed. This approach corrects for shared observation variance arising from students belonging to the same school and grade (Ansari et al., 2015).

Results: The findings reveal a notable decline in the reading comprehension of second-grade students from the seven schools under assessment, representing the most significant drop among the four grade levels. Notably, first-grade scores were already notably below the expected range in 2018, with an average of 45 lexiles, contrasting thoroughly with the anticipated range of 210-410 lexiles. Moreover, the study observes reduced average scores for students in both second and fourth grades in 2022. Upon disaggregating data by gender, compelling evidence emerges regarding the adverse impact of COVID-19 on female students. The analysis specifically examines the seven-school panel within the female cohort, revealing consistent results with prior scores. Among these, it is evident that only second-grade female students experienced significant declines in reading comprehension. Additionally, the study notes that the decline in scores for female students is nearly twice as pronounced as that observed for all students (-99 versus -56). The findings further support the assertion that students from stressed households, with reduced reading frequency and less time allocated to physical exercise, witnessed the most substantial decline in Lexile scores.

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Thursday evening, Session B, Board 15B

Evaluating the Impact of Science of Reading Professional Development on Teachers' Content Knowledge

Additional authors: Mike Coyne, University of Connecticut

Introduction: Across the country, states are passing legislation requiring school districts to implement evidence-based reading instruction grounded in the Science of Reading (SoR). The SoR refers to a collection of decades of research across disciplines that confirms how children learn to read most effectively. The five pillars of reading instruction include phonemic awareness, phonics, fluency, vocabulary, and comprehension (National Center on Improving Literacy, 2022). Within these state-wide mandates, at least 28 states are requiring certificated teachers to participate in professional development opportunities in the SoR to support their understanding of and implementation of evidence-based practices in the classroom (Schwartz, 2022). This shift in policy and increased attention to the way children are taught to read comes in part from evidence from the National Association of Educational Performance (NAEP) which tracks nation-wide trends in student reading performance. In 2022, only 33% of fourth graders scored at or above proficiency level in reading, two percentage points lower than in 2019 (NAEP, 2022). Additionally, there has been a surge in the public awareness of the importance of grounding reading instruction in the SoR from the media, including the podcast *Sold a Story* (Hanford, 2022). Literature on the gains in teacher knowledge following participation in professional learning suggests that ongoing, high-quality PD leads to increased content knowledge (Carreker et al. 2010; Goldschmit et al, 2010; Podhajski et al, 2009). The impact of virtual professional development opportunities has also been studied, suggesting favorable attitudes toward virtual professional development opportunities and increases in teachers' content knowledge (O'Dwyer et al., 2010; Tong et al., 2015), including professional development in literacy (Masters et al, 2010). However, literature evaluating virtual professional development opportunities to teacher knowledge lacks a robust evaluation of how these learning opportunities impact teachers' gains in knowledge of concepts related to the SoR. The purpose of this study is to add to the literature on PD in the SoR by investigating growth in content knowledge after participating in a 10-week virtual, synchronous professional development series spanning summer of 2023.

Method: Approximately 100 K-5 Connecticut and Massachusetts classroom teachers participated. Prior to starting each synchronous session, participants completed a brief 6-8 item pre assessment. Immediately following the session, participants took a post assessment to measure changes in accuracy. Pre-test and post-test items consisted of researcher developed 3-item multiple choice (Loudon & Macias-Muñoz, 2018; Tversky, 1964) that had been evaluated by reading professionals in the field. Items were chosen by identifying key concepts in each PD module and focus on both technical content knowledge and application in the classroom.

Results: Pre- and post-test data are in the process of being analyzed using paired sample t-tests. We hypothesize that participants will make significant gains in their accuracy of SoR content.

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Thursday evening, Session C, Board 8C

Using Open Practices to Explore the Demand for U.S. Special Education Faculty

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Introduction: The demand for U.S. special education faculty has implications for doctoral training programs, higher-education faculty, and doctoral students preparing for faculty jobs. Yet the last investigation of special education faculty advertisements used 2010 data (Montrosse & Young, 2012). The present preregistered study provides an updated descriptive profile by exploring special education faculty advertisements from 2022-2023. The study is guided by two research questions. First, what are the identifiable patterns in each coding category (e.g., specialization, institution Carnegie Classification, tenure status) for U.S. special education faculty advertisements during the 2022-2023 job market? Second, what are the identifiable relationships among coding categories (e.g., Carnegie Classification and tenure status)?

Method: Job Advertisement Searches: We searched weekly for full-time special education faculty advertisements in the United States posted between August 1, 2022, and March 1, 2023 on four websites (HigherEdJobs, Inside Higher Ed Careers, The Chronicle of Higher Education, Academic Keys) using the keyword "Special Education." Paired Open Data: Our study leveraged an innovative type of open data called paired open data (POD). All data was housed in the POD (i.e., an open access spreadsheet). The POD was disseminated via Twitter, conferences, and word of mouth to serve as outreach to help scholars on the job market; it was viewed over 2,100 times during the data collection time frame. Coding: Each advertisement was coded across seven categories: specialization, Carnegie Classification, position type, location, tenure status, posting date, and application materials. Inter-rater Reliability: During the first ten weeks, two GRAs independently conducted data collection and coding and met weekly to discuss differences until they reached 100% agreement. The GRAs averaged 97% agreement across all coding categories.

Results: A total of 223 unique job advertisements were identified and analyzed. Of the 223 unique job advertisements, 109 (49%) sought a candidate within the broad specialization of "Special Education" while the other 114 (51%) identified one or more additional special education areas of focus. Of the 114 advertisements, 77 identified a distinct disability focus or population (e.g., early childhood special education, autism spectrum disorder), and 52 identified a distinct content focus (e.g., reading, transition). The most commonly reported special education population area of focus was high incidence disabilities ($n = 18$, 8%), and the most common content area of focus was reading/literacy ($n = 15$, 7%). We coded a total of 4 position types: assistant professor ($n = 127$, 57%), open rank ($n = 65$, 29%), other faculty ($n = 26$, 12%), and professor ($n = 5$, 2%). Our poster will share these results and additional findings, including (a) frequency of job advertisements by state and (b) crosstabulations between coding categories, for example, institution Carnegie classification and tenure track positions. Discussion: Executed with outreach and use of open science practices at its core, the study provides a picture of the current demand for U.S. special education faculty and holds critical implications for the field.

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Friday morning, Board 5

Measurement of Fraction Knowledge in Fourth Grade

Introduction: Intervening in fractions in upper elementary and middle school may be the most effective way of accelerating students' mathematics learning. This may also be important for preparing students to be successful in high school algebra and beyond. Starting in Grade 3 and continuing through middle school, understanding fractions sets the foundation for algebra (National Mathematics Advisory Panel, 2008) and leads to greater success in middle school math (Bailey et al., 2012; Booth et al., 2014), high school math (Siegler et al., 2012), and college algebra (Powell et al., 2019). In middle school, fraction knowledge is widely characterized as the gatekeeper to algebra (Booth et al., 2012) and is a central contributor to future mathematics achievement (Siegler et al., 2011; Bailey et al., 2021; Tian & Siegler, 2017). SCALE Fractions is a project designed to examine the effectiveness of Fraction Face-Off (FFO, Fuchs et al., 2013), a mathematics intervention with moderate evidence (as determined by the What Works Clearinghouse) and contribute rigorous evidence of effectiveness with new populations and setting for implementation within multi-tiered systems of support. In year one of the project (2022-23), we replicated the efficacious findings of FFO (Fuchs et al., 2013) with 4th-grade students in diverse settings who were experiencing mathematics difficulty. We conducted a randomized-controlled trial with diverse student populations and settings to determine the extent to which FFO improved fraction knowledge and mathematics outcomes of students experiencing math difficulty in Grade 4. To assess the effectiveness of the intervention, a pre- and posttest battery of nine measures was administered to all participating students. This poster will examine four of those measures that were primarily concerned with fraction knowledge and learning. In year one of the study, those measures consisted of a Fraction Arithmetic assessment, a Fraction Comparison assessment, a Fraction Number Line assessment, and an Ordering Fractions assessment. Each of these measures contained a combination of replication items from the original implementation and researcher developed items. The delivery method, number of items, and scoring procedure also varied for each of the four measures. In addition to analyzing the resultant data from each of these four measures, this poster will also focus on the rationale for including each one in the assessment battery.

Method: FFO was designed as a Tier 2 intervention for students in Grade 4 to be implemented in small groups over 36, 30-min sessions. Our study utilized a blocked cluster randomized design with 304 student participants from 9 school districts across 2 states. All participants were identified by their teachers as students who struggle with mathematics. Interventionists were randomly assigned to two conditions-FFO and business-as-usual (BAU). Pre- and posttests were administered to interventionists and students.

Results: Data analysis will finish in October of 2023. The poster will present quantitative data from the four fraction measures alongside an analysis of how those particular measures were developed and why they were included in the study.

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Friday morning, Board 6

Effects of Technology Interventions on Reading Comprehension in Students with Learning Difficulties

Introduction: This review underscores the critical importance of strong reading skills for academic success, emphasizing that poor readers in elementary school face a heightened risk of dropping out before completing high school. First-grade students who struggle with reading often continue to do so, resulting in diminished interest and reduced reading both in and out of school. The paper highlights the various interventions designed to assist struggling readers, with a specific focus on educational technology. These technology-based interventions, which are adaptable to different settings and devices, are shown to enhance reading comprehension. While previous research syntheses and meta-analyses have explored the effectiveness of technology-based interventions on reading outcomes, the study's unique contribution is its examination of technology-integrated reading interventions for first-grade students with learning difficulties. The research questions guiding the study include investigating the effects of technology-based interventions on reading comprehension for first-grade students with learning difficulties, comparing the impact of technology-based and non-technology-based interventions, and assessing the quality of the included studies.

Method: A literature search utilized five educational databases, including Academic Search Complete, Education Source, ERIC, APA PsycArticles, and APA PsycInfo, focusing on peer-reviewed academic journals. The search employed three sets of keywords aligning with the research questions to identify relevant studies on population and intervention characteristics. (a) Program with a focus on reading outcomes: "reading comprehension" OR "text comprehension" OR "read* for understanding". (b) Program with technological components: "digital media*" OR "educational technology*" OR "electronic media*" OR "technology*" OR "web-based*" OR "online*" OR "multimedia*" OR "Internet*" OR "hypermedia*" OR "technology*" OR "computer*" OR "laptop*" OR "iPad*" OR "tablet*" OR "computer-based instruction* ". (c) RD population or students participated in reading intervention programs: dysle* OR "reading (disab* OR "diff * OR impair*)" OR learning (disab* OR difficult*) OR "struggling read*" OR "poor read*" "poor literacy skill*" OR "limited reading skill*" OR "special education " The initial search resulted in 1268 abstracts. After removing duplicates, I had 1168 abstracts. After abstract and full text screening, my search process yielded 7 studies for coding procedure. Furthermore, I completed a hand search of the following journals: Journal of Special Education and Journal of Special Education Technology. Next step was forward and backward search. These searching process did not yield any new article.

Results: This research synthesis involved an extensive literature review of technology-based interventions, resulting in the inclusion of seven studies meeting the research criteria. Analysis of these studies revealed that all four comparison group studies and four single-case studies demonstrated positive effects on reading comprehension. These findings suggest that technology-integrated interventions can have a potentially positive impact on the reading comprehension of students with learning difficulties. Specifically, the treatment group, which received technology-integrated interventions, outperformed the control group. This implies that early interventions involving technology effectively addressed reading comprehension deficits, preventing students from falling further behind as they progress to more advanced text structures in later grades.

Morgan
Friday morning, Board 7

Presenter(s): Jessica Namkung, University of Delaware (jnamkung@udel.edu)

Friday morning, Board 1

The title is: Magnitude Understanding of Students with versus without Mathematics Difficulties

Additional authors: Dan Osgood; Peng Peng; Wendy Smith; Erin Pfister

Introduction: The purpose of this research was to compare magnitude understanding of seventh-grade students with and without mathematics learning difficulties (MD). The data were collected as part of larger study identifying key mechanisms that underlie pre-algebra competence. The participants were two cohorts of seventh-grade students (N=342) across three states. Of the those, 206 students were identified with MD (<25 th %tile) and 136 students (35 th -75 th %tile) without MD were identified based on their performance on an on grade level screener. Students were assessed on whole-number and fraction magnitude understanding via a computerized number line task, pre-algebra competence, and foundational mathematics skills. Data analysis is ongoing with no preliminary findings to report at this time, but findings will be presented and discussed in terms of differences in magnitude understanding between students with and without MD and their predictive relation to pre-algebra competence.

Presenter(s): Christina Novelli, University of Georgia, National Center for Leadership in Intensive Intervention (christina.novelli@uga.edu)
Brennan W. Chandler, University of Texas at Austin, National Center for Leadership in Intensive Intervention (bchandler@utexas.edu)

Thursday evening, Session A, Board 4A

Have we compromised the power of interventions for students with or at risk for learning disabilities?

Introduction: Venezky (1976) identified two trends in reading acquisition research: the applied and the theoretical. He argued that the applied trend-with a predominant focus on instructional methods-proposes a solution and then forages backward for justification. This argument, echoed by Perfetti (1992) and Compton et al. (2014), may explain why many children continue to experience persistent reading difficulties even after receiving our best interventions (Compton et al., 2014; Perfetti, 2007). Reading acquisition, as theorized by Perfetti (2007), is dependent on the acquisition and quality of lexical representations at the word and sub-word level. A skilled reader possesses high-quality lexical representations, meaning the representations are fully specified orthographic representations (spellings) paired with redundant phonological representations. At the foundation of proficient reading skills are fully developed orthographic representations. This is supported by empirical evidence, as spelling instruction has been shown to improve reading skills (Graham & Santangelo, 2014). It is, therefore, essential that students with and at risk for learning disabilities are provided with effective, theoretically driven interventions that support the development of spelling skills. This analysis will answer the following questions: (1) Are there differences in word reading and spelling outcomes between intervention studies that reference spelling theory and studies that do not? and (2) Are there differences in word reading and spelling outcomes between the alignment or misalignment of spelling interventions to referenced theories?

Method: Fifty-nine studies included in a larger meta-analysis on the effects of spelling interventions were reviewed. Studies were coded and data extracted to identify (a) theory referenced or alluded to, (b) spelling intervention approach(es), (c) outcome measures, (d) theory alignment, and (e) effect sizes. Studies that directly referenced or alluded to spelling theory were then reviewed further to assess if the spelling intervention approach(es) aligned with the referenced theory. Meta-analytic techniques will account for dependencies within nested data (Hedges et al., 2010). For studies employing group designs ($k = 39$), standardized mean difference effect sizes will be calculated between intervention and comparison conditions. For SCD studies ($k = 20$), between-case parametric effect sizes will be calculated to account for variance within and across phases. Additionally, between-case standardized mean differences (BC-SMD) will be calculated for applicable designs as the between-case effect size index. Independent t-tests will be run to examine the effects of theory-driven interventions.

Results: Descriptive and comparative statistics will be reported. Implications of the influence of theory-driven interventions and the direction of the field will be discussed.

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Presenter(s): Katherine O'Donnell, University of Utah (katherine.odonnell@utah.edu)
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Thursday morning, Board 5

A Preliminary Examination of the Effect of Science of Reading Laws

Additional authors: Nathan Clemens, University of Texas at Austin

Introduction: Currently, 32 states and the District of Columbia have passed science of reading (SOR) laws that require changes to all or some of the following: professional development for teachers, screening measures, state assessments, required curriculums, retaining students, and teacher preparation requirements. SOR laws were passed with the idea that teachers may not have been taught how to teach reading effectively and need professional development and a curriculum that emphasizes the five components of reading. When given these tools, teachers will explicitly teach reading and students' reading achievement will improve. The theoretical framework also implies that by taking away some of the control and autonomy from the districts and mandating certain practices that research has found to be effective in teaching reading, students' reading achievement will increase. This study is an initial look into whether, in the four years post-implementation of a SOR law, there have been significant gains in fourth graders' reading achievement. The following questions will be addressed: Do fourth graders' reading scores improve after implementing science of reading laws? If there is an improvement, which students are improving (i.e., kids who were below basic, basic, proficient, advanced)?

Method: The data for this paper were pulled from the NAEP reading assessments given between 2007 to 2019 for the first four states to pass a SOR law (Mississippi, South Carolina, Nevada, and Michigan) and a neighboring state without a SOR law as a comparison group (Alabama, North Carolina, Utah, and Wisconsin). The 2022 data was not used due to the significant impact of Covid-19 on academic achievement. The starting year of 2007 was chosen to provide a large amount of data before science of reading laws had been passed, to serve as a comparison to outcomes after the laws had been passed. Outcome variables were average fourth-grade reading score, percentage of students reading at or above the proficient level, national ranking of the state, and the percentage of students who scored below basic, basic, proficient, or advanced. The research questions were addressed using generalized linear regression models.

Results: The results indicate that the average score of fourth-graders' reading on average progressively increased after the science of reading law was passed, whereas neighboring states' average scores progressively decreased over the same period, both the increase and decrease in scores were statistically significant. Neither states that implemented science of reading laws nor their neighbors statistically significantly changed the percentage of students reading at or above the proficient level respectively. When examining national ranking, states that passed science of reading laws significantly progressively improved their national ranking, whereas there was not a significant change in national ranking for neighboring states without science of reading laws. The states that passed science of reading laws only saw a significant increase in students who scored in the advanced range of the fourth-grade NAEP reading assessment. We are currently exploring whether these trends are true for all states or whether one state is serving as an outlier and skewing the data.

Presenter(s): Karen Omohundro, George Mason University (kmoncure@gmu.edu)
Alexandra Shelton, Johns Hopkins University (ashelt18@jhu.edu)
Thursday evening, Session C, Board 5C

Results from a Middle School Literacy Coaching Model Demonstration Project: Year One

Additional authors: Annie Karabell, University of Maryland; Jamie Smith, University of Maryland; Jade Wexler, University of Maryland

Introduction: The Adaptive Intervention Model (AIM) Coaching project is a 4-year model demonstration project funded by OSEP. During the 2022-23 school year, researchers provided literacy coaches in four middle schools with intensive support to implement AIM Coaching, an adaptive intervention coaching model, so that they could support teachers' implementation of a set of evidence-based literacy practices. We addressed the following research questions: (1) To what extent do coaches who participate in an intensive year of researcher-provided support implement AIM Coaching with fidelity? (2) What is the effect of schools' level of AIM Coaching implementation (i.e., low vs. high) on students' reading comprehension (MIM and TOSREC) and literacy self-efficacy?

Method: We computed descriptive statistics for the MIM, TOSREC, and self-efficacy measure. To contrast the posttest scores of students in two high-implementing and two low-implementing schools, we employed ANCOVA using the MIM, TOSREC, and self-efficacy measure. In the ANCOVA models, we examined whether implementation level was associated with differences in posttest scores while controlling for pretest scores. Effect sizes and standard errors comparing students in the high- and low-implementing schools were calculated using Hedges' g. Overall, there were no significant differences in improvement scores (i.e., from pretest to posttest) on any measures while controlling for pretest scores.

Results: Further, paired-sample t-tests were conducted for each measure to assess whether posttest scores significantly differed from pretest scores for students in the high- and low-implementing schools separately. We calculated effect sizes using Hedges' g and its corresponding standard errors. The same paired-sample t-tests were conducted on struggling readers, who scored below 85 on the TOSREC pretest. Results for the MIM revealed students in both high- and low-implementing schools showed significantly higher posttest scores than their respective pretest scores ($p < .001$). The effect size for the improvement in high-implementing schools was 0.45 ($SE = 0.01$), which was slightly higher than the effect size for low-implementing schools, 0.30 ($SE = 0.01$). When examining struggling readers only, a more substantial effect size was observed in high-implementing schools ($g = 0.67$, $SE = 0.02$), while a smaller effect size was observed in low-implementing schools ($g = 0.32$, $SE = 0.02$). For the TOSREC, improvement was statistically significant in the high-implementing schools ($p < .001$) with an effect size of 0.44 ($SE = 0.01$). In the low-implementing schools, the improvement was also significant ($p < .001$), but the effect size of 0.35 ($SE = 0.01$) was somewhat smaller. For struggling readers, the effect size for this improvement was much more substantial: 0.73 ($SE = 0.02$) for the high-implementing schools and 0.65 ($SE = 0.02$) for the low-implementing schools. For the self-efficacy measure, improvement was statistically significant in both schools ($p = .01$). Additionally, the effect size for improvement in the high-implementing schools was 0.24 ($SE = 0.01$), whereas it was 0.21 ($SE = 0.01$) in the low-implementing schools. However, the improvement of struggling readers was not statistically significant for either school type. We present an overview of the AIM Coaching project, results, lessons learned about variation in implementation, and next steps.

Presenter(s): Blair Payne, The University of Texas at Austin (blairpayne@utexas.edu)

Thursday evening, Session A, Board 33A

The Efficacy of a Content Area Reading Intervention for Students With Disabilities

Additional authors: Sharon Vaughn(1), Jeanne Wanzek(2), Leticia R. Martinez(1), Eleanor M. Hancock(2), Anna-Mari Fall(1), and Sally Fluhler(3) 1 The University of Texas at Austin 2 Vanderbilt University 3 Western Kentucky University

Introduction: Numerous national and international studies have revealed the persistent challenges faced by adolescents with disabilities in comprehending complex texts, leading to academic hindrances and limited postsecondary opportunities (Carnegie Council on Advancing Adolescent Literacy, 2010; Vaughn et al., 2022). Reading achievement peaks in elementary school and declines substantially thereafter, with high school students showing the most pronounced decline (Scammacca et al., 2015). Secondary students with disabilities (SWDs) experience even more significant academic difficulties, particularly in reading comprehension, and often lack necessary school-based support (Lipscomb et al., 2017). To address these issues, the Promoting Adolescents' Comprehension of Text (PACT) intervention was developed as a set of reading practices designed to be integrated into the general education classroom to enhance reading instruction for students with reading difficulty (Vaughn et al., 2013; 2015). PACT aligns with state content area literacy standards and emphasizes higher-level reasoning and critical thinking. Given that over 90% of SWDs are included in general education classes, particularly in history and social studies (Newman, 2006), PACT addresses a vital need for effective instructional practices for their teachers.

Method: In a within-teacher, randomized block design, we assessed the impact of the PACT intervention on eighth-grade students' social studies content knowledge and reading comprehension in classes that included students with disabilities. Within each school, eighth-grade U.S. History teachers' classes were randomly assigned to the PACT treatment or a Business-as-Usual (BaU) comparison condition. The study involved 28 eighth-grade social studies teachers and 893 students. Both groups covered the same standards-based content, with only PACT classes receiving PACT instructional practices and intervention materials. The PACT practices consisted of three, 10-day units covering 8th grade social studies standards. Teachers completed a one-day workshop before the school year that covered the PACT components and addressed how teachers could differentiate the PACT practices in their classroom. Coaching support from research personnel included in-person sessions, booster sessions, and virtual check-ins. Students were assessed with the researcher-developed Assessment of Social Studies Knowledge Acquisition (ASK) which consists of two subtests, content knowledge multiple-choice (ASK-MC) and reading comprehension (ASK-COMP). To estimate the main effect of PACT intervention on reading outcomes we ran four-level models on the outcome variables of interest.

Results: In the evaluation of the PACT intervention's impact, students in the PACT group demonstrated slightly higher scores on the ASK-MC at posttest ($ES = 0.07$) and follow-up ($ES = 0.08$) in comparison to control classes. Likewise, there were no statistically significant effects of PACT observed on ASK-COMP ($ES = -0.10$). Students with disabilities in the PACT condition scored higher in knowledge acquisition at posttest ($ES = 0.35$) and follow-up ($ES = 0.36$) compared to the comparison group. They also outperformed in content reading comprehension ($ES = 0.21$). Furthermore, differential effects of PACT based on initial ASK-MC scores were identified, indicating that as pretest scores increased, the impact of PACT diminished, particularly for students scoring above one standard deviation below the class mean on ASK-MC. This intervention's impact was more pronounced for students with lower ASK-MC scores.

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Presenter(s): Peng Peng, UT Austin (pengpeng@austin.utexas.edu)

Thursday evening, Session C, Board 12C

Longitudinal reciprocal relations among reading, executive function, and social emotional skills: Maybe not for all

Additional authors:

Introduction: This study demonstrates longitudinal reciprocal relations between reading and executive function for high-performing students from Grades 2 to 5 but not for the general population sample or those with reading difficulties. Our findings suggest that such longitudinal reciprocal relations are variable: Longitudinal reciprocal effects may be stronger in some contexts and populations than in others. It is important to trigger and strengthen the reciprocal relations between reading and executive function to yield synergistic effects in the development of both reading and executive function, especially for those with reading difficulties.

Presenter(s): Anna-Lind Petursdottir, University of Iceland (annalind@hi.is)

Friday morning, Board 8

Effects of Digital Token Economies on Students' Problem Behavior and Academic Engagement

Additional authors: Silja Dis Gudjonsdottir, University of Iceland, Municipality of Kopavogur

Introduction: Challenging student behavior, such as disruptiveness and nonengagement, can significantly interfere with learning and teaching in inclusive classrooms. Without effective intervention, problems can persist and escalate to the point of students dropping out of school, even despite average or above intelligence. Moreover, student problem behaviors are considered among the most difficult aspects of teaching. Given the wide-ranging detrimental effects of persistent challenging behavior, effective approaches to decreasing those problems are crucial. This study examined the effects of digital token reinforcement systems conducted through the Beanfee software, on persistent problem behavior and lack of academic engagement of elementary students in Iceland.

Method: Participants were three boys and one girl, ages 11-13, in four classrooms in a public school in the capital area of Iceland. Individualized Beanfee programs were designed for each participant in collaboration with their parents and primary teachers. Information from the teachers was used to set behavioral goals according to classroom rules and expectations. The parents chose a variety of rewards that were available in the Beanstore and provided the researcher with information about their child's favorite characters to personalize achievement badges in the Beanfee program. The participants monitored their target behaviors and marked if they had achieved their goal at the end of every class. The teachers also assessed participants' behavior in the same class and marked whether set goals were achieved. Reaching set goals led to students receiving tokens, "beans", which they could use to purchase rewards in the Beanstore within the Beanfee program. Parents received daily information from teacher and student assessments through the Beanfee software and provided feedback and back-up reinforcers their children had selected in the Beanstore. The intervention for each participant lasted 1- 4 weeks. Teachers' procedural fidelity was assessed in 100% of all measurements and was 90% on average. Duration of academic engagement and frequency of problem behavior were measured with direct observations. Inter-rater reliability was assessed in one third of all measurements and was 95% on average.

Results: A multiple baseline design across participants showed clear reductions in problem behavior and substantial increases in academic engagement in all cases. On average, the frequency of problem behavior decreased by 90%, or from 52 to 5 per 15-minute observations. Academic engagement increased by 349%, or from 21% to 73% on average for all participants. Social validity questionnaires indicated that the Beanfee software was considered easy to implement, more effective than other interventions, and commendable. These results indicate that individualized Beanfee token reinforcement systems, implemented through collaboration of teachers, students, and parents, can reduce persistent problem behavior and promote academic engagement of students in inclusive classrooms.

Presenter(s): Beth M. Phillips, Florida State University (bphillips@fcrr.org)

Thursday evening, Session A, Board 34A

Child and School Characteristics Associations with Preschooler's Participation in Supplemental Services

Additional authors: Christopher J. Lonigan, Florida State University Jessica Ritchie, Florida State University Jonathan Klepper, Florida State University

Introduction: A robust literature suggests that early language skill is significantly related to later success in decoding, reading comprehension and in a wide array of academic and related outcomes (e.g., Hjetland et al., 2020; Perfetti & Helder, 2022). Whereas young children with moderate to severe developmental delays are more readily identified and provided services early in life, those with mild language and related delays may be overlooked or considered likely to 'grow out of' their difficulties. Furthermore, although all states mandate that preschools support the identification of children eligible for Part B and C services, not all schools, especially private preschools, some Head Start centers, and rural public schools, may have more challenges in both helping families with identification and potentially in meeting young children's instructional needs, especially related to their language skills, before kindergarten entry. This study represents secondary analyses within an experimental trial of small-group language-focused interventions across multiple grades. Although all of the children within this sample were, by virtue of eligibility requirements, somewhat to very low on their language skills (e.g., range of initial standardized scores on expressive vocabulary measure 54-103, mean 82.99 [SD = 12.80]), they did not all receive additional supplemental services beyond those we may have provided during the preschool year. We aimed to investigate whether child and school characteristics could predict which children were receiving such services.

Method: Within two consecutive cohorts, 1,634 preschool children were screened on an expressive vocabulary measure and the Block Design subtest from the WPPSI-4. If below the 47th percentile, they were randomized to treatment or control in preschool, kindergarten, both or neither. The 916 randomized children attended 57 schools in 12 counties in two southeastern states; 87% attended public prekindergarten, 5.5% Head Start and 7.5% private preschools. Children, mean age 54.4 months (SD = 3.70), included 49.6% females and 31.5% whose families identified them as Hispanic. Whereas 46.1% were African American, another 43.7% were White, and 10.3% Multiracial, Asian, and other races. Among the sample 154, or 16.8% were receiving one or more school-based services (including special education placement). Details are available and will be described and included in supplemental analyses regarding the nature and quantity of services each child was receiving. In approximately February, school personnel completed a detailed survey on each child regarding their participation in special education and receipt of any specialized services (e.g., speech, language, occupational therapies).

Results: Preliminary ANOVA indicated that children identified as Hispanic, those who were female, and those with lower WPPSI-4 Block Design Scores were more likely to be receiving school-based supplemental services. Generalized linear mixed logistic regression models, however, revealed that only cohort was a statistically significant predictor of service group, favoring the slightly larger first cohort (i.e., 55% of the sample). Despite this, the model correctly classified 87.4% of children, although classification was less successful for those who were receiving services. Additional analyses will include more school-level predictors to possibly improve this classification and also will include replication analyses of service receipt in kindergarten.

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Presenter(s): Shayne B. Piasta, The Ohio State University (piasta.1@osu.edu)

Thursday evening, Session A, Board 6A

Characteristics of students potentially in need of school-based comprehension supports

Additional authors: Ye Shen - The Ohio State University Tiffany Hogan - MGH Institute of Health Professions Mindy Bridges - University of Kansas Medical Center Kandace Fleming - University of Kansas

Introduction: Language is a critical component of skilled reading comprehension. Yet, students with low language comprehension may not be identified for school-based supports because they do not meet clinical criteria for developmental language disorder (DLD) and are not identified by current academic screeners. In this study, we identify and characterize students deemed at risk for comprehension difficulties using a new language comprehension screener.

Method: As part of a larger randomized controlled trial, we administered the OWL language screener to students (N = 757) at the beginning of Grade 1 and collected background information about students from parents and teachers (e.g., race/ethnicity, family socioeconomic status, medical history, teacher concerns). Children identified on the screener as at risk for comprehension difficulties also completed other standardized measures (Test of Narrative Language, Kaufman Brief Intelligence Test, Test of Word Reading Efficiency, Gates-MacGinitie Reading Tests). We have completed all data collection.

Results: Of the students identified as at risk for comprehension difficulties and in need of school-based supports (n = 257), 36% identified as female. Approximately 40% identified as Black or African-American, 30% as White, 11% as Asian, and 18% as from multi- or other racial backgrounds. Twenty-eight percent were Hispanic or Latinx. Eighteen percent of students received special education services. Most students' families' annual incomes were less than \$55,000 (62%); 28% had incomes between \$55,001-\$95,000, and 8% had incomes of more than \$95,001. Students' mothers' education levels included less than a high school diploma (24%), high school diploma or GED (41%) associate's degree (10%), and bachelor's degree or higher (17%). Teachers reported that 31 students received speech-language therapy and expressed language-related concerns for 105 students, which we will detail (teacher reports available for 172 students). We hypothesize that approximately 1/3 will also qualify as having DLD and 1/3 will have subclinical language difficulties, based on the Test of Narrative Language and Kaufman Brief Intelligence Test data, and are currently conducting these analyses along with descriptive analyses of additional student background information. We will also explore the extent to which students exhibit comorbid word reading and comprehension difficulties using Test of Word Reading Efficiency and Gates-MacGinitie Reading Tests data. Findings have implications concerning the validity of the OWL screener as well as other indicators (e.g., medical history, teacher concerns) in identifying children at risk of language and reading comprehension difficulties beyond those with DLD. More broadly, better understanding the population of children in need of school-based comprehension supports can inform design and development of language-based supports/interventions.

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Thursday evening, Session A, Board 21A

The Integrated MTSS Fidelity Rubric: Initial Findings and Next Steps

Introduction: Although Integrated Multi-tiered Systems of Support (I-MTSS) is prevalent in schools, broad variation exists in how it is defined and implemented (Burns, et al., 2016; Freeman, Miller, & Newcomer, 2015), challenges that potentially reduce impact it could have on the educational experiences of students with disabilities. Even though a rich bank of tools exists for measuring either the academic side (e.g., reading and math) or the social-emotional behavioral (SEB) side of tiered frameworks, very few tools exist for measuring the degree to which schools strategically combine, or integrate, these two sides. Moreover, none of these tools have been rigorously examined for their psychometric properties. This poster will present findings from a five-year study on the psychometric validation of the Integrated MTSS Fidelity Rubric (IMFR), a new measure of I-MTSS. This measure aims to uncover the degree to which schools strategically combine academic areas (e.g., reading and math) and SEB student supports.

Method: The study occurs in approximately 100 elementary schools in 6 states. The primary research question is: Does analytic evidence support the validity and reliability of the IMFR? This study employs a many-facet Rasch analytic model (Linacre, 1999) and Confirmatory Factor Analysis (CFA; Brown & Moore, 2012) to examine concurrent, structural, substantive, and predictive validity and inter-rater reliability. The second research question is: What is the cost of the IMFR relative to its perceived benefit? To address RQ2, the study team administered a survey and conducted focus groups with a sample of schools.

Results: Preliminary results indicate that the IMFR has promising content and structural validity, Interrater Reliability (IRR), and usability. Structural validity results were mixed. With respect to content validity, item measure was greater than .50 for 13/15 IMFR constructs (e.g., Tier 1) across all three administration years. Only two items (i.e., school leadership and resources) fell below the .50 threshold, and this occurred only in year 3. Further, 13/15 items were within the expected fit range across the three administration years (< 1.5 for weighted mean square and unweighted mean square). For structural validity, the four IMFR domains (Instruction and intervention; assessment, data-based decision making; infrastructure) plotted to a four-factor model in years 2 and 3, and met or nearly met all goals for goodness of fit ($> .90$), comparative fit ($> .90$), and RMSEA fit ($< .05$) across all three years. IRR results improved annually, with Kappa increasing from .587 in year 1, to .681 in year 2, to .752 in year 3. Structural validity results were mixed, with the scale category thresholds disordered for all items in years 2 and 3 due to underuse of the middle rating category. Usability results reveal that schools perceive that the IMFR's benefits outweigh costs. Predictive validity results are pending release of 2023 state assessment results in participating schools.

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Examining the Validity of Performance Tasks for Measuring Pre-Service Educator Pedagogical Skills

Additional authors: Steffen Erickson, University of Virginia; Lindsey McLean, Boston University; Julie Cohen, University of Virginia; & Nathan Jones, Boston University

Introduction: Pre-service educators must develop both content knowledge and pedagogical skills to be fully prepared to support students with mathematics disabilities (SWD) in the classroom (Ball & Forzani, 2009). Teacher training programs would benefit from validated tools that provide an accurate understanding of whether teacher candidates have acquired the necessary knowledge and skills prior to entering the field. While much work has been done to develop and validate tools that measure educator knowledge, the field is sorely lacking in feasible-to-use measures of educator skill (Phelps & Bridgeman, 2022). Classroom observations, commonly used for this purpose, can be time-intensive and cost-prohibitive to administer. Accordingly, teacher educators are ill-equipped to know whether teacher candidates have developed the skills necessary to support SWD in their classrooms. In the current study, we attempt to address this gap by developing and validating a set of performance assessments as a cost-efficient alternative to classroom observations. In the current study, these tasks were developed to provide precise and actionable data regarding pre-service mathematics educators' skills with one high-leverage practice for supporting SWD- metacognitive modeling (Archer & Hughes, 2010).

Method: Study participants included 149 general education teacher candidates completing a general mathematics methods course across two university sites in 2022-2023. At the start of the semester, candidates were asked to complete three performance tasks meant to capture their ability to demonstrate skills in metacognitive modeling making sense of a word problem. Performance tasks were modeled after standardized performance task assessments designed by Phelps and colleagues (Phelps & Bridgeman, 2022; Phelps et al., 2020). Participants completed tasks on a website where they were presented with a word problem and given five minutes to prepare and then five minutes to record themselves delivering a think aloud to make sense of the problem. At the end of the semester, participants completed three parallel performance tasks and were also asked to demonstrate their instructional quality through videotapes of their instruction in their clinical field placements. All performance tasks and placement videos will be scored using a researcher-created rubric that targets five critical components of our focal practice: setting an objective for the model, unpacking the word problem, use of self-instruction, use of self-regulation, and ending the model. Placement videos will also be rated on two validated observation tools, one from mathematics education, the Mathematics Quality of Instruction tool (Hill et al., 2004), and one from special education, the COSTI-M (Doabler et al., 2014). All videos will be double-coded.

Results: Coding for the project is ongoing and will be completed in Fall 2023. Evidence for the structural validity of the researcher-created rubric will follow a process outlined in Flake (2017). We will conduct psychometric analyses of the rubric's factor structure, item difficulties, and reliability for performance tasks and placement videos, and will also examine predictive relationships between performance tasks and placement videos and the stability of psychometric properties between contexts. Finally, we will investigate the researcher-created rubric's external validity by correlating participants' MQI and COSTI-M scores with their scores on the researcher-created rubric.

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Friday morning, Board 9

Linguistic diversity and spelling: Is it a disability or a difference?

Additional authors: Heesun Chang, Texas A&M University Kimberly Wright, Texas A&M University Amanda Lindner, Texas A&M University-San Antonio Malt Joshi, Texas A&M University

Introduction: The ability to encode (spell) can be a difficult task if one is not aware of General American English (GAE) phonology and how morphological and orthographic knowledge are needed to spell proficiently. This task is heightened when students speak a language or language variation different than GAE, the language expected to be spoken in school for academic purposes. When teachers lack this knowledge, they may have difficulty teaching African American English (AAE)- and Spanish-speakers how to spell conventionally in GAE. Spelling knowledge is a valuable indicator of the linguistic knowledge one possesses. If teachers do not have this knowledge, they may consider students' spelling ability to be a linguistic disability rather than a linguistic difference.

Method: Using a spelling survey, in Study 1, teachers in one southwestern U.S. state (n=324; 18% White; 53% Hispanic; 19% African American), and in Study 2, a national sample of teachers (n=66; 83% White; 9% Hispanic) completed general questions about spelling patterns (16 questions) and questions regarding how AAE and Spanish (10 total questions) might influence the GAE spelling of words. To establish a baseline, the participants were asked questions about general spelling patterns. Additionally, the survey included demographic questions to make comparisons across variables. The following research questions were addressed: 1. What spelling knowledge items are difficult and easy for educators? 2.

Are there performance differences in general spelling knowledge and linguistic spelling knowledge across the educators' current positions, educational backgrounds, and workplaces? 3. What is the relationship between the educators' general spelling knowledge, linguistic spelling knowledge, and years of teaching? A general spelling pattern, multiple-choice item included: "A student spelled "general" as "jeneral", what should the student be taught?" A linguistic spelling, multiple-choice item is "Which of the following words might have possible influences of AAE on the spelling of GAE words?"

Results: Using the Rasch models, when comparing teachers from Study 1 and Study 2, differences and similarities were found. Notably, the item difficulty levels were different between these two groups. The Spanish-related spelling items were relatively easy for the participants in Study 1, in which items 3 and 4 were among the easiest while those same items were the most difficult items for Study 2's participants. Moreover, the infit/outfit statistics of these Spanish-related items aligned better with the Rasch model with Study 1's participants. In contrast, such response pattern to the Spanish-related items was less visible in Study 2, as indicated by larger infit and/or outfit statistics. These contrastive findings might be due to the different sample sizes between the two studies, but another possible explanation is the different demographics between Studies 1 and 2. Overall, the difficulty levels of the AAE-related items were comparable between both studies. No significant performance differences were observed across the participants' route to becoming a teacher, educational level, and workplace regions. However, the participants working as reading specialists/interventionists had significantly more spelling knowledge than their non-specialist counterparts. This knowledge is important so that AAE- and Spanish-speakers' linguistic diversity is viewed as a difference and not a disability.

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Thursday evening, Session B, Board 32B

Language in the SVR: Predicting Reading Comprehension with Morphology, Syntax, and Vocabulary

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Introduction: The Simple View of Reading (SVR; Gough & Tunmer, 1986) proposed reading comprehension is the product of basic reading skills (word recognition) and language comprehension. However, the language side of the equation merits further exploration. Perfetti (2001) proposed that reading comprehension happens at the juxtaposition of orthography, phonology, and the reader's lexicon, with lexicon defined as the reader's mental representation of the words and their meanings, which included syntax, morphology, and vocabulary. These three components frequently have been associated with reading comprehension (Baumann, 2014; Brimo et al., 2017; Spencer et al., 2017). Foorman, et al. (2015) found that syntax and vocabulary created an oral language factor that best fit the data among students in 4th through 12th grades, and decoding did not add a significant amount of variance. However, oral language combined with decoding predicted reading comprehension with 1st and 2nd grade students, and phonological awareness did not add significant variance (Foorman, Herrera et al., 2015). The purpose of this study was to examine the role of language skills in reading comprehension among students in 2nd through 4th grades. The following research questions guided the study; (a) to what extent do syntax, morphology, and vocabulary predict reading comprehension; and (b) what is the relationship between syntax, morphology, and vocabulary?

Method: The study examined existing scores on Acadience Reading K-6 (Good et al., 2021; formerly known as DIBELS Next) measures and Acadience Reading Diagnostic Comprehension, Fluency, and Oral Language (CFOL) measures (Powell-Smith et al., 2021). The participants were 273 students in second, third, or fourth grade who participated in the CFOL validation study. An initial latent profile analysis (LPA) was performed to examine the possibility of distinct profiles of student performance on the CFOL subtests. Profile enumeration was conducted using the Bayesian information Criterion (BIC), the Bootstrap Likelihood Ratio Test (BLRT), and maximizing the model entropy. Profiles were then examined in potential differences in the Acadience Reading Composite Score (RCS).

Results: Each of the three language skills had two indicators and a multi-group model was estimated, with no equality constraints across grades. Overall, the model fit very well, $\chi^2(18) = 17.58$, $p = .48$, RMSEA = .01 (90% CI: .000, .091), CFI = .99, and misfit did not significantly differ by grade. Two profile solutions fit the data best for third and fourth grades, corresponding to high and low performance on each measure. However, a three-profile solution fit best for second grade, which in addition to high and low performance, also led to a third profile that was significantly higher in sentence repetition (syntax), but otherwise like the low performance profile. The paths from syntax and morphological awareness yielded somewhat counter intuitive results. Syntax and morphology each explained about 60% of the variance in vocabulary for each of the three grades. However, neither syntax nor morphological awareness were significant predictors when controlling for the other.

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Thursday evening, Session B, Board 12B

Promoting Continued Literacy Growth for Autistic Individuals Via a Functional Reading Intervention

Introduction: For autistic children and adults, proficiency in reading is considered a highly desirable life skill that contributes to improved quality of life, provides a sense of accomplishment and improved self-confidence, and enhances vocational and independent living outcomes. However, there is a paucity of evidence on facilitating FUNCTIONAL LITERACY, or activities of daily living that require reading (e.g., texting, emailing) for autistic individuals. This information is critically needed to facilitate functional reading development as these individuals make the transition from compulsory education to adult life and, hopefully, greater independence. Our study was guided by the following research questions: (a) Is there a functional relation between written language intervention using functional texts and increases in participant use of reading comprehension strategies? (b) Do participants maintain the use of these strategies postintervention?

Method: We used a single case multiple-probe across stimuli design that was replicated across three transition-aged autistic youth. Introduction of the Written Language Intervention Using Functional Texts (WLIFT) was staggered across three or four functional literacy behaviors (e.g., text messages, email) that were identified areas of need for each participant. The virtual (using Zoom videoconferencing) WLIFT sessions included explicit teaching of reading comprehension strategies such as comprehension monitoring and summarizing. The strategies were taught and practiced using a library of functional text samples (e.g., text or GroupMe messages, emails). Within each session, the interventionist followed the teach-model-coach-review format (Roberts et al., 2014) by fading systematic supports (e.g., graphic organizer, verbal prompts) to promote independent strategy implementation. When needed, intervention adaptations were introduced to best tailor the intervention to each individual participant. We visually analyzed the percentage of reading strategies implemented accurately across all study phases. Phase means are reported as supplemental analyses to support the primary visual analyses of data.

Results: Based on visual analysis of the data, two out of the three participants demonstrated improvements on the percentage of reading strategies implemented accurately as a result of WLIFT. For one participant, although a treatment effect was observed across all four functional literacy behaviors, data changes for each behavior were not independent from one another which precludes us from establishing a functional relation for this participant. Nonetheless, all participants maintained the skill post-intervention. Based on changes in phase means, all three participants demonstrated improvements in the use of reading comprehension strategies across the baseline, intervention, and maintenance phases. Improving functional reading skills throughout the lifespan is critical as it provides a sense of accomplishment and enhances vocational and independent living opportunities for autistic individuals (Young et al., 2004). This study provides preliminary evidence that WLIFT is associated with improved use of reading comprehension strategies that maintains over time. The importance of understanding individual differences among learners and the need to match intervention adaptations with each individual to optimize treatment outcomes is discussed. Overall, WLIFT has the potential to augment current transition programming to support continued reading development which is essential as autistic individuals make the transition from adolescence to adult life.

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Thursday evening, Session B, Board 33B

Utility of AI Chatbots for Mathematics Writing

Additional authors: Erin M Smith, UNLV

Introduction: Mathematical Writing (MW) can support students' mathematical learning and is common in mathematics assessment, but MW is known to be particularly challenging for students that are at-risk or receiving special education services for a learning disability (Arsenault et al., 2022). However, AI chatbots (e.g., ChatGPT) are increasingly accessible for teachers as well as students and represent an evolving technology that could support the assessment, instruction, and feedback necessary for teachers to support students' MW as well as serve as an assistive technology for students to support composition, self-evaluation, and revision. The purpose of this study is to examine the affordances and limitations of AI chatbots in regards to supporting teacher instruction of MW as well as in supporting students in the MW process.

Method: Researchers examined the utility of three AI chatbots (ChatGPT, Bard, Bing) to produce high quality MW problems, provide exemplar MW responses to elementary grade mathematics problems, assess sample MW responses, and provide feedback to sample MW responses. We began with broad commands (e.g., "provide feedback on the provided answer to the word problem") and incrementally added commands (e.g., "the student is in third grade", "do not include algebra", "the student has a learning disability") to examine the affordances and limitations across the three chatbots. All commands entered and AI chatbot responses were copied for qualitative analyses. Our research questions included: (1) What is the utility of AI chatbots to generate upper-elementary grade mathematics word problems? (2) What is the utility of AI chatbots to generate MW responses to upper-elementary grade mathematics word problems? (3) What is the utility of AI chatbots to assess MW in response to a word problem? (4) What is the utility of AI chatbots to generate high quality feedback to MW in response to a word problem?

Results: Although data collection and analyses are on-going, we have preliminary findings. First, none of the AI chatbots examined consistently produced high-quality MW problems. Additionally, the AI chatbots were not able to produce the visual elements common in MW problems in the elementary grades. The AI chatbots were consistently capable of producing high quality MW responses to word problems (e.g., exemplar responses), both in terms of content (correct answers) and writing organization and clarity. However, the AI chatbots often required additional commands to produce MW responses commensurate with grade level expectations (e.g., third grade, producing a MW response that did not include above-grade strategies) and additional commands are required if the word problem included visual information. None of the AI chatbots provided consistently accurate evaluations of MW when directed to use a rubric. Further, AI chatbot feedback to MW was inaccurate in that the AI chatbots consistently failed to identify content specific errors, often praising responses that reflected common misconceptions of third grade students. Further, AI chatbots often provided problematic responses if told the student had a learning disability, was an English Learners, or was gifted. However, the AI chatbots often provided adequate feedback on the writing component (i.e., vocabulary, organization). Of the three AI chatbots, ChatGPT appears to be the most consistent but they generally performed similarly. For conclusions, AI chatbots provide the most utility for teachers in regards to generating exemplar MW responses to word problems but the limitations are too great for AI chatbots, at this time, to provide much utility in regards to MW assessment, problem generation, or providing feedback on student's MW.

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Thursday evening, Session A, Board 36A

SRSD Informative Writing Intervention for High Schoolers with Learning Disabilities

Additional authors: Hannah Brenner & Casey Kim, Doctoral Students, University of Illinois Urbana-Champaign

Introduction: This study addressed the urgent need for effective instruction for reading and writing to learn among high school students with and at-risk for learning disabilities who aim to go to college by developing and assessing a new, never before tested, intervention: College Ready: Reading and Writing to Learn. These capabilities are essential to succeed in high school and will make a substantial contribution in preparing students to be successful in college.

Research Questions: Does College Ready: Reading and Writing to Learn improve the performance of high school students with and at risk for learning disabilities in identifying and selecting credible source texts, advance essay planning, and informative writing from source text? Does College Ready: Reading and Writing to Learn improve high school students' informative writing genre knowledge and students' self-efficacy for reading and writing?

Method: Using a pretest posttest design, 18 high school students (10th and 11th grade) with and at-risk for learning disabilities received small group instruction on using technology tools for identifying credible source texts; reading and annotating source texts; and planning, writing, and revising informative essays that incorporates central ideas and details from source texts. The intervention included thirty total lessons aligned with the Common Core State Standards (2010). Students were taught using the self-regulated strategy development (SRSD) model for instruction, an evidence-based practice for teaching writing (Baker et al., 2009; WWC, 2017) and taught general and informative writing strategies. Students were also taught self-regulation strategies including self-statements and self-monitoring of progress by graphing the included number of informational genre elements in their essays. Instruction was delivered by four doctoral students who were trained to criteria by a faculty member with expertise in writing instruction. Graduate researchers observed 30% of the lessons. The instructors implemented the intervention with an average of 96.89% fidelity and 96.46% quality. Intraclass correlation coefficient was .96 for fidelity of implementation.

Results: After participating in the intervention College Ready: Reading and Writing to Learn, students made statistically significant gains on their genre knowledge, ($p < .001$), $g = .97$, 95% confidence interval (CI) [0.41, 1.51], identifying credible source texts ($p < .001$), $g = 1.04$, 95% CI [0.47, 1.59], planning an essay ($p < .001$), $g = 1.52$, 95% CI [0.84, 2.18], overall essay quality ($p < .001$), $g = .96$, 95% CI [0.41, 1.50], inclusion of genre elements ($p < .001$), $g = 1.24$, 95% CI [0.63, 1.84], number of transitions ($p < .001$), $g = .91$, 95% CI [0.36, 1.43], inclusion of central ideas and details from sources ($p = .003$), $g = .70$, 95% CI [0.19, 1.19] and total written words ($p < .001$), $g = 1.03$, 95% CI [0.47, 1.58]. Inter-rater reliability was .90 or higher for all measures. Students also increased their self-efficacy ($p < .001$), $g = 1.28$, 95% CI [0.66, 1.88]. Students reported the instruction improved their reading and writing skills and they found the intervention acceptable.

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Friday morning, Board 10

Measuring first and third graders' language skills using sentence-level writing curriculum-based measures

Introduction: Writing curriculum-based measures (CBM-W) are technically sound measures that provide formative, global indicators of proficiency and are often used to inform writing intervention for students with and without learning difficulties (Allen et al., 2020; Deno, 1985). Picture word CBM-W (PW CBM-W) metrics include words written, words spelled correctly, correct word sequences, incorrect word sequences, and correct minus incorrect word sequences (Allen et al., 2018, 2020). However, as general measures that capture a wide range of skills at once, current PW CBM-W metrics do not provide discrete estimates of linguistic skills such as lexical diversity (vocabulary/semantics), syntax, and grammar (morphology, morphosyntax) that underlie written expression and are associated with writing quality in elementary-aged learners (Dockrell & Connelly, 2009; Kim & Graham, 2022; Scott, 2020). As such, complementary measures for PW CBM-W that provide information about students' underlying language skills may help inform writing interventions that are more targeted to their specific areas of need. In this investigation, we replicated and expanded a previous study that applied language sample analysis (LSA) to PW CBM-W with typically developing first through third graders (Reno & McMaster, 2023) to first and third graders with and without oral language difficulties. Metrics included the production metrics number of different words written (NDW; lexical diversity), mean length of T-Unit in words (MLTU-W; syntax/syntactic complexity), and mean length of T-Unit in morphemes (MLTU-M; syntax/syntactic complexity) that had evidence of technical quality, discrimination, and growth in a previous study of LSA and PW CBM-W (Reno & McMaster, 2023). Also included were the syntactic complexity metric words per clause and grammaticality metric percent grammatical productions. Research questions include: when applied to PW CBM-W, a) what is the performance of typically developing first and third graders on LSA metrics as applied to PW CBM-W, and b) what is the performance of first and third graders with oral language difficulties on LSA metrics as applied to PW CBM-W?

Method: Two PW CBM-W samples will be collected in fall and spring semesters of the 2023-2024 academic year from 34 typically developing first graders, 34 typically developing third graders, 34 first graders with language difficulties, and 34 third graders with language difficulties. A total of 272 PW CBM-W samples will be collected and analyzed. Samples will be transcribed and scored using Systematic Analysis of Language Transcripts software (SALT; Miller & Iglesias, 2020) by the author and two PhD students in special education trained to 90% inter-rater reliability.

Results: Descriptive statistics will reveal students' performance on PW CBM-W samples as scored according to the afore-mentioned LSA metrics. We are currently seeking IRB approval to begin data collection this fall and anticipate completing data collection by early spring.

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Presenter(s): Marianne Rice, Texas A&M University (marianne.rice@tamu.edu)

Thursday evening, Session B, Board 34B

Effects of a Structured Literacy Computer Program on Preschoolers' Literacy Skills

Additional authors: Megan Bishop, Texas A&M University; Elizabeth Ivey, Texas A&M University

Introduction: The purpose of the current study was to examine the effects of a computer program designed to meet the components of structured literacy on the early literacy skills of preschool-aged children. Given the lack of universal access to preschool programs in the United States, the computer program was used by preschool children at their homes and accessed on personal tablet devices more likely to be used by children this age. The following research questions guided the current study: 1. Do preschool children who use the OgStar Reading computer program make statistically significant improvement in early literacy skills over a control group? 2. What was the overall fidelity to the planned intervention for children who used the OgStar Reading computer program and was fidelity to the intervention related to improvement in early literacy skills? 3. What was the average reported level of satisfaction on a researcher-created survey by the families who used the OgStar Reading computer program at home with their children?

Method: Participants were 42 four- and five-year-old children recruited from across the U.S., many of whom scored at-risk on the literacy assessments or had a family history of reading disabilities. Participants were randomly assigned to an intervention group, which used the OgStar Reading Early Reader iPad program, or a control group, which used IXL Math. Children used the computer programs over a period of eight weeks in the summer prior to kindergarten enrollment. The recommendation was to engage with the program for 15- 20 minutes per day for 5 days a week. Three DIBELS measures were administered at screening, pretest, and posttest. These measures were Letter Naming Fluency (LNF), Phoneme Segmentation Fluency (PSF), and Nonsense Word Fluency (NWF). Parents submitted data from about the number of lessons completed in OgStar so fidelity to the planned intervention could be assessed. Finally, families were also asked to complete a survey after the study to assess their opinions regarding the use of the program.

Results: A total of 33 children completed posttests. Using linear regression and controlling for pretest score, students in the intervention group scored statistically significantly higher on LNF posttests ($g = 0.55$, $p = .001$) and NWF- correct letter sounds posttests ($g = 0.40$, $p = .017$) over the control group. No statistically significant differences were found between the groups for PSF ($g = 0.03$, $p = .824$) or NWF- words recoded correctly ($g = 0.25$, $p = .341$). Overall, fidelity to the planned intervention varied across participants, with the majority of participants engaging with the apps far less than recommended. Fidelity data was available for 14 intervention group participants. The number of lessons completed was moderately related to participant growth in LNF ($r = 0.38$), NWF- correct letter sounds ($r = 0.31$), and NWF- words recoded correctly ($r = 0.36$). Finally, parent reported level of satisfaction with the app was generally positive. Parents reported they thought their child learned new skills (4.8/6.0), thought the app was fun (4.3/6.0), and would recommend it to other parents (4.5/6.0).

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Thursday evening, Session B, Board 10B

Effect of Partial Interval Recording on Interpretation of Intervention Effects

Introduction: Partial interval recording (PIR), the most common form of time-sampling in single-case design, is known to introduce error (Pustejovsky & Swan, 2015). Many studies published in disability-specific journals use PIR. Questionable measures may adversely affect the extent to which secondary analyses identify effective practices. We re-examined the results of a meta-analysis that suggested self-monitoring interventions decreased problem behavior by 29% (Bruhn et al., 2022). As primary studies incorporated PIR, we assessed the impact of different estimates of unreported behavioral durations on aggregate effect sizes. Questions include: (1) To what extent do intervention effects vary following a consideration of error introduced by PIR and (2) To what extent are upper and lower bounds of estimates affected by interval length?

Method: Participants and Setting. Studies ($n = 21$) were obtained from Bruhn et al. (2022). Studies included 62 participants (46 male, 16 female) aged 5-17 years ($M = 10.02$; $SD = 2.75$). Thirty-five participants had an identified disability or disorder. Analyses. Our analyses include three hypothesized durations: 25%, 100%, and 125% of interval length. We calculated a log-prevalence ratio (LPR) for all participants across the 21 SCD studies (Pustejovsky, 2022). Second, we used a fixed effects meta-analysis to aggregate individual LPRs into a single LPR per study. Third, we transformed the LPR for each study into an interpretable percentage metric. Fourth, we used a random effects model to aggregate the upper and lower bounds across the three hypothesized conditions (25%, 100%, 125% of intervals).

Results: Results and Discussion. Our results suggest a wide range of possible effects. Assuming the behavior occurred for 25% of the interval, our meta-analytic results suggest that problem behaviors may reduce by 50.0 - 65.6%, a considerable range. Assuming behavior occurred for longer durations of the interval (100% and 125%) is associated with narrower lower and upper bounds. All results included large heterogeneity values (e.g., $I^2 > 95\%$), indicating that there are key variables moderating the meta-analytic values (e.g., length of interval). Statements regarding the effectiveness of interventions may need to be tempered in instances where large portions of the research base involve PIR.

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Friday morning, Board 12

Evaluating Affixations in Long Words and Their Contributions to Informational Writing Quality

Introduction: Using secondary data analysis, a subsample of 100 informational writing samples, representing a total of 37 8th grade students, were coded using 15 different variables to examine how Long Words (seven or more letters), derivational morphology, and inflectional morphology contribute to overall writing quality. Research Questions included: 1. What types of words with various affixation levels comprise the construct of Long Words in Grade 8 students informational writing? 2. How does the distribution of affixation levels found for Long Words (seven or more letters) compare to the distribution of All Words in a student passage? 3. How do the various affixation levels of Long Words relate to Grade 8 Informational Writing Quality? Analyses included descriptive statistics, bivariate correlations, and single group path analysis. Findings showed that Long Words are more likely to be affixed, and that Multiply Affixed words may be more likely to be Long Words. Of the Long Words written by a student, many of them are inflected followed by derivational in nature. Of the Long Words that students include, only about half are sourced from the text, indicating that text contamination was not a large concern in this sample. Base words, such as proper nouns, are less likely to be considered Long Words. Regarding writing quality, inflected and derived words are strongly correlated with Writing Quality generally, but derivational morphology becomes more strongly correlated when assessing through the lens of Long Words. Furthermore, all indicators are associated with Long Words, but Long Words was not associated with Writing Quality. Finally, Multiple Affixation was negatively associated with Long Words, which is counterintuitive to the researchers' hypothesis. Implications from this study suggest that the inclusion of proper nouns in informational writing is an easy target for instruction, given the small to moderate correlations with Writing Quality, and that inflectional and derivational morphology may also have high instructional utility. Implications for researchers suggest that Long Words, as measured by 7+ letters, may be more useful than other word complexity metrics (i.e., Total Words Written) for researchers interested in students inflectional and derivational morphology use. Finally, this study suggests that researchers may consider other standards for Long Words (8+ letters) for assessing inflectional or derivational morphology use.

Method: A total of 100 writing samples from 37 8th grade students were analyzed with 15 variables, including: 1. Informational Writing Quality 2. Total Words Written (Coh-Metrix) 3. Total Words Written (MorphoLex) 4. Long Words (Sarmiento et al., in review) 5. Long Words (MorphoLex) 6. Base Words 7. Proper Nouns 8. Inflected Endings 9. Derived Endings 10. Multiply Affixed 11. Long Base Words 12. Long Proper Nouns 13. Long Inflected Endings 14. Long Derived Endings 15. Long Multiply Affixed Using MorphoLex software (Laufer & Cobb, 2020), a six-level coding scheme was used to identify the frequency and complexity of both derivational and inflectional affixations used in student writing samples. Analyses ran included descriptive statistics, bivariate correlations, and single-group path modeling using robust maximum likelihood estimation.

Results: On average, students wrote passages consisting of 182 Total Words. Of the Total Words written, they wrote 30 Long Words, usually consisting of unaffixed Base Words, inflected endings, and derived endings. Bivariate correlations indicate that the Long Words is significantly correlated with writing quality ($r=.72$, $p<.01$) and Total Words ($r=.78$, $p<.01$). The correlations between Total Words and Total/Long Base Words were multicollinear ($r=.99$, $p<.01$). Yet, the Total Long Words and Total Words were similarly related to Writing Quality. Long Inflected ($b=.5$, $p<.01$) and Long Derived Words ($b=.34$, $p<.01$) were strongly related to Writing Quality via Long Words. Results suggest that Long Words may be an instructionally useful productivity indicator as it similarly predicts quality informational writing yet provides valuable information on students' knowledge of affixed words without the noise of Base Words, which traditionally comprises the bulk of a composition.

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Thursday evening, Session A, Board 22A

Applying Economic Evaluation Methods to Single Case Research: Considerations and Adaptations

Additional authors: Kathleen Zimmerman, University of Kansas

Introduction: Federally funded projects have begun requiring the inclusion of cost studies to examine the implementation cost of interventions to support students with disabilities. However, application of these methods within single-case research is only now beginning to emerge, leaving single-case researchers to navigate the complexity of economic evaluation methods with little guidance. Additionally, initial exemplars of single-case cost studies indicate adaptations are necessary to meaningfully apply economic evaluation methods within single-case research methods. To allow for robust and meaningful use of economic evaluation, there is a need to better understand how these methods can be applied to single-case research methods to provide meaningful and translational information to disseminate to key stakeholders (e.g., practitioners, parents, and students). This poster will present the findings from a manuscript: "A Primer on Economic Evaluation in Single-Case Research Designs" with the purpose of examining the necessary adaptations and considerations when applying economic evaluation to single-case research designs (Scheibel, Hicks, & Zimmerman, In Preparation).

Method: The poster will present the CAP Cost Analysis Standards and Guidelines (Hollands et al., 2021) and compare application of these standards within a primary single-case study (Scheibel et al., Under Review) and a single-case synthesis (Scheibel et al., Accepted) to highlight adaptation points and additional considerations that are specific to single-case design research.

Results: Review of the CAP Cost Analysis Standards and Guidelines found adaptation is dependent upon the intervention form the single-case research design is applied to. Economic evaluation methods can be applied to class or school-wide interventions investigated with single-case research design methods with few considerations. However, application of the standards to individualized interventions (i.e., interventions individualized and implemented with a single student) appears to be less straightforward. Our analysis indicates two major adaptation points are required: a shift in the cost perspective from administrative to teacher, and in the cost metric used to convey the total implementation costs to isolate time cost from dollar cost. Further, results indicate considerations regarding the use of parametric effect sizes and translational effect sizes is needed dependent upon the cost perspective and dissemination audience. A rationale for these adaptations will be discussed (Scheibel, Hicks, & Bellfield, In Preparation). The initial comparison of these standards to single-case research methods using available exemplars provides an initial roadmap for application of economic evaluation methods. However, this comparison is limited by the few exemplars of single-case cost studies available- limitations and topics for future research direction will be discussed.

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Thursday evening, Session A, Board 14A

Feasibility and Usability of a Nonword Spelling Assessment in K-1 Classrooms

Additional authors: Hope K. Gerde, Texas A&M University Derek Rodgers, University of Iowa Natalie Koziol, University of Nebraska-Lincoln

Introduction: Current spelling assessments fall short for assessing children's spelling and informing instruction because they include high-frequency words that are not decodable. Such items rely on memorization skills rather than letter-sound knowledge. Nonword reading assessments have been widely used to identify students with reading difficulties (Gillon et al., 2023). Similarly, nonword spelling assessments have the propensity to isolate spelling skills and ensure children's spellings reflect their knowledge of the alphabetic principle (Stage & Wagner, 1992). Recent work has found nonword spelling scores to provide insight into students' emerging decoding skills to inform instruction (McNeill et al., 2023); however, currently used literacy screeners do not include nonword spelling (Seymour, in preparation). Additionally, spelling assessments are typically scored dichotomously (accurate/inaccurate) which offers little information to inform spelling instruction. This study provides feasibility, usability, and validity evidence of a nonword spelling assessment in kindergarten and first grade scored using three separate approaches. Research questions include: (1) What are teachers' perceptions of utilizing nonword spelling assessments? (2) What is the correlation between nonword and real word spelling scores? (3) What is the correlation between spelling scores and DIBELS scores?

Method: Two kindergarten and two first-grade teachers administered the nonword spelling assessment in a full-class setting by dictating each of the 12 nonwords. A researcher provided instruction to teachers regarding how to score the assessments using: (1) dichotomous scoring (correct/incorrect), (2) correct letter sequencing (CLS), and (3) invented spelling metrics. Teachers were then asked to complete a survey on the feasibility and usability of the nonword spelling assessment. Twenty-eight kindergarten (age M = 6 years, 2 months) and 25 first-grade (age M = 7 years, 1 month) students participated. In addition to the nonword spelling test, teachers administered the aimswebPlus Spelling assessment, a spelling assessment that includes high-frequency and phonetically regular real words. Per the assessment protocol, teachers scored student responses as correct/incorrect. DIBELS 8th Edition (University of Oregon, 2021) student data was collected from the school.

Results: Overall, teachers had positive feedback on the feasibility, usability, and face validity of the nonword spelling assessment. Teachers reported 100% agreement that the nonword spelling test, "fit within the commonly used procedures, pedagogical practices, curricula and assessments used by your school," "provides an accurate representation of students' spelling ability," and they would, "use the results of this nonword spelling assessment to inform classroom instruction." There was a significant correlation between nonword and real word spelling scores for kindergartners ($r=.66$, $p=.0001$), and first graders ($r=.76$, $p<.0001$). Further, there was a significant correlation between nonword spelling scores and DIBELS composite scores for kindergartners ($r=.63$, $p=.0004$) and a moderate correlation for first graders ($r=.40$, $p=.0541$). Lastly, there was a significant correlation between real word spelling scores and DIBELS composite scores for kindergartners ($r=.60$, $p=.0012$) and first graders ($r=.52$, $p=.0076$). The study provides initial evidence for the feasibility of administration and scoring as well as face and concurrent validity of the nonword spelling assessment. Future work will examine the predictive validity and usability of the measure for informing instruction.

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Friday morning, Board 13

E-book Narration and Parent-child Talk during Bilingual Shared Reading

Introduction: Parent-child shared reading benefits children's language development, including vocabulary, comprehension (Martinez, 1983), and print knowledge. With technology's rise, literacy apps and e-books have revolutionized home literacy practices (Strouse et al., 2019). Many e-books offer audio narrations, allowing children to read independently, but children with parents as narrators recall more story elements than those relying on audio narrations (Dore et al., 2018). While most research focuses on monolingual settings, English as a second language haven't received enough attention. Many non-English speaking parents read English e-books with their children, but were hindered by limited English proficiency. Audio narrations might mitigate this, but unlike monolingual children, English learners might still require parental scaffolding to comprehend (Harji et al., 2016). To fill this research gap, this study explores the role of English audio narration in an English-Chinese storybook app and parental language utterances, as well as how they may impact children's learning. Our guiding research questions are: 1. How is the e-book English narration correlated with children's learning outcomes measured by story comprehension, story retelling, and English story-related vocabulary gain? 2. How is the e-book English narration correlated with parents' and children's Chinese and English language utterances? 3. What direct and indirect impacts does narration have on bilingual language utterances and learning outcomes?

Method: We conducted a secondary analysis using data from a larger study designing and evaluating an English-Chinese storybook app for shared reading in an EFL context. We included 121 Chinese-speaking children, aged 3-7, and their parents from China. The e-book narrates an oak leaf butterfly's camouflage journey and has multimedia interactive features embedded with automatic English narration including multimedia dictionaries, character statement hotspots, and discussion prompts. Children and their parents read the story e-book twice at home using their touchscreen tablets. We assessed children's story English vocabulary before and after the two reading sessions, followed by comprehension and retelling tests. To analyze bilingual interactions, we measured the E-book's English narration word count, children and parents' English utterances in word count, and Chinese utterances in character count of children and parents.

Results: We built an SEM model, which has a perfect model fit (Brown, 2006). We found that the e-book narration directly predicted the quantities of parents' English utterances ($\beta = .20$), parents' Chinese utterances ($\beta = .44$), and children's Chinese utterances ($\beta = .21$), and indirectly predicted the quantity of children's English utterances through parents' English utterances. The e-book English narration only had a small but significant relationship with story retelling ($\beta = .18$). Moreover, parents' English utterances significantly predicted children's English utterances ($\beta = .22$), and parents' Chinese utterances significantly predicted children's Chinese utterances ($\beta = .40$). As for bilingual utterance and learning outcomes, we found that children's English utterances predicted story comprehension ($\beta = .24$), and story retelling ($\beta = .37$). Parents' English utterances predicted children's vocabulary gain ($\beta = .18$). Finally, parents' Chinese utterances were negatively correlated with children's story retelling score ($\beta = -.29$). While no direct correlation was found between e-book narration and children's learning, the SEM model revealed that English e-book narration indirectly influences learning through parent-child conversations. Specifically, the e-book narration affected both parents' and children's Chinese utterances and parents' English utterances. Parents mediate the effect of narration on children's English utterances, underscoring their crucial role in enhancing comprehension and vocabulary acquisition. This aligns with prior studies emphasizing parental involvement in reading (Dore et al., 2018). Surprisingly, increased Chinese interaction didn't lead to better outcomes, potentially due to off-topic discussions. These results highlight the irreplaceable role of parents in e-book reading, suggesting app designs should prioritize parental engagement in EFL contexts.

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Thursday evening, Session C, Board 6C

Special Education Teacher Educators' Focus on English Learners in Preservice Literacy Courses

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Introduction: Sixteen percent of all ELs receive special education services (USDOE, 2022) and, thus, likely experience literacy difficulties in addition to needing English-language support. Therefore, special education teachers require an understanding of second (or other) language acquisition and an ability to utilize instructional and assessment practices that consider ELs' language and literacy development (Ortiz & Robertson, 2018). Nonetheless, studies have found that special education teachers often lack knowledge and confidence related to serving ELs with disabilities (Jozwik et al., 2020). This may be due to limited opportunities to learn about supporting ELs with disabilities during their preservice training (Miranda et al., 2017). As such, it is important to examine the literacy courses preservice special education teachers complete and the knowledge and perspectives of the teacher educators who teach these courses. Therefore, we investigated their approaches to preparing special education teacher candidates to provide literacy instruction to ELs. We also examined factors influencing their preparation approaches, barriers to preparing teacher candidates sufficiently, and supports necessary to improve candidates' preparation.

Method: We interviewed six special education teacher educators across one focus group and two individual interviews. Our semi-structured interview protocol included questions related to respondents' understanding of literacy development for ELs, respondents' confidence in preparing teacher candidates to provide literacy instruction to ELs, program-level and course-specific approaches to preparing teacher candidates in this area, barriers to adequate preparation of teacher candidates and supports needed to overcome such barriers. We conducted open coding of interview transcripts and then organized related codes into categories. Next, we reviewed categories and accompanying codes to identify themes represented across respondents. To promote the trustworthiness of the data, we employed member checks and peer debriefing.

Results: Most respondents attributed their knowledge of EL literacy development and ability to prepare candidates to provide ELs literacy instruction to experiences working in linguistically diverse environments prior to their PhD programs. RJ explained that her teaching experience "was with a lot of multilingual contexts." Alternatively, SF said she did not have "personal experience working extensively with multilingual learners" but completed relevant doctoral coursework. While respondents reported using several approaches to incorporate a focus on ELs in their literacy courses, no one's program included a course dedicated to literacy for ELs. Additionally, several respondents recognized that limited time or licensure requirements (e.g., instruction/ assessment for students with dyslexia) within their class or program limited the focus on ELs. AJ shared, "We're always having to prioritize what is most important for us, and...there's always going to be pieces that we're just not gonna hit enough." Another barrier respondents identified was limited real-world application of EL content. KP explained, "Culturally, we are not as diverse of an area as might be helpful in communicating this information to students, and so it's important to myself and others in the program, but I'm not sure that students internalize it in the way we want them to. I think they're focused on other things and don't have the background necessarily to understand how this really will be relevant to them."

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Emergent Writing and Later Reading for Children at Risk for Reading Difficulties

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Introduction: The relation between reading and writing has long been established (Shanahan & Lomax, 1986). To read or write successfully, children need to draw on similar cognitive knowledge that underlies reading and writing (Fitzgerald & Shanahan, 2000; Shanahan, 2016). Indeed, writing instruction has shown facilitative impacts on children's reading development (Graham & Hebert, 2011; Hebert et al., 2013). Whereas children's writing development and its role in reading acquisition has been primarily studied in elementary grades, young children's emergent writing competence has received less attention. In the current study, we examine the extent to which children's emergent writing skills in preschool and the rate of growth of these skills from preschool to Grade 1 predict Grade 1 word reading and reading comprehension abilities. Furthermore, we examine whether being bilingual can alter the association between early writing development and later reading abilities.

Method: We used data from three cohorts of children who participated in a larger project. The larger project involved an efficacy trial of an emergent literacy intervention for preschoolers at risk for later reading difficulties and included longitudinal assessment. The current study involved 243 children in 95 early childhood classrooms with full assessment data in kindergarten, including a subset of 53 bilingual children. We comprehensively measured children's emergent writing skills using several writing tasks, including letter writing, name writing, CVC word spelling, and story composition, across four time points from the fall of pre-K to Grade 1. We assessed children's word reading and passage comprehension abilities in Grade 1, and we used growth curve modeling to examine the extent to which initial level and growth rate in emergent writing skills from preschool to Grade 1 predicted reading outcomes assessed in Grade 1.

Results: Children's initial skills of name writing, letter writing, and story writing, but not CVC word spelling, predicted their later reading abilities in both word reading and passage comprehension. Preschool children with higher initial scores on name writing, letter writing, and story writing tended to perform better on both reading measures in Grade 1. Further, the growth rate of letter writing, CVC word spelling, and story writing skills from preschool to Grade 1 was significantly and positively associated with Grade 1 word reading and passage comprehension; the growth rate of name writing skills was significantly and positively associated with Grade 1 word reading only. Results suggest that children with a faster growth rate in emergent writing also performed better in later reading. However, being bilingual did not influence the associations between each of the emergent writing skills and Grade 1 reading abilities. Our findings showed that children with better developed writing skills early on and the opportunity to further develop these skills during early childhood demonstrate more advanced reading skills later on, regardless of their language status. This suggests that teachers should actively foster children's learning of writing skills early on for later reading success.

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Thursday evening, Session B, Board 7B

The Effect of Technology-based Programs for Struggling Readers on Reading Comprehension: A Meta-analysis

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Introduction: Reading comprehension is a critical skill for academic success. However, the process of acquiring comprehension skills is complicated due to the multifaceted nature of reading comprehension, involving various cognitive and linguistic components. This review focuses on instructional technology, including reading intervention programs, vocabulary instruction programs, and digital graphic organizers. Many companies and research teams have designed technology-based reading programs to build knowledge and skills and engage and motivate students with learning difficulties. However, few programs have been examined in rigorous experiments and most districts choose programs based on affordability instead of empirical evidence (Edyburn, 2013). Several previous reviews have examined the effects of technology-based intervention programs but found inconsistent results on reading outcomes (Alqahtani, 2020; Cheung & Slavin, 2013; Strong et al., 2011). To date, no meta-analysis has examined the effect of text-level reading interventions utilizing instructional technology on reading comprehension among struggling readers. Consequently, this project aims to conduct a systematic review and meta-analysis on the effects of technology-based reading programs on reading comprehension and pinpoint effective program features. The current meta-analysis is guided by three research questions. The overarching question is: "What are the effects of technology-based reading interventions on reading comprehension for struggling readers?". To explore the relationship between instruction quality and study outcome, we divide the technology-based intervention into two dimensions, content quality and delivery quality. Firstly, we investigate content quality by exploring the instructional approaches employed by the application and whether the programs incorporate evidence-based strategies known to be effective in improving reading comprehension. Secondly, we scrutinize delivery quality, focusing on the technical aspects of the instruction in the program, including their adaptiveness to the students' learning levels; the provision of practice opportunities, incentives, and feedback; and the extent of teacher involvement throughout the intervention process.

Method: A systematic search and screening process began with an electronic database search using PsycINFO, Eric, and Education Source to identify studies for inclusion. The three groups of search terms describing the area of interest (education technology), target population (students with reading difficulty), and outcome variable (reading comprehension) were used and connected by the Boolean AND. After abstract and full-text screening, 21 articles were identified. Study characteristics, content and delivery quality, measurement characteristics and outcomes, and quality indicators of the included studies will be coded for further analysis. For research question one, reading comprehension outcomes will be analyzed using robust variance estimation. For research question two and three, meta-regression will be conducted to explore the relationship between content and delivery quality and study outcomes, respectively.

Results: The coding and analysis are still ongoing. Final results will be available in the poster presentation. Preliminary analysis show that less than half of the included studies found positive outcomes on students' reading comprehension, and studies with higher quality observed smaller effects. For the moderator analysis, we hypothesize that programs with evidence-based instructional components have larger effects. Additionally, we hypothesize that programs have larger effects when they are adaptive to students' ability levels, provide incentives, practice opportunities and feedback, and involve teachers in the training.

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Trickle-down: How teacher efficacy impacts student's mathematics anxiety

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Introduction: Teacher efficacy plays a pivotal role in effective mathematics instruction, as educators who believe in their ability to teach the subject are more likely to employ innovative methods and provide personalized support to their students. The impact of teacher efficacy on students is profound, as confident and self-assured educators can inspire their students, fostering a positive learning environment that enhances students' math skills and overall academic performance. Coaching and professional development are evidence-based ways to increase teacher efficacy (Wood et al., 2016). A question remains regarding increases in teacher efficacy and whether that trickles down to impact student's mathematics anxiety. Teacher and student data from an ongoing project STAIR 2.0, will be utilized for this study. STAIR 2.0 is an intervention framework that provides teachers with support through professional development and coaching. The goal of STAIR 2.0 is to increase teacher understanding and use of data-based individualization and evidence-based practices to increase student outcomes. The teacher provides the intervention (implementation of data-based individualization and evidence-based practices) for 24 weeks while receiving their Professional Development and coaching from outside mentors.

Method: Both teachers and students within STAIR 2.0 participated in pre- and post-assessments. Data used for this proposal is from the larger, ongoing STAIR 2.0 project. Our research question is: does teacher efficacy relate to students' mathematics anxiety. To answer this question, we will use the Mathematics Teaching Efficacy Belief Instrument (MTEBI; Enchos et al., 2000) as an indicator of teacher efficacy and the Math Anxiety Rating Scale for students in Elementary (MARS-E; Suinn et al., 1988) for student anxiety. Participants During the 2022-23 school year, the STAIR 2.0 research team worked with special education middle school teachers (n = 22) who had students with mathematics IEP goals. Across the 22 teachers, they taught a total of 105 students, 6th grade (20.5%), 7th grade (28.5%), 8th grade (39%) and 9th grade (.028%). Measures Teachers were given the MTEBI at pre- and post-intervention. This is a valid and reliable 5-point Likert-type assessment that consists of two subscales: the Personal Mathematics Teaching Efficacy (PMTE) subscale and the Mathematics Teaching Outcome Expectancy (MTOE) subscale. The PMTE measures a teacher's belief in his or her capability to teach mathematics effectively, while the MTOE measures a teacher's belief that effective mathematics teaching can result in student learning. Students were given the MARS-E at pre- and post-intervention. The MARS-E is a self-report, 5-point Likert scale survey used to determine student's degree of mathematics anxiety. Situations asked about on the survey include testing, writing on the board, participating or being in math class more generally, and reading for class.

Results: To answer whether teacher efficacy impacts student's mathematics anxiety, we will examine the MTEBI as it relates to the MARS-E through correlations. We plan to explore teachers high and low in efficacy, as well as teacher gains in efficacy as they relate to student's mathematics anxiety. Analyses will be conducted before the end of the Fall semester. Full results will be presented at the conference.

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Thursday evening, Session C, Board 7C

Examining an Algebra Virtual-Representational-Abstract Integrated Intervention for Students with Learning Disabilities

Introduction: Algebra is the "gatekeeper" to post-secondary schooling and employment (NMAP, 2008). It is foundational content for higher level mathematics and needed to engage in the modern world and workforce (Fennell, 2008; NMAP, 2008; Schoenfeld, 1995). When students are not taught algebra, "they are sorted out of the opportunities to become productive citizens in our society" (Schoenfeld, 1995, p. 12). However, only 4% of students with learning disabilities (SWLDs) are proficient in mathematics (Horowitz et al., 2017). Consequently, only 46% of adults with learning disabilities are employed (Horowitz et al., 2017). Initial research has investigated algebra interventions for SWLDs and identified concrete-representational-abstract (CRA) frameworks to be effective (Bone et al., 2021). One of the CRA frameworks, concrete-representational-abstract integrated (CRA-I), involves a simultaneous presentation of the concrete, representational, and abstract phases (Strickland, 2016). Recently, researchers have replaced concrete manipulatives with virtual manipulatives (VMs) transforming CRA-I into a virtual-representational-abstract integrated (VRA-I) framework (Bouck & Sprick, 2019). However, none of these interventions have sufficient evidence to be deemed as evidence-based algebra interventions for secondary SWLDs (Bone et al., 2021). This study examined the following research questions: 1.

What percentage of systems of equations problems do SWLDs solve correctly during and following the VRA-I intervention? 2. Following the VRA-I intervention, what percentage of systems of equations problems do SWLDs solve correctly without the use of VMs? 3. What perceptions do SWLDs have about the VRA-I intervention?

Method: The study employed a single-subject, multiple probe across participants design. Participants were three midwestern high school SWLDs who identified as Black or multiracial, enrolled in a mathematics course that covers algebra, and had a mathematics IEP goal. The intervention was implemented by a researcher in a separate setting. The VRA-I intervention was five lessons addressing solving systems of equations and followed the CRA-I process (Strickland and Maccini, 2013a) but used VMs. Each lesson used the VRA-I process with explicit instruction, virtual algebra tiles, and a graphic organizer. Each lesson was approximately 45 minutes and video recorded for fidelity checks. The intervention was reviewed for content validity by an expert in the field. The dependent variable was measured by performance assessments (PAs) consisting of six solving systems of linear equations problems (Illustrative Mathematics, 2019). Twelve parallel versions were created and reviewed for content validity by an expert in the field. Generalization of the DV was measured via the PA; however, the students did not have access to VMs. Each item on the PA was scored as correct or incorrect (accuracy percentage calculated). Participants were also given a generalization assessment with three word problems and a six-item Likert scale social validity survey. The study consisted of baseline, intervention, generalization, and maintenance phases.

Results: Results include a visual analysis, a PND, and Tau-U. Descriptive statistics of the survey were calculated. Findings showed that participants were able to increase and maintain their performance and generalize their knowledge to solve without the VMs. Results suggest teachers should use VRA-I algebra interventions to address the algebra achievement gap for SWLDs. Future research directions will be discussed.

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Preventing Summer Learning Loss in an Under-Resourced Community with Engaging ACE Podcasts

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Introduction: The importance of foundational comprehension skills, such as main idea generation, summarization, inferencing, and vocabulary knowledge, is well documented in recent research (Author). Through the Knowledge Acquisition and Transformation (KAT) Framework, students at all grade levels can be taught to learn and use the text structure strategy to effectively generate main ideas, write summaries, and extrapolate inferences. The Advancing Comprehension and Engagement (ACE) Literacy Project was designed to deliver the KAT Framework to families through interactive English and Spanish podcasts and video podcasts to help families support their child(ren)'s literacy development.

Method: In partnership with a national non-profit organization serving under-resourced children, undergraduate tutors repurposed the ACE resources to provide summer reading comprehension intervention to 42 child participants in grades 2 through 5. All participants were eligible for free or reduced-priced lunches. Participants completed a researcher designed pretest assessing main idea competency, signaling word knowledge, and top-level structure quality. Trained undergraduate tutors guided groups of 3-5 students to listen to two ACE podcasts a week for six weeks. Posttests were completed using an equivalent alternate researcher designed form measuring the same constructs. The research question guiding this analysis was: Was there any improvements in elementary student comprehension outcomes (main idea competency, signaling word knowledge, and top-level structure quality) after using the ACE podcasts for six weeks?

Results: Visual analyses were conducted to answer the above research questions. Percentage distribution for each score for main idea and recall measures was displayed through visuals. For signaling words, we used score trend visual analysis to examine the posttest has higher overall performance than pretest. From the figures we will present, we observed posttest measures, including signaling words, most human-scored reading measures, and all computer scored reading measures had higher performance than the pretest measures. Therefore, the intervention was positively associated with the improvement of student reading performance.

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Thursday evening, Session B, Board 13B

Aligning Core and Intervention Instruction for Students with Inattention and Reading Difficulties

Introduction: Students with ADHD who present with inattention also tend to have lower reading outcomes (Pham, 2016). This is particularly problematic when students encounter more complex texts in the upper elementary grades. Many students with inattention spend most of their day in general education settings (e.g., Rowland et al., 2015) but benefit from small-group instruction as a means for increasing time on task (e.g., Hart et al., 2011). In typical interventions, teachers address different content and skills than those provided in core instruction. Siloed tiers make it difficult for students to connect learning and apply skills across settings due to the differences in terminology, pacing, content, and strategies (Baker et al., 2010; Newmann et al., 2001). Emerging research suggests students with reading difficulties benefit from aligned core and intervention instruction to support reading comprehension (Stevens et al., 2020). Aligned instruction may also benefit students with inattention because it provides additional practice opportunities using same terminology and strategies across settings, which may lessen cognitive load for students and free up space for students to engage in deeper understanding of text and content (Byrd-Bredbenner & Eck, 2020; Capin et al., 2023). In this 3-arm study, we were interested in the relative effects of aligned intervention (T1 and T2 teaching the same practices) with BaU and unaligned intervention (typical practice T1 but researcher-provided T2) with BaU on fourth graders' vocabulary, content knowledge, and reading comprehension.

Method: This study reports a secondary analysis using data from a quasi-experimental design study. Using the Conners 3-AI-T, we identified a subset of students who exhibited inattentive behaviors in addition to reading difficulty ($N = 63$). In the aligned T1-T2 condition, core teachers received professional development to implement reading comprehension practices during T1 social studies instruction (i.e., building background knowledge, explicit vocabulary instruction, generating gist statements) twice per week. Students also received researcher-provided, T2 reading intervention three times per week using the same practices implemented in T1. In the nonaligned T1-T2 condition, students received the same T2 reading intervention provided in the aligned T1-T2 condition, but T1 teachers provided typical social studies lessons and did not receive professional development. In the BaU condition, students received typical T1 social studies and T2 intervention provided by the school. We evaluated three dimensions of implementation fidelity for T1 and T2.

Results: We used ANCOVA to examine the differences between the two treatment conditions and the BaU condition, using pretest GMRT Vocabulary scores as the covariate. We conducted an omnibus test and followed up with pairwise comparisons. Students in the aligned condition significantly outperformed BaU for Units 1-3 measures of content knowledge ($ES = 0.85, 1.47, 0.79$, respectively). Students in the aligned condition also significantly outperformed BaU on Units 1 and 2 vocabulary measures ($ES = 0.88$ and 1.05) but there were no significant differences for Unit 3. Last, the aligned condition significantly outperformed BaU ($ES = 0.79$) on the content reading comprehension measure, but there was no significant difference between nonaligned and BaU ($ES = 0.14$).

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Observing Core Instruction and Reading Intervention for Students with IDD and Autism

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Introduction: The purpose of this study is to describe and compare reading instruction within general education and special education classrooms for students with intellectual disability (ID) and/or autism spectrum disorder. This study examined two factors: a) How did observed instruction and intervention for students with ID and/ or ASD vary in general education and special education settings? b) How did observed instruction align with recommendations from research on evidence-based practices for this population?

Method: Observations of 13 students from 11 public elementary schools across four states in the United States were collected by in-person observers using the Instructional Content Emphasis Instrument- Reading (ICE-R, Edmonds & Briggs, 2003) to compare reading instruction by time spent within reading dimensions (e.g. - phonological awareness, phonics and word reading, fluency, comprehension) and instructional groupings (e.g. - whole class, small group) in general and special education settings. Due to the varying amounts of observed instructional time, proportions of instruction across dimensions and settings were calculated to better compare across observations. An additional analysis of the raw observation forms is currently being conducted to account for dimensions of reading that were not eligible (i.e., occurring for less than one minute but accounted for within the timestamped description of instruction) for inclusion in the larger ICE-R coding analysis. The sample of students included within this study come from varied diverse backgrounds. Of the demographic data provided by the school districts, this study includes students that are Black (N=2), American Indian/Alaskan Native (N=2), and Caucasian (N=3), students that qualify for free and reduced lunch (N=4), and a student that receives additional ESL services. This work aims to describe a snapshot of what reading instruction was observed for this population of students across diverse learning environments and serve to support better understanding of what types of instruction this population are exposed to when they have access to inclusive classrooms.

Results: Within the general education classroom setting, reading fluency and spelling were notably absent across all observations. Additionally, there was minimal vocabulary instruction observed for only one student across both general education and special education settings. However, the predominance of phonics and word reading instruction within the observations in both settings potentially indicate the continued shift from traditional sight word reading instruction for this population to more recently developed recommendations of multi-component, phonics-based instruction.

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Narrowing the Achievement Gap: issues in measurement and a proposed solution

Introduction: Over the past decade early childhood programming has gained recognition as an important means of addressing achievement gaps through primary prevention. We define the achievement gap as a discrepancy in academic performance between children who are at-risk evidenced by failing a screening assessment vs. high performers on the same assessment. The effectiveness of early childhood programming at achieving intended compensatory effects and reducing achievement gaps remains under-investigated. Although many authors make claims of casual effects within the early childhood programming literature, these claims have not been well tested. To assess the achievement gap, many intervention studies have used a two-group design, comparing a treatment group and a control group. The two-group design provides evidence of efficacy within a target sample but does not provide evidence of lessening the gap between at-risk children and their more advantaged peers. Another approach used is to compare a target sample to a normative sample (e.g., examining standard scores on a norm-referenced assessment). This method does not control for the potential for internal validity concerns that having a control group provides. To address the closing the achievement gap, research designs must include children in an at-risk target sample who do and do not receive the program, and compare them to their more advantaged peers.

Method: The project has two aims. First, to compare the results from the commonly used methods to address the achievement gap that compare only one or two groups. Second, to demonstrate our proposed analytic approach described in the next section. We will do this using the Nemours! Bright Start (NBS) intervention data as an illustrative example. Participants included 636 children aged 3 to 5 across 98 preschool classrooms. Students in each classroom underwent screening for reading difficulties, with the lowest four performing students being identified as at-risk.

Results: We propose a three-step process to determine whether an intervention has closed an achievement gap. Assume that the target (at risk) sample is established by meeting risk criteria on a screening assessment. To establish that the gap has closed, we must (1) Demonstrate that there is a difference between the treatment and control group at post-test. (2) Establish that a gap exists at post-test between children in the target (at-risk) sample control group and their non-at-risk peers. (3) If the gap has closed, we would assume that a gap should not exist between the target treatment group and their peers. Therefore in step 3, we test whether target students who received the intervention are equivalent to the non-at-risk students using an equivalence test rather than a standard null hypothesis test. Finally, (4) we propose to test whether the differences between children in the target sample (at risk) and their more advantaged peers are different than the difference between children in the target sample who did not receive the intervention and their more advantaged peers (interaction of risk status and program receipt).

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Context Matters: Triangulating Parent, Teacher, and Examiner Ratings to Predict Kindergarten Outcomes

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Introduction: Researchers routinely use ratings from different informants (e.g., parents, teachers, youth) to assess youth social skills and problem behavior across contexts (i.e., home and school). Research reveals that informants consistently disagree in their ratings. Yet, no evidence-based guidelines exist for integrating these data. To address this gap, we employ the CONTEXT validation paradigm (De Los Reyes et al., 2023). First, we identify profiles of young children's social skills and problem behavior according to parent and teacher ratings and examine their longitudinal links with examiner ratings; next, we determine whether a CONTEXT-informed approach to integrating multi-informant ratings optimizes use of ratings at age 4 to predict outcomes at kindergarten.

Method: Participants include 972 pre-kindergarten children from 63 classes within 13 childcare sites serving youth ages 3-5 in the northeastern United States from the Kidsteps II project (40% Hispanic/Latino; 40% White; 26% African American, with youth in more than one category). Over half of children (55.2%) attended Head Start classes and 44.8% were from community childcare settings. Data were collected in the fall (n = 972) and spring (n = 836) of each child's preschool year, with follow up data collected in kindergarten (n = 342). We will use parent and teacher ratings of youth social skills (e.g., cooperation, emotion regulation) and problem behavior (e.g., externalizing, hyperactivity) on the Social Skills Improvement System (SSIS) to create youth profiles. We will use independent examiner ratings on the Preschool Self-Regulation Assessment (PSRA), a structured clinical observation tool, to create a second set of youth profiles. Kindergarten outcomes include special education referral, promotion to first grade, teacher ratings on the SSIS, and examiner ratings on the Early Screening Inventory. We will use latent class analysis (LCA) to identify profiles of young children from parent and teacher ratings on the SSIS at age 4, reflecting patterns of youth social skills and problem behavior in the home and school context. We will identify separate profiles of young children from examiner ratings using domains common to the SSIS. We will then examine covariation in the two sets of profiles over time (from fall to spring assessments). Next, we will use a CONTEXT-informed method to create an integrative score that takes into account points at which parents, teachers, and examiners agree in their ratings but also when they disagree for valid reasons (e.g., differences in the contexts of observation). Finally, a series of hierarchical linear regression models will test whether this integrative score optimizes prediction over individual and composite scores to predict kindergarten outcomes.

Results: We expect the two sets of profiles (parent and teacher; examiner) to covary over time, reflecting higher agreement between teachers and examiners for social skills and problem behavior compared to parents. We expect to generate valid integrated scores for social skills/problem behavior that account for context-based differences among parents, teachers, and examiners. We expect these scores will predict kindergarten outcomes over and above individual informant ratings and composite ratings. We will conduct these analyses well in advance of PCRC 2024.

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Friday morning, Board 14

Updated and Recalculated Grapheme-Phoneme Probabilities in American English

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Introduction: Lesson-to-text matching is a commonly used method in practice to determine the decodability of text. While this controls for text readability in terms of decoding difficulty for beginning readers, it is not based on quantifiable metrics of each word's decoding difficulty. For these reasons, there are benefits to creating a measure that can quantifiably capture decoding difficulty. Prior research has shown that, not surprisingly, vowel and consonant conditional probabilities, which is the probability that a grapheme will make a specific phoneme sound, predicts whether a child will accurately decode a word beyond word frequency (Saha et al., 2020). However, the probabilities used in this prior research were sourced from a paper from Berndt et al. (1987), which is limited in that it has a relatively small word corpus. Importantly, it also may not capture the potential vowel shifts in speech within the United States that may have occurred in the last three decades. The goal of the current work was to create an updated list of consonant and vowel conditional probabilities using a larger corpus of words with more modern phonetic speech patterns, as well as began exploring whether this updated metric can better predict the probability of accurately decoding words of varying difficulty.

Method: 92,838 words were parsed into 555,255 grapheme-phoneme pairs. Parsed phonemes were sourced from the Carnegie Mellon's Pronunciation Dictionary (CMU; <http://www.speech.cs.cmu.edu/cgi-bin/cmudict/>) and words were split into graphemes that matched these phonetic parses. For each grapheme, conditional probabilities were calculated for each associated phoneme and then were compared to those in Berndt et al. (1987).

Results: Conditional probabilities were computed for the 25,000, 50,000, 75,000 most frequent words. Comparisons were made by comparing the current conditional probabilities to those in Berndt et al. (1987) for each grapheme-phoneme pair, thus providing a more comprehensive representation of grapheme-phoneme correspondences in American English. Conditional probabilities were different for many grapheme-phoneme pairs (e.g., average difference for vowels: 0.084, average difference for consonants: 0.046). Future research is necessary to determine if these newly calculated probabilities may be better able to be integrated in with other measures to capture the decoding difficulty of texts. Ongoing research is examining whether these conditional probabilities, as well as other novel ways of capturing decoding difficulty, can predict decoding difficulty of texts beyond other common word-level metrics such as word frequency, word length, etc.

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Thursday evening, Session B, Board 24B

Differential Early literacy instructions with interactive e-Storybooks on a Smartboard

Introduction: The study examines the possibility to enhance early literacy skills in a classroom-focused intervention using different forms of e-books on a SMART board in combination with shared reading, print referencing and the '4-Cycle-model' for word development. The study tests the hypothesis that children can be trained simultaneously in new word learning and phonological skills or print knowledge without a loss of impact on the development of either skill and aims to develop an effective tool, e-Prent&ABC, to facilitate the workload of teachers in tailor-made education. It is also hypothesized that additional vocabulary instruction with interactive e-books presented on Tablets, enhances the knowledge of children who generally fall behind in a classroom learning environment.

Method: A pretest-posttest within subject design is used testing different reading conditions. Four different storybooks in four different formats (1) simple e-book with life interactive reading, 2) animated e-book, 3) simple e-book including print referencing, 4) interactive animated e-book, are read aloud by a teacher, or are presented with a voice over on a SMART board or a Tablet to 5 years old children (N=80). Data are analyzed using Repeated-measures ANOVA.

Results: Vocabulary and phonological knowledge or print knowledge simultaneously increase significantly after the classroom intervention using e-Prent&ABC compared to the control conditions with large effect sizes. e-Prent&ABC is especially beneficial to children normally lacking behind in classrooms and it is expected that differential vocabulary instructions with interactive e-storybooks will increase their vocabulary to equilibrium level of their peer group.

Conclusions. E-storybooks in different forms are highly beneficial to enhance all early literacy skills essential in learning to read and their use highlight the importance to successfully differentiate early literacy instructions in kindergarten.

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Best Practices for Caregiver Training in Interventions: A Gap in Research Reporting

Introduction: Evidence suggests caregiver involvement in children's learning may positively influence educational outcomes (Averill et al., 2016). Caregivers enrich children's academic achievement within the home through play, household activities, homework help, and conversation (Izci et al., 2022; Map, 2003). Home learning environments are important for academic growth in mathematics and literacy (Niklas & Schneider, 2017; Tamis-LeMonda et al., 2019). There is promise in utilizing the home math environment (HME) to improve early mathematics outcomes. Recent evidence suggests that the HME is a predictor of children's future mathematical skills (Daucourt et al., 2021; Hart et al., 2016; Zippert & Rittle-Johnson, 2018). To promote children's mathematics achievement, recent work has explored the implementation of mathematics interventions with caregivers as facilitators, often in informal learning environments (i.e., the home; Berkowitz et al., 2015; Dulay et al., 2019; Purpura et al., 2021; Schenke et al., 2020). This work has produced overall positive results (Nelson et al., 2023). Despite the impact of these interventions, there is much work to do within the context of utilizing caregivers as interventionists. A recent meta-analysis of mathematics interventions conducted in informal learning environments revealed interventions with caregiver training and follow-up support may have greater impacts on child learning (Nelson et al., 2023). Yet, the literature does not always fully report caregiver training components. In an effort to improve the reporting of researcher engagement with families and overall caregiver training, we developed a coding protocol examining different quality aspects of caregiver training, specifically the training of caregivers involved in early childhood mathematics interventions.

Method: The coding protocol was developed while considering the training of caregivers facilitating interventions. The protocol draws from the Division for Early Childhood (2014; DEC) Recommended Practices (RPs) which were created to close the research-to-practice gap and examines areas like family partnerships, materials, and the training environment. An online database search resulted in over 5,000 articles, and we are halfway through the screening process. Screening will be completed by the end of October. Included studies must have (a) investigated mathematics intervention effects, (b) included a caregiver as a facilitator (e.g., parent, grandparent, aunt/uncle), (c) had participants in early childhood (i.e., birth to approximately nine years old), (d) administered at least one measurement of students' mathematics achievement, (e) employed an experimental, quasi-group, single-case, qualitative, or mixed method design, and (f) have published the results in English. From there, two researchers will utilize the coding protocol and subsequently rectify all discrepancies. All articles will be coded by the end of November.

Results: In this poster, we will report on the quality of evidence-based training content, family partnerships, delivery, environment, cultural competence, materials, and fidelity. Each quality indicator has variable scoring (i.e., 0, 1, and 2) and each study will receive a total score out of 34. The coding protocol will be shared as an open-access material for other researchers to utilize. With this poster, we will discuss implications for researchers creating training, how researchers are reporting their engagement with families, and recommendations for caregiver training considerations.

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Fraction Practicum: Exploring Feasibility and Potential for Preservice Teachers and Middle Schoolers

Introduction: Fraction knowledge is a key gatekeeper for other forms of mathematical knowledge (Booth, Newton, & Twiss-Garrity, 2014). Yet, many U.S. students demonstrate large gaps in the fraction domain (NAEP, 2019). U.S. teachers (including special educators) demonstrate similar gaps in fraction knowledge and skill and are therefore poorly equipped to support their students (Newton, 2008). Research suggests that delivering evidence-based fraction intervention may improve the knowledge of interventionists and students alike (Fuchs & Malone 2021). This study explored whether structuring a special education field experience around the delivery of an evidence-based fraction intervention (Super Solvers; Fuchs, et al., 2020) would improve the fraction knowledge of pre-service special educators. A secondary set of research questions considered the extent to which the field experience might have simultaneous positive outcomes for middle school students experiencing math difficulty.

Method: Fifteen special education teacher candidates (TCs) participated in this study. TCs were seniors pursuing dual certification in elementary general education and K-12 special education. At the beginning of the semester, TC's were given a fraction pre-test. The mean percentage correct was 65% on questions measuring conceptual fraction knowledge, and 68% for fraction computation skill at pre. No Teacher candidate answered all questions correctly on the pre-test, and several demonstrated very limited knowledge of fractions. Each TC was assigned a group of students to work with during the practicum. Selected 6th-8th grade students (n=41) were enrolled in two public middle schools and nominated by their schools' intervention coordinators. Students were then given a fraction pretest to confirm the need for intervention. The mean pretest scores were 23% and 14% respectively on the fraction concepts and fraction computation measures. TC's met with their assigned group twice a week for 50 minutes and delivered the Super Solvers Intervention following standard procedures. There was a range of lesson completion due to student/TC absences, school events, snow days, and pace of lesson delivery. Middle school students received 14-21 lessons out of the possible 39 included in the Super Solvers program. Fidelity was generally above 90% for all TC's. Fraction knowledge and computation skill was measured for both TC's and middle school students at pre and post using program-embedded measures. Descriptive statistics and paired t-tests were used to analyze results. To contextualize findings, the fraction measures were also administered to other pre-service teachers who were seniors not pursuing special education certification and to all 6th and 7th-grade students at the two middle schools where the participating middle school students were enrolled.

Results: Results indicated that TCs and middle school students demonstrated statistically significant growth on both fraction measures. Delivering a scripted fraction intervention may have allowed TCs to focus on their behavior management, pacing, motivation strategies, and underlying math knowledge while practicing evidence-based best practices for math intervention. Middle school students demonstrated growth, but not mastery of the fraction concepts. Gaps in fraction knowledge appear to be widespread suggesting, at least preliminarily, that field experiences of this nature could be beneficial. Limitations, implications for future research, and other findings will be shared.

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Recommendations for Future NCSER Direction from Researchers

Introduction: In 2022, the National Academies published The Future of Education Research at IES: Advancing Equity-Oriented Science. This report details recommendations for future areas of special education research that NCSER should focus on. The five themes of research were (1) equity in education, (2) the changing use of technology, (3) the use and usefulness of education research, (4) heterogeneity in education, and (5) implementation and systems change research. At the 2023 convening of the Pacific Coast Research Conference, participants were surveyed during the closing sessions regarding their opinions on the report and asked for their recommendations for NCSER. Participants responded verbally and virtually (through a live Mentimeter). The results of those recommendations are synthesized and discussed.

Method: Data was collected during the live closing session of PCRC 2023. Participants were surveyed by convenience sample. The closing session included approximately 100 researchers in an open forum format. There were two sources of data for this study. (1) In person participants verbally expressed their comments and concerns. Responses were transcribed live during the session by the first author. (2) A QR code linked participants to an open source Mentimeter to provide their thoughts to the prompt "Share your ideas for IES funded research! #FutureOfNCSER." The Mentimeter was left open for an additional week after the conclusion of the live closing session. A total of 32 online participants submitted 8 questions and 69 comments through the live Mentimeter. All responses were collected, analyzed, and synthesized into substantive recommendations for future research topics and logistical recommendations for changes to NCSER.

Results: Substantive themes included (1) assessment and measurement (e.g. reliable measures for secondary students, norming measures on populations of interest), (2) knowledge dissemination (e.g. implementation science research), (3) demographics and diversity (e.g. increasing research on secondary populations, increasing research on students from culturally and linguistically diverse backgrounds), (4) teachers and teaching (e.g. recruitment and retention), and (5) research methods (e.g. increasing observational studies). Logistical themes included (1) early career grants (e.g. extending early career to provide equitable opportunities for parental leave), (2) timelines (e.g. shortening RFA process), (3) reviewers (e.g. equal distribution of funds), (4) partnerships (e.g. IES participation in community partnerships), and (5) cost analysis (e.g. increasing support). Similarities between the National Academies publication and participant feedback are compared.

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Using concept maps to understand teacher candidate identity development: A descriptive study

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Introduction: Special education teachers are leaving the field in record numbers (Billingsley & Bettini, 2019). When a special educator leaves, the impact is felt at all levels. The cost to each level is enormous, particularly the student level because teachers have great impact on student achievement (Rand Corporation, n.d.). Researchers and school leadership have been working to determine factors of teacher attrition. One factor of interest is professional identity which, in education, has been associated with multiple choices teachers make (Beijaard et al., 2004; Hsieh, 2016; Mockler, 2011). A positive professional identity, one in which a teacher feels efficacious and has a sense of agency, has been shown to increase an individual's ability to handle challenges and remain in the field (e.g., Chong, 2011; Sabanciogullari & Dogan, 2015; Scheepers & Ellemers, 2019). Understanding how positive professional identities develop is critical to teacher retention.

Method: The purpose of this study was to examine how pre-service special education teachers articulated their teaching identities across three points of their preparation program. Research questions were: 1. How do teacher candidates articulate their professional identity as special educators at the beginning, middle, and end points of their preparation program? 2. How do individual professional identities develop? Seven undergraduate pre-service teacher candidates participated in the study across all three data collection points. Six were female; one was male. All candidates were transfers into the university from a local community college. Five participants were enrolled in the adapted licensure program; two in the general curriculum licensure program. There were three data sources for this study: (a) concept maps, (b) core course syllabi learning objectives, and (c) focus groups. Concept maps are external representations of internal learning and meaning-making (Novak, 2010). They include nodes or concepts, links between concepts, and linking phrases to indicate how concepts are related. Participants created and submitted concept maps at the beginning, middle, and end of their program. Concept maps were coded for number of concepts, levels, and inclusion of linking phrases. They were also coded for categories of concepts, including beliefs, professional knowledge, personal characteristics, role, and contextual factors. Analysis included development of categories across time by group and individual. Core course syllabi learning objectives were collected and coded for level of learning. Focus groups occurred at the final meeting of the internship seminar. Focus group transcripts and documents were coded for themes.

Results: Concept map results indicated that, as a group, teacher candidates' beliefs shifted from being "saviours" for their students to a range of personal dispositions, classroom expectations, and how to advocate for students. Their professional knowledge was consolidated and coalesced around behavior management, instructional strategies, and data collection. Their knowledge of contextual factors grew from just mentioning other professionals to identifying diverse populations, school-based personnel, and interactions with families. In focus groups, candidates stated they came to teaching because of experience with special education or as a family member of someone with a disability. There was a direct connection between course learning objectives and concepts in maps at all points.

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Friday morning, Board 15

The predictive power of a universal early literacy screener on grade 6 outcomes

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Introduction: While the correlation between early literacy skill assessments and children's later academic achievement has been established in the literature (Herring et al., 2022; Justice et al., 2019), these studies look at the correlation between early literacy screener and third grade outcomes. The purpose of this study is to examine the predictive power of a universal early literacy screener on grade 6 broad reading comprehension outcomes for all students as well as sub-groups. Specifically, the study asks: To what extent do fluency, word reading, and encoding predict reading comprehension at the end of Grade 6? Does the predictive power differ across the subgroup of students with a specific learning disability designation? Do Grade 3 reading comprehension outcomes mediate the association between early literacy skills and Grade 6 comprehension skills?

Method: This study utilizes data from a state-wide database and includes all students in public schools who were administered the universal early literacy screener in grade 1 or who were administered the grade 3 or grade 6 state-wide reading assessment. The data is multi-year and follows a cohort of students from grade 1 to grade 6. A multi-group structural equation modeling approach will be utilized to analyze data. Before comparing models across cohorts or across student groups, the best-fit model for our overall sample using end of year data from first grade assessments in word reading, encoding, and fluency (to include rate, accuracy, and prosody) will be determined. To address the predictive power across subgroups, multi-groups SEMs will be employed. That is, models will be fit to each subgroup simultaneously to compare the relations in the models across subgroups.

Results: We hypothesize that, overall, the Grade 3 broad reading comprehension measure will mediate the relationship between fluency and word reading and the Grade 6 broad reading comprehension measure, while encoding will make an independent contribution to comprehension in Grade 6.

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Herring, W.A., Bassok, D., McGinty, A.S., Miller, L.C., & Wyckoff, J.H. (2022). Racial and socioeconomic disparities in the relationship between children's early literacy skills and third-grade outcomes: Lessons from a kindergarten readiness assessment. *Educational Researcher*, 51(7), 441-450. <https://doi.org/10.3102/0013189X221091535> Justice, L., Koury, A., & Logan, J. (2019) Ohio's kindergarten readiness assessment: Does it forecast third-grade reading success? Crane Center for Early Childhood Research and Policy (CCEC). https://www.ohioschoolboards.org/sites/default/files/OSU-Kindergarten-Readiness-Whitepaper_051619_SINGLES_WEB.pdf

Presenter(s): Xueye Yan, The University of Texas at Austin (yanxueye@utexas.edu)

Thursday evening, Session B, Board 8B

Reading Instructions in the Special Education Classrooms: Secondary Data Analysis

Introduction: Although evidence suggests that intensive reading interventions of different groupings, higher frequency, and longer duration effectively enhance the reading achievement of students with learning difficulties (LD), limited numbers of studies examine how reading interventions are delivered in real-world special education classrooms and how these instructions relate to student reading performance at later stages. Further, exploring factors underlying these practical differences in special education classrooms further helps bridge the research-to-practice gap between researchers and educators, and ultimately improve student academic performance with the most appropriate and cost-effective approaches. The study aims to explore the reading instruction used in special education classrooms, which factors predict students' instruction grouping, and whether different types of grouping contribute to the reading outcome of students with LD with a national dataset at the student level. My research questions are: 1. What is the frequency of different instruction and activity grouping styles for students with LD in special education classrooms? 2.

How do student characteristics (e.g., race, family income, parent education, and previous reading performance) and teacher characteristics (e.g., teaching experience, teacher preparation) relate to their assignments to groupings of language arts instruction and activities as well as student reading performance.

Method: I used the dataset of the Special Education Elementary Longitudinal Study (SEELS) that documented the school experience of a national sample of students with disabilities from the year 2000 to 2006. The Wave 1 and Wave 2 merged dataset was used in the analysis. This analysis of the 2000-2004 dataset will serve as a pilot study for a future study with ECLS-K:2011 dataset. The sample of students with LD was 1594 and a complete case analysis was used. The average age of students who were included in the analysis was 10.99 with 68.42% males and 31.58% females. Over half of the students were white (63.24%), 17.74% were African American, 15.25% were Hispanic and 3.78% were from other race/ethnicity groups. The analysis did not focus on the other race/ethnicity groups given the small sample size. Among special education teachers who worked with these students, 594 were white (85.22%), 41 were African American (5.88%), 37 were Hispanic (5.31%) and 25 were from other race/ethnicity groups (3.59%). About 72% of the teachers held general education credentials and 15% held special education credentials. The average years of teaching was 12.47 years. To answer my research questions, descriptive statistics, linear regression, and multinomial regression were used.

Results: The descriptive statistics showed that most students received language arts instruction and participated in activities of more than one grouping type. Student race/ethnicity group, previous reading performance, and teaching experience significantly predicted students' instruction grouping styles.

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Thursday evening, Session B, Board 26B

The Differential Effects of a Reading Intervention With Anxiety Management Instruction for Students With and Without Disabilities

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Introduction: High levels of anxiety negatively affect the academic performance of students, and anxiety and academic performance form a bidirectional relationship (Eum & Rice, 2011; Grills-Tauchel et al., 2012). In addition, students with disabilities often experience higher anxiety symptoms than their peers without disabilities (Nelson & Harwood, 2011). Prior reviews reported promising effects of anxiety interventions on anxiety levels and academic outcomes (Bicer et al., 2020; von der Embse et al., 2013), and these findings imply the need for integrating academic and anxiety interventions for students with learning difficulties.

Method: This study presented the extended results from the prior efficacy study (Author, 2022) by including the cohorts and examining the moderation effects of students' special education status on reading outcomes. The efficacy study was conducted with (a) 1-year small-group multi-component reading intervention with anxiety management instruction group (RANX), (b) 1-year small-group multi-component reading intervention with math facts instruction group (RMATH), and (c) business as usual (BaU) comparison group. This study aimed to examine the following research question: To what extent do the effects of RANX and RMATH vary between students with and without disabilities on reading outcomes? A total of 542 third- to fifth-grade students with (n = 133) and without (n = 409) disabilities across three cohorts were randomly assigned to the RANX (n = 183), RMATH, (n = 180) and BaU (n = 179) condition. Reading outcomes were assessed by Gates MacGinitie Reading Test-4 (GMRT), Test of Word Reading Efficiency (TOWRE), Test of Silent Reading Efficiency and Comprehension (TOSREC), Test of Silent Contextual Reading Fluency (TOSCRF), and proximal reading comprehension measure.

Results: On GMRT, TOWRE, TOSREC, and TOSCRF, treatment effects did not significantly differ for students with and without disabilities. On the other hand, there were differential treatment effects of RANX on proximal reading comprehension measure relative to BaU ($\beta = -3.99$, $SE = 1.70$, $p = 0.02$) and RMATH ($\beta = -3.95$, $SE = 1.79$, $p = 0.03$). The effects of RANX relative to BaU and RMATH were positive for students without disabilities ($ES = 0.68$ and $ES = 0.23$, respectively) but not for students with disabilities ($ES = -0.15$ and $ES = -0.54$, respectively). That is, the effect of integrating reading intervention and anxiety management instruction was greater for students without disabilities on the proximal reading comprehension measure. The findings will be discussed in relation to the promising impact of integrating reading and anxiety interventions for students with reading difficulties, as well as the limitations of the sample size and dosage of the intervention.

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Presenter(s): Matthew C. Zajic, Teachers College, Columbia University (mcz2114@tc.columbia.edu)

Friday morning, Board 16

Characterizing Reading-Writing Educational Goals Among Autistic School-Age Children Using Latent Class Analysis

Additional authors: Nancy S. McIntyre, University of Central Florida

Introduction: Most autistic children receive special education services through an Individualized Education Program (IEP). Existing approaches have focused predominantly on services and goals aligned with core diagnostic areas associated with autism (e.g., social skills and behavior). In contrast, there has been less attention to literacy skills, even though autistic children demonstrate heterogeneous literacy needs across the school-age years. Furthermore, literacy is often conceptualized as reading or writing, with studies focused on either area (but usually not both). This study uses latent class analysis to simultaneously characterize the reading and writing IEP goals of autistic school-age children.

Method: Data come from a study of families from across the United States (n=811) who have a school-age child verified to be on the autism spectrum. Our analytical sample included 349 children who had reading and writing IEP goals during the 2019-2020 school year. (We excluded 32 and 61 children who had reading or writing goals only, respectively.) Our sample is predominantly male (79%), White (80%), and in elementary (66%) and secondary settings (34%). A small proportion had a co-occurring cognitive disability (24%), and about half had a co-occurring attention difficulty (56%). Parents or caregivers reported if their child had at least one IEP goal in reading (word reading, fluency, vocabulary, reading comprehension) and writing (handwriting, spelling, grammar, punctuation, and sentence- and paragraph-level text construction). We used the MplusAutomation package in RStudio and Mplus 8.10 for all analyses. We followed best practices for latent class analysis by conducting class enumeration until model estimation failed and selecting a final model based off conceptual interpretation and statistical justification (model fit, response patterns, and classification diagnostics).

Results: Model estimation failed at the 10-class solution. The 4-class model demonstrated the strongest statistical support for model fit (based on the Bayesian information criterion and the approximate correct model probability). Response pattern and classification diagnostics showed that the model fit the data well. (Additional details will be presented.) The 4-class solution presented the following four classes (with indicator probabilities listed in parentheses). Broad Literacy Needs (33.16%) was characterized by an overall high endorsement likelihood for all reading (.66-.91) and writing goals (.80-.96). Reading & Handwriting (18.98%) was characterized by overall high endorsement likelihood for all reading (probabilities = .68-.95) with the addition of handwriting (.80). All other writing goals were low (< .30) except for spelling around chance likelihood (.52). Reading Comprehension & Text Construction (26.35%) was characterized by an overall high endorsement likelihood for reading comprehension (.90) and text construction at the sentence (.66) and paragraph (.74) levels. All other goals were low (< .30) except for reading fluency (.45) and handwriting (.37). Handwriting (21.50%) was characterized by elevated endorsement likelihood for handwriting (.63) and low endorsement for other skill areas (< .30). Findings highlight that many autistic children demonstrate overlapping reading and writing educational goals. The extent of this overlap, however, appears to depend on latent class membership. Continued comprehensive descriptive and intervention research is needed to characterize and support the literacy needs of autistic children.

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Thursday evening, Session A, Board 8A

Translanguaging Across Generations: Empowering Immigrant Families through Arabic Peer-Assisted Learning Strategies

Introduction: Immigrants encounter challenges establishing a strong foundation in their first language due to complex intersectional identities which are compounded by limited availability of resources tailored to their linguistic needs. In the context of the growing Arab immigrant population, it's imperative to comprehend linguistic practices and promote a diverse range of literate identities. In this study we delve into the impact of PALS on the growth of letter sound fluency, the fidelity of implementation, and the various barriers and supports encountered along the way. Learning Modern Standard Arabic, holds profound significance for acquiring cultural capital, fulfilling religious and cultural obligations (Husseinali, 2006), and preserving a strong cultural identity (Bourdieu, 1977; Yosso, 2005). However, Arabic presents challenges due to the coexistence of diglossic variations. Within the familial environments of these immigrant households, translanguaging practices, characterized by the simultaneous use of diglossic linguistics, are observed (Lewis et al., 2012; Li, 2011). Consequently, this study capitalizes on the existing world knowledge of caregivers and children while building linguistic assets through Arabic-PALS, enriched by translanguaging. It addresses some of the identified issues outlined by Al Ghanem & Kearns (2014) that make the process of learning to read in Arabic challenging, which include the complexities associated with root words and morphology. Initially, PALS was designed in English as a whole-class paired reading program to support reading development (Fuchs et al., 2000), which was extended to French, Spanish, Taiwanese, Icelandic, and now, Arabic (Vardy et al., 2022). According to literature, the early years of a child's education play a crucial role in establishing a strong literacy foundation (Torgesen, 2004). However, for immigrant children, this process is complicated by their interrelated social and intersectional identities (Cho et al., 2013). They may have a harder time in attaining strong foundations in literacy (Ndemanu & Jordan, 2018), in their native language or second language. This study extends PALS, to promote literacy skills in Arabic. By employing Arabic-PALS, we not only leveraged caregivers' and children's existing world knowledge but also facilitated the development of linguistic assets, ultimately addressing challenges faced by immigrant families.

Method: Employing an ABAB single-case design (Connell & Thompson, 1986), the study assesses Arabic-PALS effects on immigrant children's letter sound knowledge. Repeated measurements over 13 weeks yield 17 data points per participant, meeting minimum requirements (Ledford et al., 2022). Feasibility forms based on Bowen et al.'s framework evaluate acceptability, demand, implementation, and practicality. Surveys and audio recordings capture satisfaction and dosage in Arabic and English. Fidelity is assessed through intervention adherence and translanguaging activities. Student-level measures include letter sound fluency probes. Social validity ratings and caregiver feedback are collected digitally, ensuring their perspectives are considered. Collaboration with experts ensures evaluation validity and rigor.

Results: Triangulation of findings in this ABAB study revealed the added-value of capturing translanguaging practices that manifest naturalistically in bi/multilingual home. The insights gained from the study paved the way for the development of highly effective instructional strategies and literacy practices that embrace an asset-based approach to support the diasporic Arab community. The implications of the research shed light on a relatively unexplored domain of translanguaging practices, particularly as they take place within the home setting as caregivers began to teach their children to read in Arabic. As a pilot study, this research served as a platform for further investigation into the impact of Arabic PALS on early reading skills, and it demonstrated the potential to scale up to encompass a larger population of Arab immigrant families. Possible directions for future research are further unpacked.

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Friday morning, Board 17

Relative Importance of Predictors in Preschool Children's Transcription and Composing

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Introduction: Early writing has been conceptualized to comprise transcription (i.e., handwriting and spelling) and composing skills (Kim, 2004; Kaderavek et al., 2009). Even for young children, handwriting considers the mechanics of writing including forming letters. Spelling reflects how children produce letter-sound connections to form words. Composing includes skills for generating ideas, selecting words, and making connections between oral and written language. Despite its importance for later literacy skills (Kim et al., 2015; National Early Literacy Panel, 2008), little is known about what factors contribute to very young children's writing, especially for composing. The current study examined the relative importance of theoretically relevant predictors of children's transcription and composing.

Method: Children (N=496), ranging from 36 to 62 months, were recruited from 54 Head Start classrooms in a Southern and a Midwestern state in the US. Trained research assistants assessed children individually using a series of writing tasks, including name writing, letter writing, word writing, and story writing, which were coded for transcription and composing skills. Two composite scores representing transcription and composing were obtained from structural equation modeling analyses (CFI = .88; SRMR = .16; RMSEA = .13). In addition, children were assessed for letter knowledge and letter-sound knowledge (Quick Letter Name/Sound knowledge task), understanding of print concepts (Preschool Word and Print Knowledge, PWPA) and phonological awareness (Test of Preschool Early Literacy, TOPEL). The Narrative Assessment Protocol (NAP) was used to measure children's oral language skills. In addition to language and literacy skills, children were assessed for fine motor skills (Early Screening Inventory-Revised, ESI-R) and behavioral self-regulation skills (Head-Toes-Knees-Shoulders, HTKS). The dominance analyses were performed in R software (Azen & Budescu, 2003).

Results: Two dominance analysis models were performed for children's transcription and composing, respectively. Seven factors were included in the first model for transcription: letter knowledge, letter-sound knowledge, print knowledge, phonological awareness, narrative skills, fine motor skills, and self-regulation. The second model predicting children's composing added transcription as another factor. The overall R-square for the seven factors predicting transcription was .500, and that for eight factors predicting composing was .261. Three factors were the most important for transcription: letter knowledge, letter-sound knowledge, and fine motor skills, accounting for .155, .141, and .074 of the R-square. The top three factors for explaining composing were print knowledge, phonological awareness, and narrative skills, which accounted for .074, .048, .046 of the R-square. The results indicated that various factors contribute to early writing, and skills contribute differentially to each component of writing. It is clear that for successful writing, children need a range of skills and thus, need support for that range of skills.

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Thursday evening, Session B, Board 9B

A Meta-Analysis of Morphological Ability and Reading in Middle School Students

Additional authors: Bob McMurray, University of Iowa

Introduction: Many middle school students have difficulties with reading comprehension and foundational reading skills (e.g., decoding, fluency) that hinder their academic success (Cirino et al., 2013). We conducted this study to better understand the relations between these reading skills and morphological ability in middle school students.

Morphological ability is multidimensional in nature and involves different types of information (e.g., semantics, syntax) and relatively explicit and implicit processes. These dimensions are captured by three constructs: morphological awareness, analysis, and processing (Goodwin et al., 2017, 2020). The purpose of this study was twofold: (1) to describe the characteristics of studies of morphological ability and the reading abilities of middle school students and (2) to determine the relations between morphological ability (awareness, analysis, processing) and reading.

Method: We conducted a systematic review of the literature on morphological ability and reading in middle school students (grades 6-8). In addition, we ran a series of random-effects meta-analytic models to examine the relations between morphological ability and reading skills. We used a random-effects model because we assumed that observed heterogeneity would be due to both within and between study variance (Borenstein et al., 2009). Because our effect size metric was the correlation coefficient, the raw correlations were transformed into Fisher's Z prior to analyses but were transformed back into the correlation metric after the analysis consistent with best practice (Silver & Dunlap, 1987). For the analyses, we meta-analyzed all possible combinations of morphological ability and reading outcomes separately. However, some combinations were impossible because no studies yielded correlations between those specific skills (e.g., morphological awareness and word reading fluency). We also conducted several meta-regression analyses examining whether grade level was associated with effect size magnitude.

Results: Included were 13 studies that yielded 75 correlations between three types of morphological ability (analysis, processing, awareness) and reading outcomes (decoding, text reading fluency, word reading fluency, and comprehension). Within the three types of morphological ability, morphological awareness was the most common ($k = 66$), with morphological analysis and morphological processing yielding five and four effect sizes, respectively. Within reading outcomes, the most common skill represented in the studies were comprehension ($k = 31$) and decoding ($k = 24$), with word reading and text reading fluency yielding 16 and four effect sizes, respectively. Across most meta-analytic models, we observed positive and statistically significant average weighted correlations that spanned from moderate ($r = .36$; morphological analysis and decoding) to large ($r = .65$; morphological awareness and text reading fluency). Within these results, heterogeneity indices were large (e.g., $\tau^2 = 0.03$ and $I^2 = 93.12\%$), indicating that observed heterogeneity was due to, in part, between-study differences. However, some results should be interpreted with caution given that they are based upon analyses with very low degrees of freedom. In addition, we observed a single negative correlation between morphological processing and decoding ($r = -.01$), but that value was based upon two degrees of freedom. The results of the meta-regressions indicated that grade level was not a significant moderator of correlation.

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