Predictors of Word Problem-Solving for Kindergarten Students At-risk for Math Difficulties

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Rationale and Aims: Math knowledge at school entry is one of the strongest predictors of academic achievement (Claessens et al., 2009) and low math knowledge at kindergarten entry and exit is associated with high rates of math disability by 5th grade (Morgan et al., 2009). Most studies of risk for math disabilities in very young children (e.g., pre-kindergarten and kindergarten) investigate number sense or numbers and operations as outcomes. However, beginning in the elementary grades, math word problems are prevalent on high stakes math testing (Driver & Powell, 2017). Given the importance of math word problem solving, little is known about early math word problem solving and what predicts it. Using data from a pre-kindergarten intervention study for children entering pre-k with very low math knowledge (Barnes et al., 2016) who were followed into kindergarten, we examined academic and cognitive predictors at pre-K of word problem solving in kindergarten.
Method: 501 kindergarten students who started pre-k with low math knowledge were included in analyses. Because intervention effects were not found at kindergarten for two broad math outcomes, data were combined across conditions for this analysis. Cognitive and math predictors measured at the beginning of pre-k included: nonverbal IQ (matrices subtest of the Kaufman Brief Intelligence Test, Second Edition), sustained attention (congruent trials from the Child-ANT), inhibition (incongruent trials from the Child-ANT), visual-spatial working memory (LeFevre et al., 2010), phonological awareness (TOPEL or SPELA), and the Test of Early Mathematics Ability-3 (TEMA-3). After controlling for age, regression models with word problem solving measured in kindergarten as the outcome were analyzed to determine significant predictors.
Results: Preliminary findings revealed a significant effect of the predictors on word problem solving, $F(7,493) = 8.310$, $p < 0.001$, with 10.6% of the variance in word problem solving explained by these predictors. Sustained attention (Beta = 2.018, Std. error = 0.537, $p < 0.001$) and TEMA-3 raw scores (Beta = 0.105, Std. error = 0.033, $p = 0.002$) were the only significant predictors. Because we also have several cognitive and academic measures at the end of pre-k, we are conducting additional longitudinal analyses to test both direct and indirect effects of pre-k predictors on kindergarten word problem solving.
Discussion: These preliminary results suggest that sustained attention as well as early math skills, are significant predictors of word problem solving in kindergarten in a group of children at risk for later math disabilities. In contrast to studies of math word problem solving in older children, language skills (tapped by phonological awareness) did not uniquely predict early math word problem solving. Findings will be discussed with reference to the literature on the predictors of math word problem solving in older children and suggestions for further research will be provided.

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The Effects of Counting-Focused Intervention: A Research Synthesis

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According to the Common Core State Standards (2010), counting and cardinality are critical content for kindergarten. By the end of kindergarten, 60% of students attain mastery of one-to-one correspondence, and two-thirds of kindergarteners appropriately use cardinality while counting (Stock et al., 2009). Counting skills are considered a gateway to other mathematics skills (e. g., cardinality, comparison, simple addition, and subtraction; Nelson & McMaster, 2019). Moreover, proficiency in early numeracy, including counting skills, during preschool and kindergarten accelerates growth in mathematics achievement (Aunola et al., 2004; Aunio et al., 2015). For these reasons, synthesizing the effects of counting-focused intervention for preschool and kindergarten students is necessary, and it will contribute to a better understanding of the student's initial understanding of these critical skills (i. e., cardinality, comparison, simple addition, and subtraction) as well as an overview of effective practices for students with or at-risk for mathematics difficulties (MD). Thus, the purpose of this synthesis is to examine the effects of counting-focused intervention and associated effective instructional strategies for students in preschool and kindergarten with or at-risk for MD. Through a systematic literature search, seven studies with 10 treatment groups met the following inclusion criteria: 1) Participants included preschool and kindergarten students. 2) Participants had MD or were at-risk for MD, based on clearly defined MD criteria including (a) cut-off percentile, (b) evidence of persistent low performance in mathematics, (c) identified by teachers, or (d) identified using a screening assessment. 3) The intervention aimed to improve counting, cardinality, and one-to-one correspondence, and at least 50% of the intervention components focused on the principles of counting skills. 4) The study design included randomized controlled trials or quasi-experimental designs, with at least one treatment group and one control group. 5) Studies were peer-reviewed, and journal articles were available in English. The characteristics of the study design are as follows. Five studies targeted kindergarten students, and two studies focused on preschoolers. A total of four out of seven studies implemented a computer-assisted counting-focused intervention, and three studies involved teacher-implemented interventions. Interventions were implemented in small groups (i.e., on average, 3-4 students per group) in 20 to 45 minute-long sessions per day. The total length of treatment duration was 50 to 120 days. Overall, results showed that a majority of students with MD showed significant improvement after implementation of the interventions. Specifically, 71% of treatment groups outperformed the control conditions. The remaining studies reported no significant growth in treatment conditions.

Finally, I examined the instructional strategies used in these studies for implementing the intervention. I determined that interventions with positive effects incorporated explicit and direct instruction, scaffolding, immediate and corrective feedback, and the concrete-representation-abstract framework. Additional analyses of the results will be shared during the presentation of this poster. This presentation will include a discussion of implications for future research as well as recommendations for practice.

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Exploring Predictors of Teachers' Sustained Use of Data-Based Instruction Using Logistic Regression Analysis

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The purpose of this study was to identify predictors of teachers' sustained use of data-based instruction (DBI) and the extent to which the identified predictors explain teachers' sustained use after completing the ongoing professional development (PD) for intensive writing instruction. Our central hypothesis for this work is that factors including teacher knowledge and skills, participation in DBI PD, years of PD participation, their perception of barriers or facilitators to sustained use, and the instructional format through which they taught students during the height of the COVID-19 pandemic, will be associated with sustained DBI use (Carrillo & Flores, 2020; Kearn et al., 2010; Klingner et al., 1999; Pokhrel & Chhetri, 2021; Poch et al., 2020). The specific research question for this study is as follows: To what extent do condition, cohort, instructional format, knowledge and skills, the number of facilitators, and the number of barriers predict teachers' sustained use of DBI? The sample for the present study included 58 teachers (treatment = 36, control = 22) who participated in a larger study of a DBI PD program, the Early Writing Project in 2018-2020 and completed an online sustainability survey. Teachers were randomly assigned to either the treatment, where they received the professional development and implemented DBI in early writing across 20 weeks, or a business-as-usual control group. The treatment group received weekly or biweekly coaching support with coaching conversations and intensive PD seminars for an academic year. The control group only received 2 full days of intensive PD seminars after students were post-tested. In the PD seminars, control teachers received the same content as the treatment group received. The final logistic model indicated a higher predicted probability of sustaining DBI components for teachers who received the full treatment (tools, learning modules, and coaching for 20 weeks of intervention during their year of participation in an efficacy trial) than for teachers in the control group who only received tools and learning modules at the end of their year of participation in the efficacy trial), and for teachers who taught in-person only compared to those who taught in fully remote or hybrid models, controlling other variables. Furthermore, as the number of facilitators that teachers reported increased, teachers were more likely to sustain their use of DBI components, controlling other variables.
Many students with learning difficulties require intensive intervention delivered over the course of multiple years to meet learning goals (e.g., Fuchs & Fuchs, 2015). If students did not receive DBI due to remote instruction, the COVID-19 pandemic may have had a devastating impact on the academic skill development of students with significant learning needs. An understanding of the factors that may contribute to sustained DBI is needed for researchers to determine what supports can facilitate long-term use of DBI, as with other instructional or educational programs (e.g., Baker et al., 2004; Foorman & Moats, 2004; Gersten et al., 2000; Wexler et al., 2022).

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Examining mathematics skills in emergent bilinguals with and without mathematics difficulties

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Children learning English as a second language who are the most rapidly growing demographic in U.S. public schools (National Center for Education Statistics, 2020). Emergent bilinguals (i.e., English Learners, ELs) whose first language is Spanish and second language is English make up the majority of emergent bilinguals (e.g., National Center for Education Statistics, 2020), and represent a substantial number of students who do not demonstrate proficiency in mathematics (National Assessment of Educational Progress, 2011, 2017, 2019; National Center for Education Statistics, 2020). Mathematical competence not only requires mastery of arithmetic, but also requires that students demonstrate competence with word problems. Indeed, it has been documented that students who are in the process of learning English as their second language have greater difficulties with word problem-solving. However, these difficulties can be due to the heavy linguistic load that word problem-solving requires students to process (e.g., Alt et al., 2014; Arizmendi et al., 2021; Powell et al., 2020), not the ability to perform mathematical processes. In this study, we will examine the following questions:
Are there differences in arithmetic performance and word problem-solving performance between students classified by their schools as "English Learners" and non-"English Learners"?
What differences emerge on arithmetic and word problem-solving measures among emergent bilinguals who evidence mathematics difficulty (MD) compared to EBs without MD?
Hypotheses: Based on the relationship between language and mathematics (Alt et al., 2013; Alt et al., 2014; Arizmendi et al., 2021; Powell et al., 2020), we hypothesize that emergent bilingual children demonstrate greater difficulties with word problem-solving and the language load tied to it, rather than performing numerical operations in arithmetic. We hypothesize that emergent bilinguals with a diagnosis of MD will demonstrate greater difficulty than those without MD on word problem-solving, but arithmetic may be comparable due to a reduced language load associated with arithmetic.
As part of a federally funded parent study, data from 1979 Grade 3 emergent bilingual students and monolingual students (EB = 816; Monolingual=1163) with and without MD will be analyzed. Findings will further our understanding on the underlying contributions to mathematics difficulties and competence in emergent bilingual students. In order to meet the demand to develop stronger interventions specifically tailored to emergent bilinguals (e.g., Arizmendi et al., 2021), we must also understand what the nature of those differences are among emergent bilingual students with and without MD, and how this compares to their monolingual peers.

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Mathematics language of instruction: The impact for Spanish- and English-speaking students

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A gap in mathematics performance between emergent bilingual students and their monolingual-English speaking peers indicates the importance of supporting emergent bilinguals in mathematics (Fesseha et al., 2020). Providing mathematics instruction in a student's home language may support emergent bilinguals, yet the impact of language of instruction on mathematics outcomes is understudied (Arizmendi et al., 2021). We asked: What are the effects of language of instruction on mathematics outcomes at the end of pre-k and kindergarten for Spanish-speaking students in bilingual programs compared to Spanish- and English-speaking students in monolingual-English programs?

This study was conducted with the business-as-usual students within a larger intervention study for students at risk for mathematics difficulty (Author, 2016). The classrooms from California used an English-only model with English- (n = 27 - 28) and Spanish-speaking students (n = 48 - 52). In Texas, classrooms used an English-only model for English-speaking students (n = 55 - 57) and a bilingual model for Spanish-speaking students (n = 31). Students were assessed on the Child Mathematics Assessment (CMA) and the Test of Early Mathematics Ability, 3rd Edition (TEMA-3).

We tested Spanish- and English-speaking students mathematics outcomes while controlling for pretest mathematics and phonemic awareness conducted in the child's home language. Separate analyses by state were conducted because dosage of mathematics instruction was confounded with state and instructional language model (more Tier 1 math instruction and higher math outcomes in general for Texas). In pre-K for Texas, no differences emerged between the English-speaking students in the English program and the Spanish-speaking students in the bilingual program on the CMA (B = 0.03, SE = 0.03, p = 0.28) or TEMA-3 (B = 1.46, SE = 1.46, p = 0.24). In pre-K for California where all Tier 1 with the English program, no differences emerged on the CMA (B = 0.06, SE = 0.03, p = 0.06) or TEMA-3 (B = -1.84, SE = 1.07, p = 0.09) between the English- and Spanish-speaking students.

At kindergarten, in Texas, no differences emerged between the English- and Spanish-speaking students on the CMA (B = -0.01, SE = 0.03, p = 0.82) or between the English- (M =26.68) and Spanish-speaking students (M = 27.29) on the TEMA-3 (B = 0.67, SE = 1.43, p = 0.64). In California, no difference emerged on the CMA (B = -0.04, SE = 0.04, p = 0.28), but the English-speaking students (M = 26.15) significantly outperformed the Spanish-speaking students (M = 20.06) on the TEMA-3 (B = -5.25, SE = 1.71, p < .001). By kindergarten, children whose home language was Spanish, but who were being schooled in English, had lower math achievement than their monolingual-English peers and there was a trend for this finding in pre-kindergarten. No differences in math achievement were found for English- and Spanish-speaking children being schooled in their home languages. The findings are discussed in relation to how the language of early mathematics instructions impacts mathematics outcomes, with potential implications for understanding later achievement gaps and risk for disabilities in linguistically diverse children.

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Evidence Based Universal Practices for Recess

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Recess is a crucial component of the school day, as it provides a break from schoolwork and gives students a chance to play, socialize, and engage in physical activity. Research suggests that recess is not only a time to play but can also directly impact the classroom environment and how students perform academically. Among other benefits there is evidence suggesting recess can improve classroom attention (Brez & Sheets, 2017). That said, recess can be a time where unstructured activities pose a higher risk for unsafe behavior. There has been a nationwide push to replace recess with more academic time but there are advocates for keeping it as a mainstay in the school schedule, particularly in middle and high school (Zavacky & Michael, 2017).

Purpose of the Research: The purpose of this research was to systematically review the literature on how recess impacts the academic, behavioral and social experiences of school age children and youth. Collating and sharing these findings is useful for researchers and clinicians to better design interventions.

Methods: We conducted a systematic review of the literature. What we are reporting here is a subset of the variables we explored. For this presentation we are sharing our findings specifically to the academic, behavioral and social variables; a subset of a larger review.

To complete this systematic review, we completed the following steps. First, a search was conducted using the University of Montana's library system utilizing ProQuest. The aforementioned variables were used as search words in combination with "recess" and "playground." We limited our search to articles published the year 2000 to April 2022. No limitations were placed on the journals to allow for the discovery of research from various academic fields. To determine inclusion of an article, the abstract was read, and it was determined if the work clearly addressed the relevant variables. Once an inclusion determination was made, the entire article was read and summarized. Using these resources, the results from the realms of academic, behavioral, and social during recess were synthesized.

Findings: Below is a summary of the findings from the search for the academic, behavioral, and social realms.

Academic: The evidence indicates that recess helps students pay attention and be more engaged in class. While there is less research suggesting that recess may directly improve academic performance, one can reason that being engaged and attentive in the classroom leads to the potential of absorbing more information and a higher motivation to perform well in school, which can lead to better grades.

Behavior: In general, recess tends to have a positive impact. In studies where more recess was compared to less recess, there tended to be fewer ODRs. However, in other cases, the doubling of recess time, resulted in an increase in ODRs.

Social: There are marked differences between male and female students. Females tend to spend more time at recess socializing where males tend to engage more in physical activities. It has also been found that physical activity during recess is associated with positive peer relationships.

The Effects of an Orton-Gillingham Based Intervention on Students' Phonemic Decoding and Oral Reading Fluency

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

Currently, 48 states have adopted dyslexia-specific legislation that protects the rights of individuals with dyslexia beyond the federal requirements of the Individuals with Disabilities Education Act (2004). Many states have legislation mandating the use of multi-sensory reading interventions, a common characteristic of the Orton-Gillingham (OG) approach. OG is a "direct, explicit, multi sensory, structured, sequential, diagnostic, and prescriptive approach to teaching reading" for students with or at risk for word-level reading disabilities (WLRD). This approach to instruction shares many overlapping characteristics with other early reading interventions, but differentiates itself by portraying multi-sensory instruction as a key ingredient for students with dyslexia. Despite legislation mandating the use of multi-sensory instruction and OG interventions, current research does not support OG as evidence-based. Findings from a prior synthesis conducted by Ritchey & Goeke (2006) demonstrated limited evidence that OG programs significantly improved the reading outcomes of students with dyslexia. What Works Clearinghouse Reviews of branded and unbranded OG programs (2010; 2012) were unable to draw conclusions about the effectiveness or ineffectiveness of OG intervention, as few studies met evidence-standards. Finally, findings from a meta-analysis conducted by Stevens and colleagues (2021) demonstrated that OG interventions did not significantly improve foundational skill outcomes (ES = 0.22; p = .24; SE = .26; 95% CI = -0.24, 0.89) or vocabulary and comprehension outcomes (ES = 0.14, p = .57; SE = 0.23; 95% CI = -0.39, 0.66) for students with or at risk for WLRD. However, research was limited and OG remains firmly entrenched in both policy and practice, calling for additional high-quality research to inform interventions for students with and at risk for dyslexia.

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The Starting Line: Using Communities of Practice to Integrate Intensive Intervention Content into Teacher Education Courses

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The mission of the NCII is to build knowledge and capacity of state and local leaders, faculty and professional development providers, educators, and other stakeholders to support implementation of intensive intervention for students with severe and persistent learning and/or social, emotional, or behavioral needs using data-based individualization (DBI).
DBI is a research-based process for individualizing and intensifying intervention that involves the systematic use of assessment data, evidence-based interventions, and research-based adaptations. DBI finds its roots in experimental teaching (Deno & Mirkin, 1977) and may be used to address student needs across academic and behavioral domains. In this iteration of the center, NCII has shifted its technical assistance approach to increase the breadth of offerings for a greater range of stakeholders. Post pandemic, we have also learned the importance of being nimble in our approach to technical assistance - meeting stakeholders where they are. One group that plays a particularly important role in post pandemic recovery is faculty. As the need for "closing the gap" becomes more essential, the role of faculty in producing high quality educators increases. The goal of the NCII faculty communities of practice (CoP) is to support faculty as they integrate intensive intervention components within their course syllabi. Through our CoP, faculty learn more about the DBI process, access free resources around DBI, and engage with our various course content offerings. During the summer of 2022, 14 faculty members from across the country attended seven CoP sessions. Many of the sessions focused on essential components of intensive intervention within reading, including interventions and assessment in intensive intervention. The culmination of the CoP was the production of a reading course syllabi that incorporated key components of intensive intervention, including resources. Survey results from the CoP indicated that not only was the CoP of high quality, but the CoP increased faculty's own knowledge about intensive intervention.
This poster will review the entirety of the faculty CoP, including the successful outcomes, the approach in developing our faculty CoP, resources, and our lessons learned.

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An Overview of Reading Comprehension Intervention Outcomes for Students with Learning Disabilities

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Reading comprehension is critical to academic performance, yet many students struggle in this area. Students with learning disabilities (LD) demonstrate particular challenges; for example, 88% of LD students sampled as part of the National Longitudinal Transition Survey performed below or very below average in reading comprehension (Cortiella & Horowitz, 2014). In the early 90s, systematic reviews focused on explicit instruction in reading comprehension, and the National Reading Panel's 2000 meta-analysis further identified several instructional approaches important in this area. In the subsequent two decades, researchers began focusing on reading comprehension for students with LD. Systematic reviews in this area narrowed in on instruction related to text type (e.g., Gajria et al., 2007), specific content area (e.g., Ciullo et al., 2016; Swanson et al., 2014), specific instructional components such as graphic organizers, peer tutoring, self-regulation (respectively Kim et al., 2004; Edmonds et al., 2009; Berkeley & Larsen, 2018), and instructional supports with digital text (e.g., Berkeley et al., 2015; Kim et al., 2017).

In response to an increasing body of secondary research in a field, further synthesis is needed that employs similar methods but with the review as the unit of analysis. A few such overviews, also known as second-order meta-analyses, tertiary reviews, or "mega-analyses" (as coined by Forness et al., 2001), have been conducted in the field of educational research (e.g., Forness et al., 2007; Hattie, 2009; Kavale, 2007). However, the current analysis is the first overview to synthesize the existing research base on effective reading comprehension instructional practices for students with LD. This overview will also illustrate strengths and weaknesses of syntheses conducted in this area, and provide direction for future research and synthesis.

To identify reviews for inclusion in this overview, we conducted systematic database, ancestry, descendent, and hand searches for records published in English from 2000 to present. Identified records were double screened at the abstract (n = 446) and full-text (n = 103) levels. Syntheses were included if they (a) targeted reading comprehension instruction, (b) included a majority of students with LD in their sample (50% or greater) or disaggregated data for students with LD, (c) contained a method section detailing systematic review procedures, and (d) contained an overall effect size and/or contained a minimum of five group design studies (Tipton et al., 2015). Included reviews were coded for information at the review level (e.g., inclusion/exclusion criteria, search procedures, coding conventions, and data analysis procedures) and primary study level (e.g., intervention focus, population, text type, design, reading comprehension outcomes).

Fourteen systematic reviews were included in this overview (twelve peer-reviewed publications, one dissertation, and one report), with a median of 21 studies in their synthesis. A total of 95 unique studies were represented, with 47.5% of studies occurring in more than one review. The average effect size for reading comprehension post-test outcomes is 0.96, 95% CI [.91, .99]. Additional findings related to explored moderators and methodological characteristics will be presented, along with implications for research and practice.

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Computer-adaptive Assessment of Causal Inferencing During Reading

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Traditional reading comprehension assessments provide limited insight into why a student who can read fluently comprehends poorly and, thus, no guidance on how to improve the situation (Pearson et al., 2020). Most reading comprehension assessments focus almost exclusively on comprehension as a product (i.e., what is remembered after reading) and provide little to no information about how a reader arrived at that product: the comprehension process, which involves making inferences during reading of a text. Teachers and researchers have repeatedly called for the latter -- measures reflecting individual differences in comprehension processes -- to better support targeted intervention with students who struggle specifically with comprehension (e.g., Pearson et al., 2020).

MOCCA is a new assessment designed to identify and differentiate among types of poor comprehenders in Grades 3 to 6 based on the comprehension processes they use during reading. Poor comprehenders fail to maintain causal coherence of the text due to their over-reliance on paraphrasing or making elaborative inferences. Think aloud research has consistently found these two types of poor comprehenders in the intermediate grades (McMaster et al., 2012; Rapp et al., 2007). Moreover, McMaster and colleagues (2012) found that poor comprehenders who are paraphrasers or elaborators respond differently to reading comprehension interventions (McMaster et al., 2012).

Each MOCCA item is a short narrative text (between 5-10 sentences in length). All items follow a causal structure (i.e., plot) developed around a main goal or idea that motivates subgoals or supporting ideas in the text (e.g., Trabasso et al., 1989). Readers who take MOCCA fill in a missing sentence (always the second to last) with one of three response type choices: (1) a causally coherent inference (i.e., the correct, deleted sentence), (2) a paraphrase, or (3) an elaboration. These response types are aligned to the paraphrasing and elaborative processes that distinguish poor comprehenders.

We will present on the multi-dimensional Item Response Theory (IRT) measurement model that makes MOCCA unique and describe how it functions in a computer-adaptive test (CAT) format. The CAT version of MOCCA is innovative in two respects: the CAT is multidimensional, not unidimensional, and the second dimension is designed to be diagnostic of student propensity for paraphrasing or elaborative inferences. The first dimension, reading comprehension ability, uses a three parameter IRT model that includes the traditional difficulty, discrimination, and guessing parameters. The second dimension is conceived as a bi-polar dimension with those who predominantly make paraphrase errors (when they make a mistake) located at the positive end, those who predominantly make elaboration errors (when they make a mistake) at the negative, and those with no predominant error type in the middle.

We will also present preliminary results from a randomized control trial comapring the CAT version of MOCCA to the original fixed-length version. Specifically, we will compare effects on standards errors of measurement along both dimensions and on testing time. 472 words

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Effects of explicit peer-assisted instruction on student´s reading skills in Iceland

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Reading is an essential skill and children need effective instruction from the beginning. Phonics-based reading instruction, with emphasis on letter-sound relationships, blending and decoding lays the foundation for reading fluency. Establishing letter-sound fluency, that is automatic, rapid, and accurate naming of letter-sounds, is essential in preventing later difficulties. Peer-Assisted Learning Strategies, PALS, is a class-wide peer-mediated program that has been developed for use in Kindergarten (K-PALS) and 1st grade (1st grade PALS) to teach early reading skills, including phonological awareness, letter sound fluency, decoding, word recognition, and oral reading fluency. PALS incorporates systematic and explicit phonics and has been found to be effective in comparison to other instruction, but mostly in research studies in the US. The effects of the Icelandic versions of K-PALS and 1st grade PALS have yet to be studied within Icelandic elementary schools, where there are differences in the orthography and teaching practices in schools.
This study assessed the effects of reading instruction including K-PALS and to some extent 1st grade PALS on students' early reading skills in 1st grade with a randomized controlled trial. Participants were 299 students who began 1st grade in Fall 2022 in eight public schools in the capital region of Iceland. Schools were matched and then randomly assigned to experimental or control conditions. All students in the four experimental schools received instruction with PALS, while students in the four control schools received literacy instruction as usual. Several early reading skills were measured in September, January and May, including; letter sound knowledge and fluency, oral reading fluency, nonsense word fluency, and sight word fluency. Analysis of Covarience (ANCOVA), controlling for initial individual differences in scores, was used after the first schoolyear to determine if there were significant differences between the experimental and control groups. Analyses found students' letter sound fluency, letter sound knowledge and letter sound growth to be significantly higher in the experimental group. students in identified at risk groups including those with initial low letter naming fluency, non-native Icelandic speakers and the youngest students all performed significantly higher and grew faster in their letter naming knowledge and fluency than at risk students in the control group These findings indicate that including PALS as part of early reading instruction can be effective for establishing important foundational skills for 1st grade students in Iceland and could be a more effective approach than reading instruction typically being used.
In order to improve the practical implications of the research project follow-up qualitative interviews were conducted to determine teachers' perceptions regarding the feasibility and effectiveness of K-PALS and First Grade PALS. Nine teachers were randomly selected from the four research schools and all of them reported the programs to be effective and practical to implement.

Promoting struggling upper elementary comprehenders' reading through a response-to-intervention design

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Introduction: Despite the importance of reading comprehension in today's knowledge society, many students struggle with it (Hjetland et al., 2020). These difficulties already arise in upper elementary education, a critical period for the development of comprehension skills (Keresteš et al., 2019). In response to these students' reading difficulties, specialized interventions are needed. Response-to-intervention (RTI), an increasingly implemented research design, is in this respect promising to address struggling students' needs (Jefferson et al., 2017; Jimerson et al., 2016). RTI consists of varying support levels (i.e., tiers) in accordance with how students respond to the intervention (Clarke et al., 2016; Fuchs et al., 2003). All students start with an evidence-based whole-class instruction (i.e., tier 1). Students who do not make sufficient progress in tier 1, proceed to supplemental and more intense levels (i.e., tier 2 and tier 3) (Kaminski & Powell-Smith, 2017). Although RTI seems promising for struggling students, RTI research focusing specifically on struggling upper elementary comprehenders is limited. Moreover, tier 2 interventions are typically researcher-delivered, while interventions implemented by school internal staff are preferred in view of sustainability (Donegan & Wanzek, 2021; Ollivier et al., 2020). Since teacher aides are used to work with special needs students and belong to the school context, teacher aide-delivered RTI interventions offer promising potential (Clayton, 1993; Harris & Aprile, 2015). Therefore, this study investigated the impact of a tier 2 reading comprehension intervention on upper elementary struggling comprehenders, delivered by teacher aides (RO1). Additionally, the differential impact of the intervention was investigated considering fidelity of implementation differences (RO2). **Method:** A pre-post intervention design was conducted in 13 classes from 6 Flemish schools. In total, 48 struggling upper elementary comprehenders participated, guided by 6 teacher aides.
These students were selected from a preceding tier 1 comprehension intervention (n=246) (Authors, 2022). Specifically, the lowest 25th percentile comprehenders per class was selected based on four reading comprehension tests, completed during tier 1. By doing so instead of using a predetermined diagnosis as selection criteria, a heterogeneous group of struggling comprehenders was composed (e.g., students with learning difficulties, unmotivated students, non-native students). Paired sample t-tests were performed in SPSS to investigate RO1. As to RO2, fidelity of implementation (FOI) was investigated for each teacher aide through various data sources (e.g., observations, interviews). Subsequently, teacher aides were divided in low and high FOI. Next, unilevel analyses of covariance were conducted to investigate RO2.
Results: As to RO1, struggling comprehenders reported a significantly higher overt strategy use (e.g., highlighting) at the tier 2 posttest compared with the pretest. Further, their academic and recreational controlled reading motivation (i.e., read from a sense of internal or external pressure) decreased. However, struggling comprehenders' autonomous motivation (i.e., read from a sense of willingness) at school decreased as well.
As to RO2, students guided by high FOI teacher aides reported significantly higher overt and covert (e.g., questioning) strategy use compared with low FOI teacher aides. Further, students guided by high FOI teacher aides reported significant higher autonomous reading motivation in the academic and recreational context.

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Initial Word Reading Performance as a Moderator of Intervention Effects for Students with Reading Difficulties in Grades 3-12

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Intervention is key for remediation of reading difficulties; for this reason, it is critical to develop an understanding of for whom and under what conditions (Pawson & Tilley, 1997) additional instructional support is effective. Designing an intervention requires decisions pertaining to: (a) instructional focus, (b) dosage, and (c) outcome measures; however, what informs these instructional choices? In a Response to Intervention model, universal screenings are used to identify students at-risk for reading difficulties and/or in need of reading intervention, but how baseline data is interpreted may influence the success of improving student outcomes as a result of the subsequent intervention.

Primary research has demonstrated inconclusive evidence with respect to the impact of initial reading performance on reading outcomes; these findings vary as a result of: (a) specific measures of reading examined prior to and following intervention (i.e., subskill of reading assessed), (b) participant characteristics (e.g., grade level), and (c) intervention features (e.g., dosage and instructional focus). Some studies have found stronger initial performance is associated with stronger outcomes after receiving an intervention (Coyne et al., 2019; Vaughn et al., 2019); in contrast, some research supports the notion that poor initial performance results in stronger outcomes (Clemens et al., 2019; Fuchs et al., 2019). Alternatively, some findings have demonstrated no relationship between initial performance and final status (Wanzek, Roberts, et al., 2019).

The present meta-analysis aimed to answer the following questions: (1) Does initial word reading performance (i.e., word identification, word identification fluency, decoding, and decoding fluency) moderate intervention effects for students with reading difficulties in grades 3-12? (2) Does the moderation of intervention effects by initial word reading performance vary across reading domains assessed as a function of participant characteristics (i.e., grade level), intervention (i.e., dosage and instructional focus) and/or study-level (i.e., publication year) features? A comprehensive search of studies published between 1980 and 2020 yielded 31 studies that met the following inclusion criteria: (a) experimental and quasi-experimental study design; (b) reading intervention was provided; (c) participants demonstrated reading difficulties and were in grades 3-12; (d) reading outcomes were assessed; and (e) pretest data for a measure of word reading (i.e., word identification, word identification fluency, decoding, and decoding fluency) was reported as a standard score (or a score that could be translated to a standard score using a widely-available conversion chart).

In the meta-analyses, we first estimated meta-regression models including only the initial word reading moderator to examine the impact of the moderator on reading outcomes. Then, when the number of studies available was sufficient to result in df > 4 (a condition for the reliability of the results according to Tipton, 2015), we conducted additional meta-regressions with other moderators, including publication year, total hours of intervention, group size, grade level, and intervention type, separately. The moderator effects were not statistically significant for the word identification and word identification fluency measures of initial word reading, but were significant for the decoding and decoding fluency measures. Findings from additional moderator analyses varied by meta-analysis.

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Relation of Middle School Students' Academic and Mathematics-Vocabulary Performance

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Mathematics competency includes numerous skills, ranging from computation to reasoning to mathematics-related vocabulary. One key element of mathematics language is mathematics vocabulary. Students' mathematics vocabulary understanding is imperative for mathematical text comprehension (Carter & Dean, 2006). Due to an increase in demands on students' mathematics vocabulary competence across grades, it is important to determine the academic skills related to differences in mathematics vocabulary performance. Little is known regarding the relation of mathematics vocabulary to other academic skills at the middle school level. Research in this area tends to be focused on approaches to teaching mathematics vocabulary (e.g., Dunston & Tyminski, 2013; Livers & Elmore, 2018) or occurs in a different country than the United States, where standards for instruction and ages of middle school students can differ (e.g., Duku & Koklu, 2011). To address this gap in the literature, this study investigated the following research questions: (1) To what extent does (a) general vocabulary, (b) word reading fluency, (c) quantity discrimination, and (d) missing number explain the variance in mathematics vocabulary performance for students in Grades 6 and 8? (2) Do the relations among reading, mathematics, and mathematics vocabulary skills differ for students in Grades 6 and 8? (3) Do academic skills (i.e., reading comprehension, reading fluency, mathematics skills) differ along the distribution of mathematics vocabulary skills? Students attended one of two school districts (i.e., Pacific Northwest or South) and one of nine teachers' classrooms. Individual teachers received the testing packets with attached student information sheets, written teacher directions, and informed consent information. Test administration procedures for the battery of assessments, which totaled approximately one-hour of testing, were included in the teacher directions sheet.
Four different tests were administered. In order of presentation to the students, these measures included the mathematics vocabulary measure, a measure of reading comprehension, a test of algebra readiness including two separate subtests, and a silent word reading fluency measure. For the Mathematics Vocabulary measure (Hughes et al., 2020), students had to identify either the definition of a mathematics vocabulary term or the term that matches the definition provided. The Gates-MacGinitie Reading Test was administered as a measure of reading comprehension. Two different measures were used to evaluate students' algebra readiness skills: Quantity Comparisons and Missing Number. The Test of Silent Word Reading Fluency was used to assess students' reading fluency skills. In this assessment, students had to identify words by writing separating lines between words presented. Through the multi-group regression analyses, we determined that there were differing relations between the academic measures and the mathematics vocabulary performance between students in Grades 6 and 8. The unconditional quantile regression method estimates coefficients without reference to values of other variables in the model by defining quantiles before fitting regressions (Hajovsky et al., 2020; Fuchs et al., 2020). Pattern of differential effects depending on mathematics vocabulary achievement level were present for students in both Grades 6 and 8. These results are continuing to be analyzed and will be prepared to present prior to the poster presentation.

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Use of a Think-Aloud Procedure to Examine Adolescent Reading Strategies

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Reading comprehension requires complex coordination of linguistic and cognitive skills, including the deliberate use of reading strategies (e.g., Denton et al., 2015). In this study, we investigate the relationship between reading comprehension and the types and frequencies of reading strategies used by adolescents during a think-aloud measure.

Participants include students in 9th grade (N=163) across the Midwest and Southwest regions of the United States who have been followed since preschool as part of a larger reading comprehension study (see LARRC, 2015). All students participated in a think-aloud protocol (see Caldwell & Leslie, 2010), in which they read an expository text modified from the Qualitative Reading Inventory-5 and were asked at several points to stop and verbalize what they were thinking. Responses were transcribed and coded for different types of reading strategies. There were eight total types of reading strategies identified: a) synthesis; b) paraphrase; c) repetition; d) inference; e) association; f) evaluation; g) monitor; and h) question. We also coded for errors, which were comments that included inaccurate information. Twenty percent of the samples were randomly selected and coded by a trained graduate student, who served as the second coder. Inter-rater reliability was 89%.

Data were analyzed to a) determine the frequency of different strategies and b) examine correlations between different strategies and reading comprehension scores as measured by the Passage Comprehension subtest of the Woodcock Reading Mastery Test-3.

Preliminary results showed adolescent students used a variety of reading strategies when reading expository text. As seen in previous research, less skilled readers used fewer strategies overall (Denton et al., 2015). Pearson product-moment correlation coefficients were calculated. The two strategies most highly associated with good reading comprehension were associations (.237) and evaluation (.280). The most frequent strategy used was paraphrasing, which was also positively correlated with reading comprehension (.161). Errors, or comments that included inaccurate information, were negatively correlated with reading comprehension (-.313).

Educators may wish to use a think-aloud procedure to take inventory of student reading strategies and develop targeted interventions. Supporting students in making associations and evaluating reading passages may be particularly beneficial. Further analyses will examine potential differences in gender.

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Investigating the ISocial Intervention for Students with Autism Spectrum Disorder in the Home Setting

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Objectives. The Social Competence Intervention for Adolescents (SCI-A, Stichter, et al., 2010), an in-person social skills intervention for adolescents with autism spectrum disorder (ASD) has been proven efficient in a cluster randomized control trial (Stichter et al., 2017). Currently, the SCI-A intervention is called iSocial and is delivered through a videoconference platform (Zoom) to the students with ASD in their home setting. The effectiveness of the iSocial program delivered through videoconference platform to students in a home setting has not been studied yet but an investigation is needed to explore the utility of this intervention for students with ASD in their home environments. The aim of the study is to explore the videoconference learning experience for students with autism spectrum disorder (ASD) and their parents in iSocial intervention through answering the following research questions:
1. Does the iSocial intervention delivered through videoconference impact students' social skills as reported by pre-and post-social performance measures and parents' reports?
2. Is the experience in iSocial intervention socially valid as reported by parents and students?
Method. The pre-test post-test design with control group (Gay et al., 2012) were used to evaluate the impact of the social skills intervention delivered synchronously using a videoconference platform to students while they located at their homes in order to further inform the development and implementation of online interventions to students with ASD. A total of 24 participants (12 students with ASD and 12 parents) have participated in the experimental group. The control group included 6 students with ASD and their parents (6 parents). The following measures were used: the Social Responsiveness Scale (SRS; Constantino and Gruber, 2005), the Behavior Rating Inventory of Executive Functioning (BRIEF-2; Gioia et al., 2015), General Social Outcome Measure (GSOM; Stichter, et al., 2012), Social Validity Survey. For all pre-post assessments changes in scores from pre to post were examined via paired samples t-tests to detect if the differences were statistically significant (Stichter et al., 2012; Stichter et al., 2014; Hill et al., 2017). To investigate the social validity of the interventions, the means and standard deviations of the social validity survey items were calculated, presented, and discussed. The open-ended responses were analyzed through qualitative analysis, specifically thematic analysis (Braun&Clarke, 2012).
Results. The results of the study demonstrated social skills growth among participants of the intervention group in comparison to minimal social skills improvement in control group. Parents and students reported positive experiences in iSocial intervention. Some barriers and challenges were identified by parents and students.
Conclusions. The findings from the current study can inform practitioners, teachers, and parents about the benefits and limitations of social skills intervention delivered to students with ASD through videoconference in a home setting. Many families of children with ASD have difficulties accessing services and interventions for their children due to geographical (e.g, rural areas) distance, health (e.g, contagious disease), pandemic, and time restraints. The social skills intervention delivered online could increase the accessibility of needed and effective social skills intervention to the population with ASD.

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Specialized Instruction to Reach All Learners (SPIRAL): Professional learning and coaching

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The purpose of this study was to examine the impact of Tier 2 educators' mathematics content knowledge and educator pedagogical (i.e., teaching) skill in mathematics within an intensive, 12-week, professional learning-coaching model for educators who provide small-group intervention to Grades 4 and 5 students with mathematics difficulty (MD). We identified Tier 2 educator as any educator providing mathematics intervention to help learners meet or exceed grade-level mathematics standards. We identified students with MD as students who Did Not Meet Grade Level expectations on the previous year's Texas STAAR Mathematics test. We asked the following research questions: (1) What is the effect of SPIRAL professional learning-coaching on educator mathematics content knowledge? (2) What is the effect of SPIRAL professional learning-coaching on frequency and understanding of instruction and assessment in mathematics intervention? After we obtained IRB approval, we began recruiting participants from a large urban school district. We worked with interested principals to identify educators eligible for participation. Any educator (e.g., special education teachers, general education teachers, MTSS specialists, math specialists or interventionists and paraprofessionals) who provided mathematics intervention to students in Grades 4-5 were deemed eligible. Participants were then self-selected and compensated for their participation in the 12-week study. More than half of the participants were women (80%) with an average of 10 years in education.
We tested eligible participants (n = 20) on content knowledge using the Mathematical Knowledge for Teaching (MKT) and their frequency and understanding of mathematics instruction and assessment using the Educator Instructional Practices (EIP). Testing occurred in one 30-minute session. The professional learning-coaching model included 4 professional learning sessions. Professional learning consisted of two sessions on word-problem instruction and two sessions on teaching fractions. Each professional learning session took place virtually through Zoom. All professional learning sessions included (1) evidence-based math strategies, (2) guided practice, (3) resources, and (4) implementation tips. Differentiated coaching followed each professional learning series, which entailed two 30-minute sessions provided by research staff trained on professional learning materials and coaching protocols. Coaching practices varied across schools and across teachers in effort to differentiate support by interest and readiness. Examples of coaching activities included goal setting, modeling, elbow coaching, co-teaching, lesson planning, inter-visitation, and focused observations.
Following the 12-week professional learning-coaching model, we post tested all educators on the MKT and EIP to determine growth from pre- to posttest. Preliminary findings suggest SPIRAL educators increased their math content knowledge and understanding in mathematics intervention. The results from pre-test ($M = -0.13$, $SD = 0.49$) and post-test ($M = -0.06$, $SD = 0.60$) MKT scores indicated that educators who participated in professional learning-coaching increased their mathematics content knowledge, $t(14) = 0.62$, $p = .27$. EIP post-survey results show increased frequency ("everyday") and understanding ("I know a lot about it") of instruction and assessment, compared to pre-survey average responses of "2-3 times per week" and "I know some details about it". Complete results will be available Spring 2023. These findings hold implications for educators of Grades 4-5 students with MD.

Effects and Characteristics of Reading and Language Comprehension Interventions

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Language comprehension, or the ability to understand text and discourse, is an important component of reading. A subset of at-risk students failing to read proficiently require intensive, targeted instruction in language comprehension to read proficiently. Understanding the effect of intensive instruction on students' reading comprehension and language comprehension is essential to increasing reading proficiency. In this study, published journal articles were located through an online database search using ERIC and Education Source to identify studies that 1) described a language or reading comprehension intervention and 2) were delivered to students identified as at-risk of developing a reading disability. After a data-based search yielded 1,337 studies, a review of titles and abstracts was followed by a review of the methods section. Twenty-nine studies met the inclusion criteria and were included in the review. The specific research questions for this study are: 1) What are the effects of language and reading comprehension interventions for students with disabilities or at-risk of developing disabilities on language and reading comprehension outcome measures? 2)Do the effects of these interventions differ according to intervention characteristics (e.g., language components, durations)? 3)Do the effects of these interventions differ according to participant characteristics (e.g., ELL status, race)? Results were grouped into two categories: interventions delivered in a reading format and interventions delivered in an oral language format. Results indicate that reading and language comprehension interventions are effective overall. The median effect size for studies delivered in a reading format was medium (.57), while the median effect size of interventions delivered in an oral language format was small (.33). Variability in the data made identifying trends challenging for both categories, however, some trends in the data are noteworthy. Interventions yielded more significant outcomes for students qualifying for free and reduced lunch. Further, interventions for younger students also led to higher effect sizes on outcome measures. In examining intervention characteristics, there are a few key takeaways. First, decoding instruction in combination with comprehension instruction yielded higher effect sizes on reading comprehension outcomes. Second, language comprehension interventions that included vocabulary instruction led to higher effect sizes on language comprehension outcomes. Third, an overall trend in the data suggests that individually administered interventions were a beneficial component in comparison to small-group administration. Last, increased dosage, such as the amount of time daily in instruction and overall duration, did not lead to higher effect sizes, on average. Several aspects of reading and language comprehension interventions require further research. Proximal measures generally led to larger effect sizes, however, outcomes on distal measures were also promising with small to medium effect sizes. Which outcome measures to use and for what purpose deserves further attention. The reviewed studies rarely used technology, which is important given the increase in technology over the last several years. A review of the effect of interventions using technology is important in planning instruction. Last, this review did not evaluate long-term gains from interventions, which is an important aspect of education that needs to be examined.

A Systematic Review of the What Works Clearinghouse's Literacy Intervention Evidence: Are Black Students Represented?

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Many students in the United States exhibit persistent difficulties with reading and writing acquisition. National data indicate that 47% of White students read and 39% write at or above the proficient level (NAEP 2011; 2019), whereas only 17% and 9% of Black students met reading and writing proficiency, respectively (NAEP 2011; 2019). Due to the persistence of these disparities in educational outcomes, it is imperative to ensure that interventions are designed to support all learners and that study findings are generalizable to diverse groups of students. However, previous researchers have reported substantial underrepresentation of Black students in study samples across behavioral intervention research (Graves et al., 2021), autism intervention research (Steinbrenner et al., 2022), and reading intervention research in three journals (Lindo, 2006). To date, there has been no comprehensive review of study samples across reading and writing intervention studies.
Thus, the purpose of this systematic review was to examine the extent to which Black students are included in reading and writing intervention study samples. We reviewed the literacy intervention evidence reported in the What Works Clearinghouse (WWC)-a federal source that compiles evidence for intervention effectiveness based on a rigorous set of review standards. WWC studies undergo great scrutiny and are alleged to be of the highest quality in education research. Further, many teachers, administrators, and policymakers turn to the WWC to inform evidence-based decisions for their schools and districts. We sought to address three research questions: (1) Across all literacy intervention studies included in the WWC, what percentage report the race/ethnicity of study samples?; (2) For studies that report race/ethnicity, what is the proportion of Black student represented in study samples?; and (3) What percentage of intervention studies disaggregate outcomes by race/ethnicity?
We conducted a three-step screening and selection process to identify the corpus of studies for this review. First, we extracted all literacy interventions that the WWC reported as having positive or potentially positive effects (n = 57). Second, we identified those that met our operational definition of "intervention." For the purpose of this review, we considered an intervention to be remedial or supplemental reading or writing instruction provided in addition to core classroom instruction. Twenty-four interventions were excluded because they were core curricula (n = 9), general instructional practices (n = 9), or school-level models (n = 6). Finally, for each of the remaining 33 interventions, we used the WWC intervention reports to identify and compile all of the studies that were reported to have met evidence standards with and without reservations. After excluding duplicate studies (n = 17) and those that did not report literacy outcomes (n = 4), 107 studies were included in our final corpus. Following study selection, two doctoral students independently coded all 107 studies using a codebook created in a secure online data management system (REDCap). The senior author reviewed any discrepancies and resolved issues through further discussion and review of relevant articles. Coding for each study included: year and type of publication; study design; intervention name, domain, and outcomes; delivery format; implementer; number of participants; geographic location; grade(s); gender; race/ethnicity of participants; percent of Black participants; and whether outcomes were disaggregated by race/ethnicity. Preliminary results suggest that there is variability among Black participation in reading and writing intervention studies. Variables such as intervention and publication type influenced the degree to which Black students were in the sample. Additionally, few studies disaggregated outcomes by race, which leads to implications for future intervention development, adoption, and analysis.

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Examining the effects of Anxiety Interventions for Students with Learning Difficulties

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Students with learning difficulties make up a large portion of the student population. Apart from their academic difficulties, research has shown that they also face socioemotional difficulties. Anxiety is one of the socio-emotional problems that students with learning difficulties face. It is characterized by excessive worry combined with physical symptoms, such as fatigue, insomnia, and nausea. Almost 70% of students with learning difficulties experience higher levels of anxiety than students in general education (Nelson & Harwood, 2011). Academic anxiety is a sub-type of anxiety that is experienced in educational settings. Examples include fear of failing during evaluative activities (e.g., test anxiety) or fears about failure in a particular subject (i.e., math or reading anxiety). Anxiety limits the cognitive and working memory efficiency of students, reduces problem-solving ability, leads to distracting social comparisons, and lowers self-confidence. Due to these negative consequences, high levels of anxiety negatively affect academic performance. Students with learning difficulties demonstrate high anxiety levels and this emotional stress results in more severe learning difficulties.

Research has shown that anxiety interventions have promising results for anxiety and academic performance of typical students. The systematic review of von der Embse et al. (2013) examined the effects of test anxiety interventions on anxiety and academic outcomes of elementary and secondary school students. The findings demonstrated that some test anxiety interventions can reduce test anxiety and improve academic performance. A meta-analysis by Bicer et al. (2020) examined the effects of cognitive and behavioral therapy on math anxiety of students. The results indicated that anxiety interventions based on cognitive and behavior therapy can have positive effects on math anxiety.

This systematic review adds to the research base by focusing on students with learning difficulties and sheds light on the effectiveness of anxiety interventions for this population of students (kindergarten to Grade 12) and investigates the following question: What are the effects of anxiety interventions on students (K - 12) with learning difficulties on anxiety and academic performance outcomes? An electronic database, hand search, and forward and backward search has been conducted and the results will be completed on December 1, 2022. Data from every qualifying study will be extracted and presented based on: (a) study characteristics (publication year, research design, and sample size), (b) student participant demographics (e.g., age, grade, gender, ethnicity, learning or other difficulties), (c) intervention characteristics (e.g., interventionist, group size, length of intervention, anxiety-reducing strategy), (d) measure details (e.g., name and type, standardized vs. unstandardized), and (e) overall findings and effect size. We hypothesize that the results will be aligned with the previous studies on anxiety interventions for typical students, which yield positive effects on anxiety and academic outcomes.

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Development and Validation of Kindergarten Dynamic Assessments in Alphabetic and Vocabulary

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Accurate early screening of students at risk of developing reading difficulties is critical to the success of a prevention model. Dynamic assessment(DA) is an assessment paradigm that interleaves instructional prompts within a test to capture students' response to instruction, and its use as a screening tool supplemental to traditional, brief universal screeners has gained much attention in the literature (Wagner & Compton, 2009). Although, a few studies examined DA in kindergarten, and none focused on phonological awareness (Bridges & Catts, 2011; Gellert & Elbro, 2017), and none focused on alphabetic or language. The purpose of this study was to develop DAs of alphabetic (letter sound and blending) and vocabulary and examine its psychometric properties and validity evidence.
DA of letter-sound asked students to learn the sounds of 7 letters (a, i, o, b, t, m, s) with instructional prompts based on pictorial mnemonics. DA of blending asked students to read 3 Vowel [V] - Consonant [C] and 3 CVC words with instructional prompts based on the synthetic phonics approach. DA of vocabulary asked students to listen to a story with a nonsense word and figure out the meaning of the word using context clues, with prompts simplifying the story and offering additional clues. Kindergarteners (N=166) were assessed in three DAs and four subtests from the Texas Kindergarten Entry Assessment (letter-sound [α =.73], blending[α =.64], listening comprehension [α =.79], vocabulary[α =.80]) at the beginning of fall. Among them, we obtained school-administered first-grade NWEA MAP data for 48 students.
We used graded response models to refine each DA by identifying the most appropriate number of instructional prompts to make DA efficient while maximizing the item discrimination and test information. In particular, DA of letter-sound demonstrated greater sensitivity in assessing low readers. We then fit 3-factor Confirmatory Factor Analyses (CFA) model to demonstrate the DAs are 3 separate, unidimensional constructs (TLI and CLI > .98, RMSEA =.03) and show high reliability of DA (ωs >.81). DAs showed discriminant validity such that each DA had moderate to high correlations (rs = .42 to .69) with its respective universal screener (e.g., DA blending and TX-KEA blending) but low correlations (rs = .21 to .34) with universal screeners of less directly related constructs (e.g., DA blending and TX-KEA vocabulary). Moreover, DA tends to have higher predictive validity in explaining first-grade reading MAP data (rs = .50 -.56) than TX-KEA (rs = .31 -.56). Taken together, the results support the interpretation that DAs have promise as a reliable measure of alphabetic and vocabulary with adequate validity evidence.

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Effects of Data-Based Instructional Change for Students with Intensive Learning Needs

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Students with significant learning needs often do not make adequate progress despite being provided with validated, supplementary instruction, and may require more intensive, individualized intervention (Austin et al., 2017; McMaster et al., 2005). For this small proportion of students, research has supported data-based instruction (DBI), a systematic way to individualize instruction based on student progress monitoring data, as an effective approach (e.g., Filderman et al., 2018; Jung et al., 2018). In the DBI process, teachers plan and enact instructional changes in cases where the individual student's curriculum-based measurement (CBM) data indicate insufficient response to current instruction and therefore suggest a need for teachers to change instruction somehow.
Despite the considerable body of research assessing the efficacy of DBI, few researchers have examined the effects of instructional changes isolated from the general efficacy of DBI. The few studies examining the efficacy of changing instruction relied on static scores measured at a given time point (e.g., Denton et al., 2013; Filderman & Toste, 2021). This study seeks to establish whether instructional changes lead to improved outcomes for struggling students over time. Furthermore, we examine whether the effects of instructional changes differed by types of instructional changes, teacher characteristics, and student characteristics. Regarding the types of instructional changes, we referred to Fuchs et al.'s (2018) taxonomy of intensification strategies, which includes strength, dosage, alignment, transfer, comprehensiveness, and behavioral support, and used the term instructional changes to include teachers improving fidelity or changing the content as well.
Specific research questions included:
1. What is the effect of teachers' instructional changes after eight data points based on progress monitoring data?
2. Does the effect of teachers' instructional changes vary by type of instructional change?
3. Does the effect of teachers' instructional change vary by teachers' DBI knowledge and skills and self-efficacy?
4. Does the effect of teachers' instructional change vary by students' initial writing performance and disability status?
Data were drawn from a larger randomized control trial. We used data from word dictation, a CBM task that measures writing skills at the word level. Participants included 29 teachers and 46 students in grades 1-3 with intensive writing needs. Teachers made instructional changes when eight weekly data points were collected. We applied a piecewise linear mixed-effects model to compare writing growth in two distinct instructional phases: before and after the instructional changes (Phases 1 and 2, respectively).
Results show that students made significant writing growth in both phases, with greater growth rate in Phase 2. The growth in Phase 2 significantly differed by the types of instructional changes. Students' initial writing performance was significantly associated with the slope in Phase 2, whereas the disability status was not significantly related to either slope. Teachers' DBI knowledge and skills were not significantly associated with either slope, whereas teachers' efficacy was significantly associated with Phase 2 slope. These findings enhance understanding of the effects of systematic instructional changes on students' learning outcomes. We also discuss the need for providing professional development focusing on data-based instructional change.

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A Comprehensive Meta-Analysis of Writing Interventions for Elementary Students with Disabilities

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Purpose Writing outcomes on the most current fourth-grade National Assessment of Educational Progress (NAEP) reported only 6% of students with disabilities achieved a level of writing proficiency (Persky et al., 2002). Therefore, more research is needed to identify empirically-based practices that improve learner outcomes. Highlighting effective interventions also ensures teachers have access to reliable instructional resources. The present comprehensive meta-analysis investigated writing interventions for students with and at-risk for disabilities in Grades K-5. This meta-analysis extended previous systematic reviews (e.g., Gillespie & Graham, 2014) by examining writing outcomes beyond writing quality. Moreover, the present meta-analysis estimated effect sizes (ES) for students with a range of disabilities (including those at risk) to understand for whom writing interventions are effective and under what conditions.
Research Questions: Two research questions were investigated:
1.What writing interventions are effective on what writing outcomes for students with and at-risk for disabilities in Grades K to 5?
2. Under what conditions are writing interventions effective on what writing outcomes for students with and at-risk for disabilities in Grades K to 5?
Method and Findings: The present meta-analysis applied systematic search methods to conduct electronic database searches, reference harvesting, journal hand searches, examination of previously conducted reviews, and consultation with prevalent writing researchers. Included studies met the following criteria: (a) participant sample included students with or at-risk for disabilities, (b) study investigated the effectiveness of a writing intervention, (c) outcomes included at least one measure of writing, (b) design used a Randomized Control Trial (RCT) or quasi-experimental design with pretest data reported. No restrictions were placed on date of the study, the country in which the study was implemented, or language of instruction. Moreover, all studies were reported in English. Approximately 20% of studies were independently screened and coded by a second researcher. Reliability for screening and coding exceeded 92% and 80%, respectively.
Results identified 81 studies eligible for inclusion, with outcomes representative of 365 ES in the present meta-analysis. Hedge's g (Hedges, 1981) standardized mean difference ES estimated the effects of writing interventions when compared to control conditions, with ES adjusted when pretest scores were reported. The STATA macro, reg sandwich (Tyszler et al., 2017), that applies Robust Variance Estimation (RVE) procedures, was used to estimate the average ES for categories of writing interventions. Separate models were estimated for each intervention and outcome, with a value of $\rho = .80$ applied to estimate between-study variance (Hedges et al., 2010). Initial findings indicated an overall average ES of .80 ($p < .001$; CI 95% [0.57, 1.03]) for studies investigating writing interventions for students with and at-risk for disabilities. Additional subgroup analyses explored ES for different categories of interventions (e.g., strategy instruction, spelling interventions, computer-assisted instruction) and writing outcomes (e.g., holistic quality, writing output). Moderator analyses further explored if study characteristics such as intervention duration and language of instruction explained heterogeneity in study ES. Findings provide implications for disseminating writing interventions to improve classroom instruction and underscore areas needing further attention in future research.

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Educational Leaders' Insights on Implementation and Sustainability Practices of SRSD after PBPD

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This qualitative study followed up with educational leaders who received practice-based professional development (PBPD) on self-regulated strategy development (SRSD) for informative writing for elementary students with IEPs. Many of the PBPD participants taught SRSD instruction during an online summer tutoring program. The present study gains insights on the impact of PBPD on the implementation and sustainability of SRSD in participants' current roles.

Research Questions:

1. How do educational leaders describe their involvement implementing SRSD instruction in their current roles after PBPD instruction?
2. What factors do educational leaders identify having impacted the adoption and dissemination of SRSD instruction in classrooms and schools?
3. How do educational leaders describe SRSD instruction impacting students?

Six educational leaders participated: one district specialist, three district coaches, one elementary student services coordinator, and one elementary school principal.

Semi-structured interviews were held one-on-one over Zoom and recorded for transcribing purposes. Initial codes were developed through open coding. An initial codebook was piloted against the first and second interview line by line and members came to coder agreement. Codes were adjusted/refined/expanded as needed and the updated codebook was used on uncoded transcripts. The final codebook with themes and subthemes was applied to the whole data set.

Five themes emerged including intention for enrolling, application, additional supports, barriers, and impact.

1. Intention for Enrolling: Two participants volunteered because they wanted to learn more about writing. The training was required for the district specialist, one coach, and the principal. An additional coach did not participate in the training or tutoring but was included due to her present involvement in SRSD implementation.
2. Application: Four participants (two coaches, student services coordinator, and principal), were using SRSD and providing supports to teachers. The principal had a one day PBPD on SRSD at her school provided by two of the coaches. The student services coordinator implemented SRSD daily with a small group. They all increased buy-in and interest by sharing their PBPD and SRSD experiences and student outcomes.

The district specialist and one coach were not using the SRSD due to their current roles. However, the specialist was incorporating PBPD into his trainings.

3. Additional Supports: Coaches attended Professional Learning Community meetings, did fidelity checks, modeled lessons, and assisted with differentiation for teachers implementing SRSD during the school year. Additional supports needed from the research team was guidance on progress monitoring and materials in different genres. Future supports mentioned included providing more training and expanding SRSD instruction beyond elementary.
4. Barriers: One barrier was administration. The principal only required implementation of SRSD one day per week. The pandemic impacted staff shortages, absences, pacing, and student gaps. Another barrier was time with teachers not prioritizing writing daily. The last barrier was teacher understanding and buy-in of SRSD.
5. Impact: The last theme was the impact of SRSD. Participants said SRSD had a positive impact on students, providing a structure for writing and increasing confidence. The PBPD on SRSD also had an impact on the educators, equipping them to be better writing teachers.

A False Dichotomy? Distal and Proximal Assessments in Early Mathematics

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Purpose and Research Questions: In recent years, robust intervention studies in the field of mathematics have been conducted, establishing strong intervention programs for students in early elementary grades (Nelson & McMaster, 2019). One key feature of intervention research is the inclusion of effective outcome measures (Park & Nelson, 2021). Gersten et al. (2005) presented a set of quality indicators for group experimental research in the field of special education stating that the inclusion of both measures closely aligned with the intervention (proximal) and measures of generalized performance (distal) as an essential quality indicator. The study uses data from a randomized control trial and is designed to explore student's responses to items on proximal and distal measures of early numeracy skills by study condition and the level of alignment of the item with the intervention content. The purpose of the study is to assess items within the proximal measure to determine the degree to which alignment with the intervention curriculum influences student outcomes on the measure. ProFusion is aligned with the Fusion intervention as well as the Common Core State Standards for mathematics in first grade, therefore, determining the degree to which alignment between the measure and the curriculum influences student outcomes has implications for understanding the dichotomized variation in results when using proximal and distal measures in intervention research. The current study will address the following research questions: (a) To what extent do student scores on the ProFusion proximal assessment correlate with student scores on a distal measure? (b) To what extent do correlations between student scores on the proximal and distal measures vary by treatment condition? (c) To what extent does cohesion between the intervention and proximal measure at the item level influence student scores by condition?
Participants: The original study randomly assigned 459 at-risk first-grade students within 53 first-grade classrooms to one of three conditions: (a) treatment group with a 2:1 student-teacher ratio, (b) treatment group with a 5:1 student-teacher ratio, or (c) a no-treatment control condition (business-as-usual).
Method: Data for this study was collected during a conceptual replication efficacy trial of Fusion, a first-grade tier 2 mathematics intervention that has been shown to effectively increase student's mathematics skills (Clarke et al., 2014). Student mathematics gains were measured with pre- and post-test assessments including both a proximal, researcher-developed measure (ProFusion) and a distal norm-referenced measure (Test of Early Mathematics Ability-Third edition [TEMA-3]). To address the first and second research questions correlation coefficients will be calculated between student's pre- and post-test scores on ProFusion and the TEMA by treatment condition. To address the third research question items on the ProFusion assessment were rated by two independent coders according to their cohesion with the Fusion intervention and descriptive statistics will be calculated at the item-level. Item-level data will be examined for patterns based on alignment with the intervention.
Findings: Results from this study will include the examination of correlation coefficients and item-level descriptive statistics including the identification of patterns based on cohesion between assessment items and intervention content. Implications for future research will be discussed in relation to cost and time effectiveness as well as quality of outcome measures and usage of proximal and distal measures in terms of educational decision making in mathematics.

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The effects of advanced phonemic awareness instruction on first grade literacy outcomes

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There is an extensive theoretical and empirical knowledge base supporting the importance of phonemic awareness to learning to read and spell. Including phonemic awareness instruction as part of a comprehensive approach to teaching foundational reading skills is widely accepted as an evidence-based practice and is included in recommendations across most standards and guidance documents. Although there is broad consensus on the importance of teaching phonemic awareness, there are continuing questions about the mechanisms by which phonemic awareness proficiency supports successful reading as well as about the most effective way to teach phonemic awareness. For example, an emerging new perspective in the field suggests that typical phonemic awareness instruction focused on basic skills may not be sufficient to support proficient reading. Instead, this new perspective advocates for teaching more advanced phonemic awareness to all students in the early grades through purely oral language activities separate from other foundational reading skills instruction (e.g., phonics). We conducted a study evaluating the Heggerty curriculum, a widely used program that exemplifies this new approach to advanced phonemic awareness instruction.

A total of 13 school were blocked on demographic variables and randomly assigned to treatment or control conditions. A total of 870 first grade students participated in the study, 510 students in the treatment schools and 360 students in the control schools. All first grade teachers in the seven treatment schools implemented the Heggerty curriculum, a published advanced phonemic program, for 15-20 minutes per day during whole class instruction between October and May. The Heggerty curriculum consists of eight daily phonological and phonemic awareness routines focusing on skills related to rhyming, onset fluency, blending, identifying final or medial sounds, segmenting, adding phonemes, deleting phonemes, and substituting phonemes. Treatment teachers received full day of initial training, a series of monthly professional learning community meetings for teachers, and on-going, classroom-based coaching. Control teachers implemented business as usual literacy instruction. To evaluate the effects of advanced phonemic awareness instruction using the Heggerty program, we accessed district-collected measures of phonemic awareness, word decoding, and reading connected text. Research team members also administered the Phonemic Awareness Baseline Assessment, a measure developed by the publishers of the Heggerty program to assess phonemic awareness skills taught in the program. Multi-level modeling indicated that the Heggerty curriculum had a meaningful impact on its intended primary proximal outcome, students' advanced phonemic awareness skills. However, we found that that Heggerty curriculum did not have a statistically significant effect on measures on nonsense word reading fluency or oral reading fluency. These findings suggest that effects of the Heggerty curriculum did not have an impact on measures of reading, a near transfer measure of word decoding and a far transfer measure of reading connected text.

Testing the Efficacy of a Handwriting Curriculum with Pre-School Students with Visual Impairments and Additional Disabilities

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Presentation description: The development of handwriting skills, particularly for preschool and kindergarten-age students, is an important part of the ECC and a child's overall literacy skills. It is typically part of the everyday preschool curriculum and relies on the child already having a certain level of fine motor skills/shoulder girdle development/core stability/hand strength, visual-motor skills, and concepts, as well as visual imitation. These pre-requisite skills and concepts begin before school and are typically mastered before children begin formal handwriting instruction. Children who are visually impaired often need additional supports and repeated direct instruction in order to ensure they are ready to begin handwriting lessons with their sighted peers. In addition to specific instruction, students with visual impairments may also need tactile or visual adaptations to their materials in order to access and participate with the materials. Therefore, it is important for TSVIs working with young children to be aware of and monitor their students' pre-writing and writing skill development and work with the child's family and educational team to make sure appropriate accommodations are made. The purpose of this presentation is to give TSVIs the resources and background knowledge they need in order to monitor their preschool/kindergarten students' pre-writing and handwriting progress, as well as provide data-supported strategies and modifications to teach developmentally appropriate handwriting skills.
Five pre-school students with visual impairments were studied using a multiple-probes across sets research design to explore their handwriting skills development. The mechanics of learning handwriting can be especially challenging for students with visual impairments depending on many factors related to hand-eye coordination, fine motor skills, and levels of functional vision. This study explored the efficacy of the Handwriting Without Tears (HWT) curriculum to see if this "off-the-shelf" program could be used effectively with students with visual impairments and additional disabilities. Lists of potential accommodations were considered based on groups of similar students (I.e. low vision, CVI, tactile learners, etc.). We also gathered documentation on how the HWT curriculum has been or may need to be modified/adapted for students with visual impairments. This will include how this curriculum has been used with our students across developmental levels, including teaching pre-requisite skills and concepts to students with developmental delays. This study included long-term data charting student progress using materials from this curriculum to teach beginning writing concepts such as big/little, straight/curve, top/middle/bottom, and shape recognition, as developmental precursors to handwriting. Data on student performance with and without accommodations, specifically with tracing and letter formation handwriting worksheets will be reported and shared. The pros and cons of beginning with tracing before copying letters from a model will also be discussed. In addition to worksheets, other modifications and accommodations for pre-writing and writing activities will be shared. Pilot data from a single-case study using individualized accommodations, HWT materials, and developmentally appropriate fine motor activities as an intervention package to increase the beginning handwriting skills of preschool and kindergarten students with visual impairments will be presented in this poster. This includes students with visual impairments who are developmentally delayed or have additional disabilities.

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Examining Fidelity Reporting within Studies of Reading Interventions for Elementary Students

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Research suggests that early access to evidence-based reading intervention improves reading outcomes for students with or at risk for reading difficulties (Al Otaiba et al., 2009; Torgesen, 2004; VanDerHeydan et al., 2007). Additionally, studies have found that teacher implementation of reading interventions determines their effectiveness in improving early reading skills for students at risk for reading difficulties (Swanson et al., 2011). Fidelity of reading intervention implementation may be a bigger contributor to outcomes for students with reading difficulties than for their typically-developing peers. For example, studies have found that the influence of fidelity on student language and literacy outcomes is greater for students who demonstrate lower initial performance (Connor et al., 2007; Hamre et al., 2010; Neugebauer et al., 2017) and students with learning disabilities (Boardman et al., 2016). However, recent syntheses have suggested that less than half of reading intervention studies report treatment fidelity data (Capin et al., 2018; Swanson et al., 2011).
The purpose of this meta-analysis is to build on the existing knowledge base regarding implementation fidelity by providing a systematic review of studies of reading interventions for students with or at risk for dyslexia in Grades K-5. In particular, we asked:
1. What proportion of foundational reading intervention studies for K-5 students with or at risk for dyslexia reported treatment fidelity data?
2. For studies that reported fidelity information, what dimensions of fidelity (i.e., adherence, quality, dosage, responsiveness, or differentiation) were reported and how was data collected (i.e., live observations, recorded video/audio, or self-report) and reported (i.e., quantitatively or qualitatively) for those dimensions?
3. Was fidelity reporting associated with any other study/intervention features (i.e., publication year, research design, student grade level, intervention implementer, intervention group size, and intervention duration)?
4. Was there a difference in the average effect size for studies that reported fidelity information relative to those that did not?
A total of 51 studies were included. Results indicated that 75% of studies reported fidelity data. Studies reporting fidelity primarily focused on adherence and dosage data with little to no information reported for other dimensions of fidelity (i.e., quality, responsiveness, differentiation). The average effect of reading interventions on reading outcomes for studies that reported fidelity was estimated as $g = 0.30$ ($p < .01$), whereas the average effect on reading outcomes for studies that did not report fidelity was estimated as $g = 0.50$ ($p < .01$).

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Analyzing Alphabet Knowledge Acquisition in Young Children

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The Simple View of Reading emphasizes the importance of both decoding and language comprehension for adequate reading comprehension (Gough & Tunmer, 1986). A student who has deficits in either word recognition or language comprehension will not be a proficient reader or speller. Importantly, the two broad constructs of decoding and language comprehension are comprised of multiple subskills. Alphabet knowledge and acquisition in the early years of schooling is one of the best predictors of word reading ability (National Reading Panel, 2000; Snow et al., 1998; NELP, 2008). Students who do not solidify this foundational skill struggle with future skills required for proficient reading as data has shown the predictive power of alphabet knowledge (AK) for later reading achievement (Hammill, 2004; National Reading Panel, 2000; NELP, 2008; Piasta & Wagner, 2010; Schatschneider et al., 2004). However, not all letters are created equal in terms of their degree of difficulty in learning the names and corresponding sounds (Justice et al., 2006; Druin, et al., 2012; Gerde, 2019). Understanding the complexity of letters and sounds is important when making instructional decisions as it can directly affect sequence and pace of instruction. Evidence indicates what teachers choose to focus instruction on and how they execute instruction strongly impacts children's learning of letters and sounds (Justice & Pullen, 2003; Piasta & Wagner, 2010). When knowledge about letter difficulty is coupled with other evidenced-based instructional practices students will experience success. The success of these lessons is likely to increase students' motivation for learning and builds interest in learning additional letters (Roberts et al., 2021).
The goal of this analysis is to estimate individual letter difficulties using a diverse data set collected from four-year-old children participating in uppercase and lowercase letter naming and letter sound production tasks. The final sample consisted of approximately 425 students enrolled in public pre-k. Rasch model analysis for dichotomous response was used to look at (1) the overall fit of the data to the Rasch model (including analysis of individual misfitting items and people), which gives information about the underlying unidimentionality of AK and (2) the relative difficulty of AK items within the Rasch model. The results from this study may provide insight into the ideal age for administering AK subtests, confirm previously suggested developmental sequence of alphabet acquisition, as well as provide evidence of instructional shifts that have taken place over the last ten years; informing future instructional considerations.

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The Impact of Professional Development on Teacher Outcomes: A Meta-Analysis

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Professional development (PD) is the most effective route to educate teachers on current research-based practices. Research is evolving and teachers that were sufficiently trained previously may not have the knowledge to implement current, effective, research-based methods to lessen achievement gaps (Connor et al., 2014). With estimates suggesting 5-10% of teacher time is spent in PD (Gulamhussein, 2013), it is problematic that there is no conclusive evidence regarding what makes PD effective for teacher learning. There is a breadth of research on PD, yet questions remain. Meta-analyses indicate student outcomes are significantly improved after teachers participate in PD but it is undecided what variables related to PD elicit the change (e.g., Blank & de las Alas, 2009; Didion et al. 2020; Kennedy, 1998; Yoon et al. 2007). Intensity, relevance, and collaborative learning processes (i.e., active and collective participation) are identified features of high-quality PD (National Center for Education Statistics, 200; Desimone, 2009). Heterogeneity of PD design complicate analyses of the degree these features result in teacher and student learning. Alternatively, other literature reviews have focused on specific components to draw conclusions related to effective PD. For instance, some research synthesized literature related to a specific PD format (i.e., coaching; see Kraft et al., 2018; professional learning communities, see Vangrieken et al., 2017), content area (e.g., science, see van Direfl et al., 2012), or population (e.g., early childhood, see Zaslow et al., 2010). Conclusions suggest PD effectively strengthens teacher outcomes and impacts student achievement, but this finding is limited by study parameters. There are still questions about what factors are meaningful for efficacious PD, significantly impacting teacher behavior and, subsequently, student achievement. A new lens is required to comprehensively review PD literature, such as examining theories of teacher learning and considering mediation effects on student outcomes.

A comprehensive search of peer-reviewed research published between the earliest possible start date (1974) and 2021 resulted in 128 studies that met inclusion criteria. Study features, effect sizes, and quality indicators are currently being coded. The effect size index that will be used for all outcome measures is Hedges' g (Hedges, 1981) and will be corrected for sample size bias. All eligible, independent effect sizes will be included from each study, resulting in some studies contributing multiple effect sizes when several reading outcomes are reported. To account for the statistical dependencies of these correlated effects, random effects robust standard estimation will be used (Hedges et al., 2010). Preliminary findings from 585 effect sizes from 66 independent samples indicate PD had a significant effect on teacher outcomes (Hedges' $g = 0.54$, $p < .001$, and a 95% CI of [0.40, 0.68]). Findings may shed new light on complex issues about what makes PD effective. Discussion will be based around moderating effects of PD design and mediating effects of teacher outcomes on student outcomes. This is a resubmission of a previously accepted poster. I was unable to attend PCRC 2022 due to concerns with the COVID-19 delta variant and keeping my newborn safe.

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Piloting a Cross-Age Dialogic Reading Intervention: Promises and Pitfalls

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Education and policy experts have proposed tutoring as a solution for students who were most adversely affected by COVID pandemic learning loss.1 Compared to other alternatives that have been proposed (e.g., extended school day or year, summer school, or after-school programs), tutoring has the largest overall impact on student achievement and can be scaled up (reaching more students in more schools) at relatively low cost.1,2 Cross-age tutoring is particularly promising as a scaled-up intervention because of its low cost and evidence supporting enhanced academic achievement of both tutors and tutees.1,3,4 Our project involved a summer pilot study to develop a cross-age tutoring format for our intervention called Dialogic Reading with Integrated Vocabulary Enrichment (DRIVE). DRIVE is a shared book reading approach designed to promote vocabulary development and reading comprehension in early elementary readers based on the original dialogic reading method of Whitehurst and colleagues.5,6 In this approach, adults ask open-ended questions and encourage children to develop language through scaffolding, modeling, and praise using strategies summarized by the acronym, EMPOWERED.7 We have conducted several small-scale community-based participatory research studies with Title I schools in which we trained undergraduate research assistants (RAs) to implement the approach individually with first and second graders who are at risk for reading problems. Results have indicated that 2 to 4 total hours of individual, 10-minute intervention sessions over about 6 weeks can improve reading comprehension of at-risk Grade 1 and 2 students with below-average reading skills, narrowing the gap between these struggling readers and typically-achieving peers.8,9,10 Over 80% of first- and second-graders also reported positive feelings about participating in the DRIVE intervention, indicating a beneficial effect on children's attitudes and motivation to read.10

We planned a 6-week cross-age tutoring pilot study at a summer camp with a detailed protocol for training older children (Big Buddies) to use the DRIVE approach and for monitoring their performance while reading to younger children (Little Buddies). When the camp site unexpectedly fell through, we conducted a smaller, briefer pilot in our lab with an abbreviated Big Buddy training. Four Big Buddies (8.5-15 years old) and four Little Buddies (5.5-8.5 years old) participated. Three RAs (one male, two females) trained the Big Buddies and monitored/scaffolded Reading Buddies sessions between the Big Buddy and Little Buddy. Big Buddies were trained in a single 30-minute session using one book, contrasted with the plan of training small groups over several 10- to 15-minute sessions using two books.

Our poster will discuss the pitfalls and promises of the approach as a cross-age tutoring technique. Results show that Big Buddies are able to use many of the EMPOWERED strategies, some being more difficult to consistently employ, as previously found in treatment fidelity research with RAs.11,12 A lengthier training (as planned) could improve Big Buddy performance. Surveys indicated that Big and Little Buddies enjoyed the experience. Parents also found it rewarding for their children and expressed interest in having this approach in schools. The results are being used to plan a larger-scale study in schools this year.

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Model Constraint Tests of Spanish Alphabet Item Sets by Case and Format

Presenter(s): Noé Erazo, Rightpath Research and Innovation Center, University of South Florida (erazo@usf.edu)
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OVERVIEW: The U.S. is now the second largest Spanish speaking country in the world, and by 2050 it is expected to be the first (Instituto Cervantes, 2018). Alphabet knowledge is a core emergent literacy skill and a key kindergarten readiness outcome. In comparison to English, only a few research studies exist concerning Spanish alphabet knowledge from a developmental and measurement perspective (Ferreiro & Teberosky, 1979; Ferroni & Diuk, 2010). Our current study extends the previous research by testing Spanish speaking children in the U.S. in both uppercase and lowercase letter names in both receptive and expressive tasks using the School Readiness Curriculum Based Measurement (SRCBM) system. Children from Spanish speaking homes in the United States often begin school with delayed English language and literacy skills when compared to their English-speaking peers. There is a lack of research on how Spanish speaking children develop early literacy skills in both languages and how to mitigate potential risk factors. The authors will describe the latest findings on Spanish letter name knowledge and its utility for informing instruction.

ABOUT THE SRCBM SPANISH STUDY: A single-shot case study design with a large heterogeneous sample was chosen to address hypotheses related to the Spanish alphabet's order of acquisition. In total, 1,558 Spanish-speaking children participated from public and private schools in Texas and Florida. Children ranged in age from 2 years to 8 years, with a mean age of 5 at the time of initial testing. The sample was 50% female. Participants' parents provided information pertaining to parental educational levels and Spanish dialects spoken in the home. Information on language use in the classroom were also collected from teachers. In the past three centuries, the Spanish alphabet has gone through numerous changes, including the addition of K and W for use in loan words, the demotion of Ch and Ll to digraphs, and the push to rename Y "i griega" as "ye" (Real Academia Española, 2016). The authors will discuss the data collection process for measuring Spanish letter names.

QUANTITATIVE RESULTS: The authors performed confirmatory factor analyses of dichotomous data in Mplus version 8.2 (Muthén & Muthén, 2017). The estimator used was maximum likelihood estimation. Model comparison results showed that Spanish letter name knowledge is a unidimensional construct. As a follow up, we performed a series of two-tailed z-tests on standardized parameters from sets of items to evaluate the main and interaction effects of case and test format. Results showed that lowercase letter name items on average were collectively more difficult than uppercase letter name items. Free response letter name items were on average collectively more difficult than multiple choice letter name items. Results also showed that lowercase letter name items were on average collectively more discriminating than uppercase letter name items. Free response letter name items on average were collectively more discriminating than multiple choice letter name item. The authors will discuss potential order of acquisition, and how letter case and test format could be introduced in a way that facilitates instruction.

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Supervision of Itinerant TSVIs and COMS: A Case Study

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In recent years, legislators and administrators have increasingly focused on teacher performance to ensure student success. As a result, administrators continue to place greater emphasis on teacher supervision and evaluation, processes which, when conducted effectively, can result in institutional improvements. Such supervision has, as its goal, quality instruction and optimal learning for students (Bays, 2001; Mette et al., 2015). By increasing teacher effectiveness and quality of instruction, administrators hope to increase student achievement and improve student outcomes. In most cases, schools have established protocols for teacher supervision, which are often based on the clinical supervision model (Mette et al., 2015). Importantly, though, these supervision models reflect the roles and responsibilities of the general education classroom teacher (Woolf, 2019). As such, these measures may fail to accurately capture or describe the teaching practices and performances of special education teachers, especially those who serve students with low-incidence disabilities. Teachers serving these students often adopt an itinerant model, traveling between educational sites to deliver instruction and provide supports (Correa-Torres & Howell, 2004). Itinerant TSVIs and COMS may work with students as young as infants and as old as 21 years across a variety of settings (e.g., the child's home, preschools, hospitals, etc.). As a result, TSVIs and COMS may have multiple supervisors, each with different educational backgrounds, training, and experiences (Benson, 2001). Currently, little research exists regarding supervision of itinerant special educators, and in particular, itinerant TVIs (Benson, 2001; Woolf, 2019). The purpose of this case study is to describe the supervision and evaluation process(es) for itinerant TSVIs and COMS at a public school district in Nebraska. The primary research question asks: How are itinerant TSVIs and COMS supervised and evaluated? To further investigate and describe the supervision process, I ask the following subquestions: a) What supervisory processes do itinerant TSVIs and COMS find effective? b) What supervisory experiences do itinerant TSVIs and COMS need to improve their practice? c) What are the barriers or challenges to effective supervision for itinerant TSVIs and COMS? d) How could the supervisory process be improved? To understand how itinerant TSVIs and COMS experience the supervision and evaluation process, a case study approach was used to collect data through semi-structured interviews, document analysis, and surveys. One-on-one interviews were conducted with itinerant TSVIs and COMS, as well as their supervisor(s). TSVIs and COMS were also asked to identify a "home base," a school they spent a majority of their time serving; the school's principal was then asked to complete a brief survey regarding supervision and evaluation of itinerant personnel serving that school. At the time of interview, TSVIs and COMS were asked for copies of evaluation documents from the 2021-2022 school year, which, with other district evaluation documents, were analyzed for themes. Analysis of results is ongoing. However, the collected data will be synthesized into a narrative. Themes and findings will be shared, with a focus on how to improve the evaluation process.

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Co-Teaching, Inclusion, and Collaboration: Practices That Work and Some That Don't

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Purpose: The proposed presentation aims to showcase and compare results of two qualitative studies that examined effective inclusion and co-teaching models and to discuss their findings in the light of special education teacher preparation and improvement of the outcomes for students with disabilities. The first study examined collaboration and co-teaching in inclusive classrooms during an early fieldwork practicum for pre-service special education teachers. It presents the perspectives of pre-service co-teachers, university supervisors, and parents of students with disabilities (including learning disabilities (LD), intellectual disabilities (ID), and Autism Spectrum Disorder (ASD). The benefits and challenges of collaboration and co-teaching for teachers-in-training and students with disabilities in a unique inclusive university-based setting are discussed. The second study was conducted with stakeholders (teachers, paraprofessionals, administration, and parents of students with disabilities) at a public elementary school that is well-known for its exceptionally successful inclusion model. It discusses the school systems in place that contribute to effective inclusion model. The purpose of the proposed presentation is to share effective approaches to inclusion and co-teaching when implemented by pre- and in-service teachers and to discuss the implications for special education teacher training.
Research Questions: Study 1: What are the benefits and challenges experienced by special education pre-service co-teachers and their students with disabilities (LD, ID, ASD) in inclusive classrooms? Study 2: What schoolwide practices do school personnel and parents of students with disabilities identify as contributing to the successful inclusion?
Participants: Study 1 included eight participants: four pre-service special education teachers, two university supervisors, and two parents of students with disabilities in upper elementary grades. Study 2 included eight participants: two elementary general education teachers, two elementary special education teachers, one paraprofessional, one school administrator, and two parents of students with disabilities in elementary grades.
Methods: Both studies used qualitative methods. Individual semi-structured interviews were conducted to identify: a) benefits and challenges experienced by special education pre-service co-teachers and their students with disabilities in inclusive classrooms (study 1) and b) schoolwide practices contributing to successful inclusion of students with disabilities in an urban elementary school (study 2). The transcribed interviews were analyzed a thematic analysis approach, which provided flexibility in thematic coding and allowed to identify, examine, and describe patterns using both inductive and deductive approaches (Braun & Clarke, 2006).
Findings: Study 1 findings identified teacher-focused benefits including higher levels of preparation for future co-teaching, problem solving/conflict resolution, and increased professional flexibility. Student-focused benefits included academic achievement (consistent with Saunders et al., 2015), and greater socio-emotional growth. Teacher-focused challenges included struggle with professional communication, focus on self rather than students, and difficulty with being collectively in charge of students' learning. Student-related challenges included difficulty with navigating the class scene with multiple authority figures. Study 2 uncovered purposeful school systems that participants identified as key to successful inclusion. Besides collaborative stakeholders' mindset and multi-tiered systems of support identified in prior literature (Shogren et al., 2015), school's logistics (i.e., scheduling, staff onboarding), coaching, and within the school and home-school collaboration emerged as leading practices for successful collaboration.

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Trajectories of Early Mathematics Skill Development for English Learners

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Achieving success in early numeracy is one pillar in foundational mathematics knowledge that promotes continuing success in later academics. Further, early mathematics knowledge equips learners for future success in science, technology, engineering, and math (STEM) fields (Frye et al., 2013). Gaining insight to the performance of young mathematicians can help identify students who need support to prevent persistent and continuing math difficulties in their future. Curriculum-based measures (CBMs) are useful for identifying students as at-risk (or students at risk) for missing foundational mathematics competencies (Clarke et al., 2011). Recent evidence suggests that CBMs designed as single-skill mathematics probes (e.g., computation of single-digit addition) are an efficient and promising approach to detect students who are at risk of experiencing difficulty in mathematics (VanDerHeyden, 2017). In addition to the psychometric and validity data which provide evidence regarding the accuracy of capturing students who are truly at-risk for mathematics difficulties, the use of mathematics CBMs present a promising approach to supporting early mathematicians, but also have important educational policy and practice implications which should be taken into account. More specifically, there is a dearth of research on the applicability of standard early numeracy screening measures for use with English Learners (ELs; Alt et al., 2014). Contemporary research on mathematics CBMs for ELs is in its infancy (e.g., Aspiranti et al., 2022) and the implications of educational practice in this area drives the need for more in-depth research. As some researchers have pointed out, the early results on the (applicability/appropriateness) of mathematics CBMS for the diverse population of early elementary students are mixed. Therefore, there is not only the potential, but an overall need, for the field to reconceptualize the utility of early mathematics CBMs for ELs (Hall et al., 2022)

This study will use multiple approaches (i.e., multiple regression, ROC curve analyses) to analyze growth of both ELs and non-ELS over time on single-skill CBMs. The kindergarten and first grade students (n = 715) in this study were part of a large-scale efficacy trial in which students received a business-as-usual class-wide core curriculum. Outcome data will point to the association between a mathematics CBM and an end-of-year standardized published measure of mathematics proficiency for ELs and non-ELs as well as diagnostic accuracy statistics used for determining cut scores to determine risk and severe risk for ELs. This study points to the appropriateness of a universal screening approach with CBMs in kindergarten and Grade 1 (or first grade- you choose). Identifying ELs with mathematics difficulty at school entry increases opportunities to intervene early, which could lead students towards a successful path forward. Results are discussed in terms of future research recommendations and educational programming practices.

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Discrete Trial Training for Children with Intellectual Disabilities in Inclusive Settings: Guidance for Practitioners

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The ability to be able to read is one of the most important skills for students to be successful in school. Reading ability has implications for school performance as well as an individual's daily life, employment options, and self-confidence. Although children with ID display lower performance in reading relative to their peers (Allor et al., 2014), research suggests this population benefits from systematic, direct literacy instruction (Dessemontet et al., 2019). However, many professionals in inclusive environments, such as paraprofessionals and general educators, have not received training in systematic approaches to direct instruction. Discrete-trial training (DTT) represents a fundamental and empirically supported element of EIBI instruction used to teach skills to children with ASD (Lerman, Valentino, & LeBlanc, 2016). DTT is associated with large improvements in a range of skills including language, adaptive behavior, social skills, and the prevention of problem behavior (Devlin & Harber, 2004; Koegel, O'Dell, & Dunalp, 1988). For the purposes of acquisition, DTT requires instructors to distill complex behaviors into basic subskills and guide students through a series of trials or repeated opportunities for practice (Tarbox & Najdowski, 2008). Specific intervention targets of DTT programs range from behaviors, including imitation to using common household items, discriminations between parts of speech, and sight word reading (Smith, 2001). Although DTT is a popular technique often embedded within natural environment teaching and other approaches (Lerman et al., 2016; Smith, Donahoe, & Davis, 2000; Tarbox & Najdowski, 2008), instructors in inclusive environments often hesitate to integrate DTT into their practice. This presentation (a) defines the different elements of DTT and describes a model for its application in inclusive environments, and (b) demonstrates the usage of DTT in a classroom by giving a hypothetical example of a special education teacher who uses DTT in her classroom with all students in one-to-one daily instruction to teach sight words and (c) identifies the positive outcomes and challenges with the application of DTT in the inclusion environment. (d) provides recommendations on how to deliver instruction based on the outcome of using DTT. As it is very important for students with reading difficulties to increase their vocabulary knowledge, this presentation will focus on applying DTT to single-sight word instruction. Considerations such as selecting appropriate targets, measures, instructional procedures, and sample data sheets will be addressed. These will be presented in the context of a targeted population-elementary school students with intellectual disabilities who are receiving specially designed instruction(SDI). Guidance on how to present the efficacy of the procedures using experimental design, e.g., single-case) will also be provided. Finally, the presentation will address decision-making-how to know when the procedure is effective and when to alter or discontinue the use of DTT. Additional implications for practice will also be discussed.

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Representation of Racially Minoritized Students with Disabilities in Self-Determination Interventions

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Students with disabilities continue to experience inequitable outcomes in school and beyond as compared to peers without disabilities; and these disparities are even greater for students from racially minoritized backgrounds (U.S. Department of Education, 2019; Thoma et al., 2016; Trainor et. al. 2008). Across the lifespan, self-determination has been shown to be associated with positive outcomes for students with disabilities (Wehmeyer, 2014). Recent findings by Shogren and colleagues (2021) suggest that self-determination skill development and use may differ for students of color (Shogren et al., 2021); however, there is little else known about this topic due to the underrepresentation of racially minoritized students in special education research (Graves et al., 2021; Steinbrenner et al., 2022). Lack of representation in self-determination intervention research may lead to an inaccurate generalization of the effectiveness of these interventions to diverse student populations. To date, there has not been a comprehensive review of self-determination interventions analyzing the racial and ethnic diversity of participants. Thus, the purpose of this systematic review was to examine the racial and ethnic demographics of participant samples represented within self-determination interventions. This systematic review sought to address two research questions:
1. What is the proportion of racially minoritized participants represented in interventions that include self-determination components for K-12 students with disabilities?
2. To what degree do interventions include culturally responsive adaptations in design or delivery?
We conducted a comprehensive electronic database search of peer-reviewed articles in English between 1990 and June 2022. Following screening, studies were considered eligible for inclusion if they included: (a) school-based intervention targeting at least one self-determination component; (b) participants enrolled in kindergarten through 12th grades; (c) students with disabilities (studies were excluded if the sample included students both with and without disabilities); (d) experimental, quasi-experimental, or single-case design; and (e) at least one dependent measure of a school- or transition-related outcome.
The initial database search yielded 2,069 studies; titles and abstracts were reviewed for potential inclusion. Next, 248 articles underwent full-text screening and 64 studies met inclusion criteria. A subsequent reference list and citation search yielded an additional 15 studies. In total, 79 articles met inclusion criteria. Studies were coded for participant demographics including race and ethnicity, disability, grade, gender, age, English Learner status, free and reduced lunch status, and current school placement. Interventions were coded for intervention type (e.g., model), research design, sample size, setting, intervention length and dosage, targeted self-determination component(s), school (e.g., academic) or transition (e.g., vocational) outcomes, instructional model used to teach desired dependent variables and if culturally responsive adaptations in design and delivery were made. Additionally, findings were coded for descriptive statistics, effect sizes, and interpretation of results.

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Intensification of Reading Comprehension Instruction: Preliminary Findings from a Randomized Controlled Trial

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Students are expected to independently read complex texts to glean meaning for content- area learning beginning in upper elementary grades (Edmonds et al., 2009). However, 65% of fourth grade students read below proficiency (NAEP, 2019), resulting in substantial barriers to learning. Many students in the upper elementary grades and beyond uniquely struggle with reading comprehension, necessitating explicit instruction and remediation in this area (Catts & Kahmi, 2017). We conducted a study wherein we use data-based individualization, a research-based systematic approach to student data collection and analysis (DBI; National Center for Intensive Intervention [NCII], 2013), to intensify the evidence-based Strategies for Reading Information and Vocabulary Effectively (STRIVE) comprehension intervention (e.g., Swanson et al., 2021). The research question is: What are the effects of DBI within the STRIVE intervention (DBI-STRIVE) compared to the STRIVE intervention alone (STRIVE) and business-as-usual (BAU) on the reading comprehension of upper elementary struggling readers? Last year, we presented our study aims and research design. This year, we present preliminary results and implications of our study. Intervention is being delivered in small groups of four to six students, 45 minutes per session, three days per week, over the course of 12 weeks. The first six weeks of intervention are parallel for students in STRIVE and DBI-STRIVE conditions, wherein both conditions receive the STRIVE intervention. Following the sixth week of instruction, students in the STRIVE condition continue with the base intervention, while students in the DBI-STRIVE condition have their intervention adjusted based on DBI procedures.
The STRIVE intervention includes scripted lessons with evidence-based practices to support comprehension before, during, and after reading. Before reading, teachers build background knowledge using illustrations based on the lesson content and provide explicit vocabulary instruction using semantic maps. During reading, teachers ask literal and inferential questions and help students identify main ideas within text. After reading, students apply their newly learned vocabulary by completing semantic maps and writing summaries using main idea statements. Progress was monitored weekly using: (a) Maze curriculum-based measurement (Maze CBM; Dewey et al., 2015), and (b) a proximal specific subskill mastery measurement (SSMM). Students in the STRIVE treatment received the intervention without adjustments. After six weeks, data were evaluated in the DBI-STRIVE condition to identify response. Intervention components will be adjusted based on response. Students were assessed using the Gates-MacGinitie Reading Test, the Test of Silent Reading Efficiency and Comprehension, Maze CBM, and researcher-designed mastery measurement. Data will analyzed using multi-level modeling to account for clustering in the data and the potential increase in Type 1 error. We use Benjamini-Hochberg corrections, with a false discovery rate of .05 (1995), to control for increased false discovery rate associated with multiple contrasts. We have completed pre-testing and are currently engaged in intervention delivery. We will present preliminary results and discuss implications of the study.

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A T.E.A.M. Approach to Instructional Coaching for Special Educators

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Instructional coaching has shown to help improve teacher self-efficacy, quality of instruction, and student achievement (Matsumura et al., 2012; Stein et al., 2008). The most common elements of effective coaching models include the following: a focus on student outcomes, teacher empowerment, and iterative observation and feedback cycles (Connor, 2017). Previous research indicates that instructional coaching increases implementation fidelity and self-efficacy, especially for novice teachers, in the areas of engagement, instruction, and classroom management (Stein et al., 2008; Walsh et al., 2020). Additional benefits to the practice are decreases in teacher turnover rates and increased sustainability of practices (Teemant, 2014).
After reviewing research relevant to teacher coaching models, the authors developed the TEAM approach: Take Data, Evaluate, Action, and Maintain. The Take Data step involves informal data collection through interviews and self-efficacy scales, and instructional video data collection (i.e., baseline data). During the Evaluate phase, the coach and teacher review the videos independently. The teacher answers reflective questions while watching the videos and the coach completes the researcher-created Classroom Observation Tool (COT). The coach and teacher then meet to review the videos and show the results of time spent on instruction and set a goal to increase said instructional time. The Action phase involves the teacher choosing a strategy from the school's resource journal based on teacher-need. Once a strategy is chosen, the coach develops the action plan, which involves modeling the strategy and a data collection schedule. The Evaluate and Action phases repeat as a cycle of data collection and feedback sessions until the goal is met. The Maintain phase begins when the goal is met and uses the same data collection methods to evaluate the maintenance of the teacher's goal.
The purpose of this pilot study is to evaluate the effects of the TEAM coaching model at A Step Up Academy, a private non-profit school for students with Autism. The pilot study uses a multiple-baseline across participants research design with three special education teachers. The primary dependent variable is instructional minutes. Distal measures are teacher self-efficacy, implementation fidelity, and student achievement data.
The research questions were as follows: 1. What is the effect of the TEAM coaching model on instructional time in the classroom? 2. What is the effect of the TEAM coaching model on teacher self-efficacy and the implementation fidelity of research- and/or evidence-based practices? 3. What effect does the TEAM coaching model have on student academic and behavior goals? This study is currently being conducted. Because research has shown that coaching programs may be able to impact student achievement and quality of instruction, we hypothesize that the TEAM coaching model will be effective in increasing instructional time as well as lead to improvements in teacher self-efficacy, implementation fidelity, and student achievement and behavior (Matsumura et al., 2012; Stein et al., 2008). Research and practice implications will be discussed.

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The Relation Between Anxiety and Reading Achievement in Students with Reading Difficulty

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The purpose of this study is two-fold. The initial step is to determine if and to what extent self-reported reading anxiety, general anxiety, and text anxiety are related to each other. The second step of this study will explore the relation between the different self-reported anxiety measures and reading performance. Next, quantiles of reading performance will be examined to see if the different anxiety measures relate to reading achievement differently based on students' reading performance. This research is responsive to calls for further research that examines the relations between anxiety and reading achievement (Macdonald et al., 2021). The following questions will be explored: RQ1: To what extent are third and fourth grade students' who have reading difficulty self-reports of reading anxiety, general anxiety, and test anxiety related to each other? RQ2: To what extent are these dimensions of anxiety associated with reading outcomes among this sample? RQ3: Do reading anxiety, general anxiety, and test anxiety predict reading performance differently for students based on their reading performance? To answer these questions, this study will take advantage of pretest data from a large-scale study conducted with 3rd and 4th grade struggling readers (n = 310). Self-report anxiety assessments will include The Reading Anxiety Scale (Grills et al., under development), Children's Test Anxiety Scale (Wren & Benson, 2004), and The Beck Anxiety Inventory for Youth (Beck et al., 2001). Reading assessments will include the Test of Silent Reading Efficiency and Comprehension (Wagner et al., 2010) which was used to assess comprehension, and Woodcock Johnson Test of Achievement subtests: Letter Word Identification and Word Attack Test which was used to assess word reading, and The Test of Silent Contextual Reading Fluency (TOSCRF) which was used to assess reading fluency. The analyses are underway and will be completed on December 1, 2021. We hypothesize that the anxiety measures are related and that we will likely see a stronger correlation between reading anxiety and reading achievement than general anxiety and test anxiety and achievement. Furthermore, we predict that the lowest quantile of students with reading difficulty may have more reading anxiety than student who are not as low. We anticipate that the results from this study will help to shed light on the relation between anxiety and reading achievement and help to support future reading interventions efforts.

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PAWS Together: An Investigation of a Combined Reading and Writing Intervention

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Purpose and RQs: Reading and writing go hand in hand, students who struggle in reading are likely to struggle in writing (Hooper et al., 2010; Costa et al. 2015; Graham et al., 2021). In a study by Puranik et al. (2017, 2018) investigating the feasibility and promise of a whole-class peer-assisted writing strategies (PAWS) intervention, the authors found that students with below average reading skills struggled to improve their early writing skills. This study expanded on the findings from Puranik et al. (2017, 2018) to investigate the primary experimental RQ: "Does iPAWS + R improve early writing skills (word building, sight words, and sentence construction) for first grade students with reading difficulties?" and the secondary descriptive RQ: "Is there evidence of improvements in early reading skills (phoneme segmentation fluency, nonsense word fluency, and oral reading fluency) for first grade students with reading difficulties after participating in iPAWS + R?"

Research Methods: Through teacher nomination, six students were selected for participation. Five participants were identified as having difficulties in reading and/or had an identified disability with difficulties in reading. The sixth participant was selected due to difficulties in writing.

This study used a multiple-probe across behaviors design (Gast et al., 2018) for each participant to evaluate the relation between iPAWS + R and changes in the dependent variable (iPAWS probe). Each tier within the multiple-probe represented an individualized, targeted word reading/building skill and sight words. iPAWS probes were researcher-developed 6-item writing lesson mastery probes. Each lesson set (word building and sight words) had six items assessing mastery. Probes were created from a pool of items from the individualized advanced reading skill and targeted sight words for each lesson set (tier), with six items randomly chosen for each probe. I used visual analysis of graphed data (level, trend, and variability of data paths) to determine the presence or absence of a functional relation. Visual comparisons between baseline and intervention, and vertically across tiers to determine whether introductions and withdrawals of the independent variable are associated with consistent changes in these data features. If such changes replicate across at least three tiers within the design, the researcher concludes a functional relation (i.e., causal relation, experimental control) is present between the independent and dependent variables (Horner et al., 2005).

As a part of the descriptive portion of this study, I collected data on students' sentence combination and story generation skills within early writing skills. Additionally, I collected data on students' phonemic segmentation fluency, nonsense word fluency, and oral reading fluency as measures of early reading skills. These measures were reported on descriptively.

Findings: My results indicated that the three participants who had sufficient data to demonstrate possible intervention effects, through visual analysis there was evidence of a functional relation. The other two students, did not have sufficient data for the determination of a functional relation, however there were positive trends from baseline to intervention following lesson set introduction. Implications and future directions are discussed.

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Starting with the Data: DBDM in High School Algebra

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This study explores whether data from three different types of algebra progress monitoring measures demonstrates adequate technical adequacy for use as progress monitoring tools within a data-based decision making (DBDM) context. We are interested in whether there is significant variability in intercepts and slopes within the participating students. We also seek to determine whether students' intercepts and slopes are associated with other achievement, demographic, and contextual variables. The research questions guiding the analyses are 1.Do students enrolled in Algebra 1 differ in (a) their entering levels of algebra proficiency (intercepts) and (b) their growth (slopes) during the course, as measured by three types of algebra progress monitoring assessment? 2.To what extent are students' intercepts and slopes for each of the three types of algebra progress monitoring measures associated with algebra achievement (scores from two other algebra measures), demographic factors (disability, race, gender), and contextual factors (teacher, state)? The study was conducted with 635 students enrolled in 14 teachers' high school Algebra 1 courses across three states. Students completed one of the three types of measures (Algebra Basic Skills [ABS], Algebra Foundations [AF], Algebra Content Analysis [ACA]) on alternating weeks during the duration of their Algebra 1 course. Students had 5 (ABS, AF) or 7 (ACA) minutes to complete as many problems correctly as possible. Scores were based on the number of correct responses (ABS, AF) or the number of points earned using a partial-credit rubric (ACA). Initial analyses of growth used OLS regression models given the frequency with which these are used by practitioners and many practitioner-oriented graphing tools. Then hierarchical models (HLM) that better represent the nested nature of the data (observations within students within classes) were applied. OLS results identified a range of individual growth rates across students (from -0.75 points/week to 1.62 points/week) and states (from .14 to ,72), with mean rates of growth that differed considerably across measures (AF = .17, ABS = .26, ACA = .45). HLM analyses revealed statistically significant intercepts and slopes for all three types of measures and estimates for rates of growth similar to the OLS results (AF = .20, ABS = .24 ACA = .47). Additional HLM analyses (currently in progress) examine whether there are statistically significant differences in intercepts and slopes on each of the three types of measures with respect to students' algebra achievement (scores from two other algebra measures), demographic factors (disability, race, gender), and contextual factors (teacher, state). The results of these analyses will provide insight on the degree to these factors are associated with differential intercepts (starting levels) and/or rates of growth on the three types of algebra progress monitoring measures. Establishing these technical characteristics of these measures is essential to the viability of their application within DBDM systems.

A Survey Study of Teachers' Planning Time, Take Two

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Purpose: Teachers of students with disabilities (SWD) report insufficient access to time for planning and collaboration with colleagues (Gesel et al., 2021). This tension makes sense with consideration of the complexity of special education teacher's (SET's) roles, particularly in positions that may include a range of inclusionary settings and collaboration with multiple stakeholders across the school building (Bettini et al., 2020; Billingsley & Bettini 2019). There has been little research into how SETs spend the planning time they do have, or how often that time is protected by administrators rather than being reclaimed in the service of substitute assignments, office work, playground supervision, or other tasks.

Research Questions:

1) How much planning time are SETs afforded by their administration?
2) How often is that time taken back through requests to formally cover another class or duty period?
3) How often is that time taken back through informal requests to complete tasks unrelated to planning or collaboration?
4) How do SETs spend this time when they are allowed to choose?
5) Do SETs have sufficient planning and release time?
6) How many stakeholders do SETs work with?
7) What roles do SETs' collaborators hold across the school building?

Method: We submitted a similar poster proposal for PCRC 2022 and presented the project design, but were not able to present findings due to a lack of respondents. We added incentives for participation and distributed our survey using social media, receiving over 2,600 responses, many of which are clearly fraudulent. The work of sorting legitimate respondents from bots is ongoing; ultimately, we anticipate having 150-200 genuine responses based on click counts from social media and other metrics. We collected data regarding the disabilities of students served by teachers in our sample, the types of roles in which they work, teacher demographic data, the characteristics of schools in which they work, and information about their allotted planning time and use of that time. For SETs indicating interest in a follow-up interview, we will conduct semi-structured interviews to learn more about the SETs' use of planning time and expectations.

Findings: We anticipate being able to share the full results of our survey and analysis at PCRC 2023 and making recommendations for teachers and administrators to manage planning time and better support SETs.

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Language Proficiency, Executive Functioning, and Science Achievement Among Multilingual and Monolingual Students in Elementary School

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Job growth in science, technology, engineering, and math (STEM) is outpacing job growth in all other fields; however, linguistically diverse minorities are underrepresented in the U.S. STEM workforce (Pew Research Center, 2018). Differences in STEM achievement can be traced to kindergarten (e.g., Morgan et al., 2016), indicating that more attention on early STEM achievement is needed to increase representational equity. The empirical literature focused on STEM achievement among multilingual students in early elementary school in the U.S. is almost non-existent. Prior research (Barnard-Brak et al., 2017; Hwang, 2020), guided by domain-general theories of development (e.g., Vygotsky, 1962, Pascual-Leone & Johnson, 2021), suggests that science achievement is distinct from math and reading achievement during early elementary school. However, Barnard-Brak et al. (2017) did not focus on multilingual students specifically and the science measure used in Hwang (2020) was a measure of general knowledge that included science and social studies items. Research also suggests that language proficiency and executive functioning (EF) support science achievement (Koerber & Osterhaus, 2019; Mayer et al., 2014; van der Graff et al., 2016), though such studies were conducted internationally and limited to concurrent relations. To better understand science achievement, its associations with math and reading, and factors that support science achievement among multilingual children in the U.S., more research focused on early elementary school is needed.

The present study used the public use file of the Early Childhood Longitudinal Study, Kindergarten class of 2010-2011 (ECLS-K: 2011) and included multilingual (n=1,022) and English monolingual (n=12,343) children. Science achievement was measured annually in the spring of kindergarten, first, and second grade. Language proficiency and EF was measured during the spring of kindergarten. Consistent with Barnard-Brak et al. (2017) and Hwang (2020), science was separable from math and reading achievement for multilinguals and English monolinguals, though highly correlated (see Table 1). Multigroup path analyses constrained to equality indicated that kindergarten language proficiency and EF supported science achievement similarly across early elementary school for multilingual (R2 = 0.24-0.39) and English monolingual (R2 = 0.25-0.34; see Table 2) children, even when accounting for the effect of SES statistically. This pattern of results was cross validated using a subgroup of multilingual English language learners (ELLs) (n=524) and a subgroup of English monolinguals who were not ELLs (n=294); thereby strengthening the inferences that can be drawn from this study.

The results from the path analyses coupled with high correlations among science, math, and reading achievement suggest that science instruction that takes advantage of domain interconnectedness may reduce redundancies and help children connect with science content. Moreover, based on a clear body of research that indicates oral language is critical for learning, we posit that intentionally organizing instruction such that science, math, and reading instruction that takes advantage of children's oral language may help reduce redundancies and increase instructional time dedicated to science content, thereby contributing to increased learning. At the very least, integrated instruction and cross-domain effects is a promising new area of research (Cabell & Hwang, 2020; Cervetti & Wright, 2020).

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Do We Talk About Instructional Decision-Making? CBM Content in Practitioner-Focused Journals

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Federal education legislation and subsequent litigation have established a clear mandate for teachers to monitor student progress for the purpose of accountability. For students in special education, the use of progress monitoring data is essential to timely evaluation of the effectiveness of academic interventions and responsive, effective instructional decision-making. Curriculum-based measurement (CBM; Deno, 1985) is quick, simple to administer, and measures the same skills at the same level of difficulty over time. Although the utility and effectiveness of CBM have been demonstrated repeatedly since the 1980s (Fuchs, 2016; Jung et al., 2018), many teachers still lack proficiency in using CBM to engage in data-based decision-making (e.g., Fuchs et al., 2021; Gesel et al., 2021; Stecker et al., 2005). To explore the amount of attention devoted to data-based decision-making (DBDM) aspects of CBM in training, Espin et al. (2021) conducted a systematic review of CBM professional development (PD) materials. They found that only 12% to 14% of materials were dedicated to DBDM. This proportion is significantly less than that dedicated to information on topic such as selecting and administering CBM. That is, most PD materials paid little attention to what both CBM experts and researchers deem to be the core purpose of CBM: using data to systematically make instructional decisions. To date, there has been no review of CBM articles in practitioner-focused journals, another key source of teachers' professional learning.

Thus, the purpose of the present review is to conduct a conceptual replication of the Espin et al. (2021) study by tailoring their research questions and coding procedures to an examination of CBM in practitioner-focused journals. Specifically, the current study seeks to address the following research questions: (1) What proportion of information is devoted to DBDM, relative to other topics, in CBM practitioner-focused articles?; (2) Does the proportion of information devoted to DBDM differ from what would be expected if information were to be equally distributed across major CBM instructional topics?; and (3) When DBDM content is included in articles, what patterns emerge related to the specificity and comprehensiveness of presented concepts? A systematic review was conducted for any CBM articles published in 12 expert-recommended special education practitioner journals. Initial abstract screening resulted in 516 articles focused on CBM; following full-text review of 160 articles, 29 articles were identified for inclusion based on set criteria. To be included, studies had to be written in English for a practitioner audience and focus on CBM. The coding protocol, adapted from Espin et al. (2021), identified four categories of CBM information: general CBM information, procedures for conducting CBM, CBM DBDM, and other. To address our third research question, we conducted a content analysis of all text that discussed DBDM in the included articles. This focused on the specificity of the DBDM content, comprehensiveness of the descriptions, and use of vignettes. Results focus on the overall proportion of CBM practitioner-focused journal articles that address DBDM and how this information is communicated to readers (e.g., teachers). Implications for teacher education and professional development are discussed.

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Systematic Review of Writing Interventions Studies for English Learners with Learning Disabilities

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Previous systematic reviews and meta-analyses have focused on exploring the effects of writing interventions for English learners (ELs) or students with or at risk of learning disability (LD) (e.g., Lee & De La Paz, 2021; Gillespie & Graham, 2014). To date, none of the reviews focused on writing interventions for students classified as ELs who also had or were at risk for LD. Therefore, the purpose of this study was to address this gap by systematically reviewing writing intervention studies that implement a writing intervention to ELs with or at risk of LD. The following questions guided our review:1) What are the demographics characteristics of participants in qualifying studies?; 2)What are components in writing interventions that include EL students with LD?; 3)What is the writing outcome for EL students with LD?; 4) What is the publication trend of writing intervention studies that target ELs with LD in the literature?

We conducted electronic searches of peer-reviewed articles and unpublished articles on the following databases for all years of publication through March 2022: EBSCO host, ERIC, APA PsycInfo, Academic Search Ultimate, Education Source, and ProQuest Dissertations & Theses Global. The search terms focused on four components, linking by "AND". This yielded 641 results of peer-reviewed articles and 29 unpublished articles on ProQuest Dissertations & Theses Global. A hand search on related journals and search of reference list of previous related systematic reviews were also conducted. One additional article was identified. Thus, 642 peer-reviewed articles and 29 unpublished articles were identified. After removing duplicates, 498 articles remained for abstract screening. To meet abstract screening criteria, the study must include EL/ students with or at risk of LD/ EL with or at risk of LD, and implement a writing intervention. This yielded 52 peer-reviewed articles and 19 unpublished articles identified for full-text screening. To be included in this study, the article must 1) use group design or single-case study design, 2) publish in English, 3) contain at least one participant who was EL with or at risk of LD, 4) have participants age between birth to 21 years old, and 5) implement writing intervention to participants. A total of eight studies included in this study.

We coded study level characteristics (authors, country, study design, participants, gender, grade, race/ethnicity) and intervention level characteristics (genre, cognitive process, setting, length, intervention duration, interventionists, outcome measurement, instruction components). We found that majority studies conducted in the U.S. used the single-subject design method, while studies conducted in other countries used the groups design methods. In terms of writing intervention used, the most frequently used instructional method is the Self-Regulated Strategy Development (SRSD). Although eight studies measured different outcomes, six instruction elements that were commonly used when implementing writing interventions. Majority of studies showed an increase in ELs with LD participants' writing ability. It is worth noticing that the publication trend showed a death of published and unpublished writing interventions included or focused on ELs with LD.

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School-Based Motivational Interviewing: A Meta-Analysis

Presenter(s): Jenna Gersib, The University of Texas at Austin (jenna.gersib@utexas.edu)
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The effects of motivational interviewing (MI) have been investigated on a variety of important outcomes, including smoking cessation, healthy eating habits, and student academic achievement. Though MI has abundant research supporting its efficacy with adults in a variety of settings, no study has quantitatively synthesized the impact of these interventions on the outcomes for children and adolescents in school settings. Therefore, the proposed meta-analysis seeks to understand the efficacy of the current empirical literature involving school-based MI. Additionally, the proposed research aims to explore a set of student, intervention, and study-level factors that are hypothesized to moderate the strength of the effect MI interventions has on targeted outcomes. Two research questions are proposed: (1.) What is the overall magnitude of the effect of MI interventions on the behavioral and/or academic outcomes of school-aged children? (2.) To what extent does the efficacy of MI on students vary by specific participant and intervention-level factors? Dissertations, theses, and peer-reviewed studies were included to capture the gray literature fitting the established criteria. In total, 42 studies met inclusion criteria and were included in the meta-analysis. Results suggest that school-based MI is as effective, if not more effective, than MI with adults. MI was most effective on behaviors related to addiction and substance use. The moderator analysis revealed students of color responded at higher rates than non-minority White students, a finding consistent with past meta-analyses on MI (Hettema et al., 2005; Lundahl et al., 2010). No treatment effects were found related to dosage or group size, a promising finding for future school-based intervention research. Conclusions and recommendations will be discussed.

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Single-Case Designs in Reading Research: Examining Effects by Types of Outcomes

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Purpose: Though researchers use single case designs (SCDs) to assess the effect of reading interventions, challenges related to academic dependent variables (DVs) may influence interpretations of results (see Christ et al., 2013; Klingbeil et al., 2019; Lieberman et al., 2010; Van Norman et al., 2018; Van Norman et al., 2019). The purpose of this systematic review and meta-analysis was to examine factors related to the DVs used in SCD research and synthesize the effect of reading interventions on those DVs.
RQs: (1) What types of DVs are used in SCD research to measure effects of reading interventions?
(2) What is the overall effect of reading interventions on participants' reading outcomes and does the effect differ by effect size (ES) metric (e.g., author-reported functional relation, independently coded determination of functional relation, ES estimates)?
(3) Are ES estimates moderated by features of the study or DVs?
Research Methods: We conducted a systematic literature search to identify published and unpublished studies that: (a) included a reading DV for the English language with legibly graphed data assessed continuously across sessions; (b) used a demonstration SCD focused on the acquisition of non-reversible behaviors (i.e., multiple baseline or probe); (c) had at least three A-B contrast with at least 3 data points per phase and at least 1 data point immediately before entering intervention; (d) had K-12 participants with the majority of participants being students with disabilities; and (e) involved intervention centered on instruction rather than accommodations to instruction. In all, 100 records met all inclusion criteria. This accounted for 95 unique manuscripts (59 peer-reviewed journal articles, 36 dissertations/theses). Five additional records were dissertations of peer-reviewed articles already included in the final study set. In these cases, we coded the peer-reviewed journal, but supplemented coding with dissertations for any variable that was not reported in the peer-reviewed journal. Within the 95 unique manuscripts, the authors reported 101 SCD studies (62 within peer-reviewed articles; 39 within dissertations/theses). We coded studies descriptively for information on participants, design, conditions, and measurement. We also coded author-reported functional relations (FRs) and our independent evaluation of FRs.
After extracting data from the SCD graphs, we calculated both baseline-corrected Tau-U (Parker et al., 2011) and between-case standardized mean difference (BC-SMD; Pustejovsky et al., 2014). We calculated an overall ES, as well as ESs for reading skills and errors separately. For any significant moderator, we conducted exploratory analyses of differences in ESs across the dichotomized characteristics.
Findings: We found statistically significant omnibus effects for Tau-U ($g = 0.66$) and between case-standardized mean difference (BC-SMD; $g = 2.65$) effect size (ES) estimates. ESs were comparable for skill-based and error-based DVs. Publication status and DV type (general outcome vs. researcher-created/mastery measure) were significant moderators for both metrics, and design type (across participants vs. across behavior) was a significant moderator for BC-SMD.

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Mixed Methods Evaluation of a Peer-Assisted Mathematics Intervention

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Peer mediated instruction (PMI), also called peer-assisted instruction, is an effective strategy for increasing academic achievement, supporting social growth, providing access to curriculum, and elevating participation in content areas for students with disabilities across a range of grade levels and mentoring programs (e.g., Carter et al., 2021; Hudson et al., 2014; Jimenez et al., 2012). Yet there are few evaluations of PMI to support academic skill development of students with developmental disabilities, including the area of mathematics. Even less research exists evaluating the overall social validity, acceptability, and feasibility of PMI strategies for students with developmental disabilities. This presentation will present the findings of a mixed methods study that not only evaluated the effectiveness of peer assisted instruction on mathematics skill development for students with developmental disabilities but also the applicability, feasibility, and favorability of the intervention.
1. What is the effect of peer assisted modified-schema based instruction on the frequency of correct problem solving behaviors when solving multiplicative comparison word problems for high-school students with extensive support needs?
2. What are the perceptions of participants (e.g., peer mentors and peer mentees) on peer-assisted mathematics instruction?
3. How does the integration of qualitative data on participant perceptions and quantitative data on problem solving behaviors enhance interpretation of outcomes?
An embedded experimental mixed methods design (Creswell & Plano 2011) was used to answer these research questions. This method was selected to add a "narrative flesh on the bones of the experimental and statistical analysis" to support replication and generalization" of the intervention (Onghena et al., 2019). By doing this, the research team used quantitative data to evaluate the causal relationship between the independent and dependent variables and gathered qualitative data from multiple sources to conduct in-depth, rigorous investigation of the practical significance of the intervention (Kazdin, 1999; Perdices & Tate, 2009), the perceived feasibility, appropriateness, and meaningfulness of the intervention (Onghena et al., 2019). Quantitative data was obtained from a multiple probe across participants single case design (Ledford & Gast, 2018) and analyzed using visual analysis and two effect size measures. Qualitative data sources included participant interviews and surveys, participant daily reflections, and field notes. This qualitative data was analyzed using thematic and descriptive analysis. The sample included nine high school participants: five participants with developmental disabilities (i.e., peer mentees) and four participants without developmental disabilities (i.e., peer mentors). Participants ranged from 9th to 12th grade and represented a range of ethnic backgrounds (e.g., hispanic, black, white, asian island pacific islander). The peer mentees had a primary diagnosis of intellectual disability (n=4) and other health impairment (n=1).
Results of the single-case research design indicate a functional relation between peer-assisted MSBI and math problem solving behaviors. Visual analysis was supported by a between-case standardized mean difference of 7.4 at 95% CI and a Tau-U finding of 1.00 with a p value of <0.00 at 95%. Integration with qualitative themes supports the social validity, feasibility, acceptability, and favorability of the MSBI delivered by peer mentors.

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Speech and Language and Learning Disability Identification: Disproportionality and the Ever-EL Framework

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There is conflicting evidence regarding the over- or underrepresentation of English learner (EL) students in special education nationwide. More recent work finds patterns in disproportionate identification based on EL students' English proficiency level (i.e., ever-EL framework) and grade level; current EL students were overrepresented in special education at the secondary level, while students who have been EL (ever-EL) were underrepresented (Umansky et al., 2017). To address this conflicting evidence, we sought to identify the extent to which EL students are identified with two common disability categories, specific learning disabilities (SLD) and/or speech and language impairments (SLI). Our study provides a rigorous and complete examination of whether and to what extent EL students with different language proficiency and classification status (i.e., former-EL vs. current-EL) are disproportionately identified as SLD and SLI in special education services nationwide. We analyzed restricted student-level data from repeated cross-sectional samples of students from the National Assessment of Educational Progress (NAEP). For this study, we examined fourth and eighth grade reading and mathematics surveys from 2009 to 2019 to provide the latest national evidence of special education identification. Our analyses incorporated weighting to account for complex sample design and nonresponse in achieving nationally representative estimates. NAEP's restricted-access data files include students' background information (i.e., EL status, race/ethnicity, free school lunch program eligibility).
We conducted logistic regression with three models: Model 1 includes EL status without any covariate adjustments; Model 2 added all the covariates; and Model 3 added school-fixed effect. By adjusting school-fixed effect, we substantially controlled all the un-observed variability between schools. In the future, we plan to conduct weighted time-varying effect modeling (TVEM, Lanza et al., 2016), which is an extension of linear regression for examining over-time relations that advantageously differs from growth or random-effects models by estimating regression coefficients as continuous functions of time and making no assumptions that the regression coefficients are fixed with respect to time. Based on the fluctuations of odds ratios reported in our logistic regression across different years, such dynamic estimates would be suitable for our future analyses.
Our preliminary results indicate that EL students are still disproportionately identified in special education for SLD and SLI during the past decade. More importantly, such disproportionate identification differs by EL students' status, grade, and across years. Using the ever-EL framework, we found that in 2019, current EL students were significantly less likely to be identified as SLD than never EL students in both grades. Meanwhile, in eighth grade, former EL students were significantly less likely to be identified as SLD than never EL students and less likely to be identified as SLI. Moreover, current EL students were significantly less likely to be identified as SLI than never EL students in fourth grade. Our findings enhance the field's current knowledge base on the relationship between EL status and special education receipt and help inform future civil rights policy design regarding meeting the needs of EL students with SLD or SLI.

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A Review of the Relations Between Trauma and Academic Achievement for Students in Pre-K to 12th Grade

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Trauma-informed practices have become increasingly present in school systems with training to support to teachers, counselors, and other school staff in implementation (Chafouleas et al., 2016; Thomas et al., 2019). There is clear evidence that trauma exposure influences attendance (Morrissey et al., 2014), attention (Polderman et al., 2010), and behavior regulation (Burke et al., 2010). The impact of violence exposure on academic achievement have been previously reported (Fry et al., 2018; Supol et al., 2021), but there is less known about the impact of various type of trauma exposure on academic achievement. Thus, the present synthesis sought to extend the literature by addressing this gap. We addressed two research questions: (1) What are the relations between childhood trauma and academic achievement?; and (2) Does the pattern of relations differ based on sample demographics, trauma type, or achievement domain?

An electronic database search was conducted of studies published between 1990 and November 2021, followed by a hand search of two key journals (e.g., Child Abuse & Neglect, Child Maltreatment). The initial search yielded 4,378 articles. Following abstract screening, 49 studies moved forward to full-text review. Eligible studies had to meet the following criteria: (a) participants enrolled in Pre-K to 12th grade, (b) reported at least one quantitative measure of trauma exposure or adverse childhood experiences (ACEs), (c) reported at least one quantitative measure of reading or mathematics performance, and (d) reported at least one correlation between any measure of trauma and achievement. A total of 24 studies met criteria for inclusion in the present synthesis.

Studies were coded based on (a) design features; (b) participant information (sample size, age/grade, demographics); (c) trauma measure and type (ACEs, maltreatment, neglect, violence exposure); (d) academic measure and domain (reading, mathematics); and (e) correlations (including means and standard deviations, if reported). Across the 24 eligible studies, maltreatment was the type of trauma most commonly measured (47%) followed by domestic violence (16.7%), child abuse and neglect (12.5%), CPS involvement (12.5%), ACE exposure (8.3%), and traumatic stress or exposure (8.5%). Reading achievement was reported in all studies (100%) and math achievement was reported in 62.5% of studies.

Preliminary results from this synthesis indicate a pattern of negative relations between trauma and achievement. There did not appear to be differences in these relations based on academic domains. Findings suggest that relations between trauma on academic achievement are strengthened by (1) severity of trauma, (2) overall time of trauma, and (3) time after trauma. Implications from these findings include a need for early identification measures to increase the use of early interventions along with the development of interventions that target both psychosocial and academic competencies.

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Nebraska WORDS: Improving Reading Achievement in Rural Elementary Schools

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The ongoing COVID-19 pandemic has had demonstrable effects on academic instruction (Goodrich et al., 2022; Namkung et al., 2022) and student reading achievement (National Center for Education Statistics, 2022). These negative effects were often more poignant in areas with limited resources, such as rural areas with limited internet capacity for providing remote instruction. Therefore, the purpose of this study is to implement a professional-development based intervention for teachers to accelerate reading achievement of their students in rural Nebraska schools in the aftermath of the COVID-19 pandemic (the Nebraska WORDS project).

In accordance with the Nebraska Reading Improvement Act, all schools in Nebraska must implement beginning, middle, and end of year reading screeners for kindergarten through third grade students. Any students falling below the predetermined cut score on a state-approved reading assessment must be provided with individualized reading instruction and progress monitoring. The Nebraska WORDS project is specifically designed to support schools' implementation and evaluation of reading assessments and intervention for students falling below the cut score in several ways. First, participating treatment schools received professional development sessions around various topics related to the science of reading prior to the beginning of the 2022-2023 school year. Additionally, school personnel receive in-service professional development to help with interpreting assessment data and planning instruction. Reading instruction sessions are observed by Nebraska WORDS project personnel, and teachers receive individualized coaching on their instruction regarding what they are doing well and which of their instructional practices can be improved to be more consistent with evidence-based reading instruction. Finally, low-performing students are provided with the opportunity to opt in to after-school tutoring, and teachers in Nebraska WORDS project schools are offered payment to provide optional after school tutoring. Ten WORDS intervention schools are participating in this study. We will take two data analytic approaches to evaluate the impacts of the intervention on student reading achievement. First, we use regression discontinuity design to compare students just above and below the cut score at the beginning of the school year on reading achievement at the middle of the school year (preliminary analysis for this PCRC poster proposal). Students are randomly distributed around the cut score, due to measurement error. Thus, students above and below the cut score should be similar at baseline, providing a strong comparison for the examination of the effectiveness of WORDS program for accelerating reading performance for students below the cut score. Second, we use a matched control group design to compare schools that receive the WORDS intervention to schools that do not. In addition to the ten treatment schools, we recruited five control group schools using a nearest-neighbor matching procedure. All treatment and control schools are using DIBELS 8 as their universal screening assessment for reading. Student achievement at the middle of the school year will be compared across treatment and control schools. For both analyses, we hypothesize that students who receive the Nebraska WORDS intervention will outperform those who do not.

Dual-Language Learners Supports of a Second Grade Mathematics Intervention Program

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Dual language learners in early childhood are an increasingly growing student population in the United States (Banse, 2021). There is an exponential rise in DLLs placed in English-speaking classrooms with teachers who may not already have the knowledge of how to best support this demographic of students (Russakoff, 2011). As a result, it is important to target DLL specific supports in early childhood interventions as it may have implications for alleviating later academic disparities for multilingual students at risk for developing math difficulties (U.S. Department of Education, 2016). The current review and adaptation of best practices centered around instruction and design, as informed by empirical research, is critical for curriculum development.

Previous research demonstrates that the use of students' home language by teachers or students is a valuable asset during language acquisition and aid in math talk activities to build fluency in literacy instruction (Gillanders et al., 2017). Our team synthesized empirical literature on the instructional practices for supporting early language development and mathematics learning for multilingual students in early elementary grades. Best practices for supporting DLLs were then embedded into a second-grade mathematic intervention program in the form of in-program activities and supplemental resources, designed for the purpose of increasing language acquisition and mathematics outcomes. We began by developing vocabulary cards to define words that DLLs may have not previously been exposed to. For example, we created Spanish translated versions of the pre-existing vocabulary embedded within the second-grade mathematics intervention along with visual representations (i.e., illustrating three apples and three fingers to convey the meaning of the word 'equal'). To ensure that all languages have fair representation in the DLLs supports, blank versions of these vocabulary cards were developed so teachers can include other languages spoken in the classroom. Next, we developed supplemental resources that include teacher tips, vocabulary routine, and math language development activities. These resources tap into connecting student background knowledge to new material and facilitating additional dialogue between students and teachers (Doabler et al., 2016). Additionally, we then added supports within each individual lesson. For example, when introducing new vocabulary terms, we used a routine aligned with explicit instruction, which has been shown to be effective for DLLs (Archer & Hughes, 2011). Lastly, DLL support resources were then expanded to include the use of resources such as a word wall for teachers to use during lessons, and a weekly note-home including math language development activities for students to work on with their parents at home. For the next phase of this research, the team will test the usability and feasibility of the materials with teachers, students, and families through brief learning trials. Data from this process will be used to further refine DLL supports within the context of early numeracy intervention.

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Perspectives and Experiences with Special Education: Findings from Educator Focus Groups

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The role of educators, administrators, and related service providers is a critical factor in yielding successful outcomes, or obtaining educational benefit, for SWDs; it is associated with increased academic achievement and decreased maladaptive social behavioral issues (Juarez & Purper, 2018; Sindelar et al., 2010). For SWDs, the individual education program (IEP) is intended to serve as the cornerstone for developing and implementing specially designed instruction that results in this obtainment of educational benefit. Unfortunately, research tells us that educators and other stakeholders remain confused about IEP development, implementation, and assessing progress (Yell & Bateman, 2019). The confusion is further compounded by inconsistency in the case law and gaps in the research literature.

In an effort to identify educational planning successes, challenges, and potential recommendations from the lens of educators, the project team conducted focus groups with 60 educators, representing rural, suburban, and urban districts from regions across the United States. During this poster presentation, presenters will share findings related to:

-the experiences of educators who have been involved with the development and implementation of high-quality educational programming for SWDs;

-stakeholder input on processes, procedures, and systems that facilitate successful IEP implementation or negatively impact it; and

-potential recommendations for schools to consider for enhancing special education programming and services.

Seven survey questions addressed educators' perspectives in developing and implementing IEPs, evidence-based academic and functional behavior interventions, data-based decision making considering each students unique needs, services and supports, professional learning opportunities, collaboration, Covid-19 responses, and educator job satisfaction. The findings in the subsequent section are from educators who have supported SWDs.

-The majority (81.7%) of educators felt their school provided evidence-based academic and functional interventions and supports for SWDs.

-Most (91.7%) educators reported their school IEPs are data-based and developed considering each student's unique learning and behavioral needs.

-The majority (83.3%) of educators felt their SWDs received educational services in settings where they can access instruction at their individual level and demonstrate growth.

-Survey participants were split when asked if special educators and related service staff received ongoing, high-quality professional learning and training on topics related to SWDs; Strongly Agree = 8 (13.3), Agree = 23 (38.3), Disagree = 22 (36.7), Strongly Disagree = 6 (10), and I Don't Know = 1 (1.7).

-While some respondents noted mixed experiences, slightly over half (53.3%) of educators felt their general and special educators in their school met and collaborated regularly around instruction, intervention, and accommodations for SWDs.

-Just over half (56.7%) of educators believed their school provided high-quality educational programming for SWDs during the COVID-19 pandemic. •Educators reported mixed responses when asked to rate their job satisfaction; Very Low = 2 (3.3%), Low = 7 (11.7%), Average = 18 (30%), High = 21 (35%), Very High = 12 (20%). Educators' top recommendations for schools are:

-Enhance professional learning opportunities for all stakeholders supporting SWDs.

-Increase collaboration among stakeholders.

-Provide educator mentoring and support.

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Synthesis of Growth Mindset Interventions on Academic Outcomes for K-12 At-Risk Students

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This poster presents results from a meta-analysis of growth mindset (GM) interventions targeting academic outcomes for k-12 students with or at risk for academic difficulties or LD. Growth mindset refers to individuals' beliefs that intelligence or academic success are malleable and the product of effort (e.g., Dweck, 2008). This mindset stands in contrast to fixed mindsets where individuals believe intelligence is not malleable-they either have it or don't-and academic success is outside one's control and the result of luck or innate ability. GM has been shown to relate to academic performance in reading (Author), math (Blackwell et al., 2007), for elementary students (Petscher et al., 2021), and secondary students (Destin et al., 2019). Although meta-analyses suggest the relationship between GM and academic outcomes for all students may be small (e.g., Costa & Faria, 2018, ES = 0.07), it may be larger for vulnerable students (e.g., at risk of dropping out, transitioning to secondary schools; Sisk et al., 2018, ES = 0.17). The present meta-analysis contributes to the latter body of research by describing the effect of GM interventions on the academic outcomes of academically at-risk students. We analyzed intervention studies targeting GM (either as stand-alone intervention or as part of a broader academic intervention) reporting an academic outcome. Inclusion criteria dictated students with or at risk of academic difficulties, including LD in K-12 school settings, published in English through January 2022, and an experimental, quasi-experimental, or single-subject design. Risk status included students identified as having LD or students with learning difficulties (e.g., students are at or below 25%ile on a norm-referenced test) in reading, math, writing etc. We conducted an electronic database search, an ancestral search of key meta-analyses on this topic, a forward and backward search, and a hand search. Our proposed search terms included: implicit theory, mindset, self theory, lay theory, incremental theory, intelligence, academic, education, Dweck, learning disabilit*, neuroplasticity, motivation, achieve*. The search resulted in 621 abstracts; we included 6 articles after abstract screening and an additional 3 through hand searches. Our final corpus included 9 studies and 92 effect sizes. Studies were double coded for intervention characteristics including academic domain, dosage, intervention group size, implementer (e.g., researcher or teacher), and whether the intervention was GM-only or GM + academic content. We specifically coded whether interventions conveyed information about neuroplasticity, concrete actions students could take to implement GM, and involved active student engagement in those actions. Comparison conditions could be business as usual (BAU) instruction or academic interventions without GM component. Preliminary results found a mean ES = 0.18 of GM interventions on academic outcomes. When looking at comparisons separately, we found GM-only compared to BAU to have ES = 0.59; GM + academic ES = -0.06 when compared to academic interventions but ES = 0.35 when compared to BAU. These results suggest GM interventions have a small, but significant, effect on academic outcomes for at-risk students. We will discuss the relationship between GM interventions and academic interventions in our poster session.

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Improving Algebra Readiness through Teacher Knowledge: Review of a Four-Year Study

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According to the latest Nation's Report Card, only 9% of Grade 8 students with disabilities and 37% of Grade 8 students without disabilities are at or above a proficient level in mathematics (National Center for Education Statistics, 2019), suggesting a need for targeted instruction and support in the middle grades, especially for students experiencing mathematics difficulty (MD). The increased demands of middle school, leading up to algebra in high school, can be daunting for students experiencing MD and their mathematics teachers. The goal of this model demonstration project is to target middle schools, to provide early intervention to students who experience MD and who may be struggling to reach proficiency in pre-algebraic knowledge and skills. To reach this goal Project STAIR was designed to increase teacher knowledge, which in turn, increase student knowledge. Data for this proposal comes from pre and post assessment data from participating teachers across four years of implementation. Measures included Teacher Instructional Practices Survey (TIPS), Integrated Knowledge and Motivation Assessment-MR (IKMA), and Self-Efficacy Survey. Across four years of implementation, we had a total of 51 middle school mathematics teachers complete the project. Each year participating teachers took a series of pre and post assessments. These assessments were collected via one continuous survey distributed through a Qualtrics link.

Between the pre and post assessments, teachers participated in three Core Professional Development (PD) sessions prior to and during the school year. These Core PD sessions included the following content: Day 1-introduced teachers to the STAIR study purpose, overview, and study goals. During this initial day, the Principal Investigators (PI) and Graduate Research Assistants (GRAs) at each site presented initial teacher assessment surveys including demographic information, teacher practices, and teacher beliefs. Day 2-concentrated on DBI components describing progress monitoring, collecting diagnostic data, decision-making based on student responsiveness, and reviewing STAIR student assessments. Day 3-focused on mathematics content and instructional adaptations; we reviewed components of instructional delivery including explicit instruction, multiple representations, the use of precise mathematical language, and strategies including fluency building, problem-solving heuristics, and increasing motivation. These PD sessions were followed by ongoing coaching with a member of the research team who worked with teachers in their classrooms by meeting monthly for a pre conference, observation, and post-conference along with a virtual meeting in between in-person coaching sessions.

Results include outcomes across the first three years of teacher data. Year 4 data is currently being cleaned and analyzed. The results reported thus far suggest teachers that implemented STAIR tailored coaching and professional development increased middle school mathematic teachers' instructional practices of DBI in the areas of frequency, confidence, and overall understanding. These data also suggest that the work needs to continue to best meet the needs of teachers to see even more increases in content knowledge, self-efficacy, and use of DBI in the classroom. Acknowledging the varying obstacles throughout the four-year project, researchers on the project know there is still work to be done to increase content knowledge for our teachers.

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Technology-Integrated Reading Intervention for Elementary English Learners: A Systematic Review

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Background: In the United States, English learners (ELs) continue to demonstrate lower academic achievement than English-only students, especially in the area of reading (Hussar et al, 2020). Effective and evidence-based reading interventions are needed to address the reading difficulties of ELs (Hall et al., 2019). In recent years, using technology to enhance learning in reading is a promising approach (Baker et al, 2020). Several research syntheses have summarized the research on reading interventions for students with RD using technology (Cheung & Slavin, 2013; Jamshidifarsani et al., 2019). However, none of these studies have examined the effects of these interventions on ELs. Purpose: The purposes of this study were twofold. First, it aimed to determine the effects of technology-integrated reading intervention for ELs with reading difficulties. Second, it sought to explore the pattern of integrating technology into reading intervention programs for ELs. Participants: We focused on students who are ELs with reading difficulties in elementary school (i.e., Grades K through 6) in the United States. Methods: We conducted a systematic review by searching through 4 electronic databases (i.e., Academic Search Complete, Education Source, ERIC, and APA PsycInfo) and two most-relevant journals (i.e., Journal of Special Education Technology and Reading Horizons). We set a time limitation between January 2010 to August 2022, because we tend to fucus on technology in the most recent decades. We then screening the database results with the following inclusion criteria: (a) participants included ELs with RD in Grades K through 6 in the United States; (b) the intervention design integrated at least one form of technology; (c) at least one dependent variable addressed English reading outcomes. After determining eligible studies, we coded each each study on three categories: (a) studies designs and sampling; (b) characteristics for participants, measures, effects sizes, and results; (d) characteristics for intervention programs, including dosage, type of technology, teaching contents, the role of interventionists and the role of technology. Results: From our preliminary results, we obtained 1,289 peer-reviewed studies from database search and identified eight studies that met our inclusion. All included studies were single-subject designs. Eight studies conducted in elementary schools in the United States were included. All studies were single-subject designs. Results showed that technology-integrated reading intervention is generally effective, with seven studies having moderate effect sizes (PND > 70%). There were three patterns of integrating technology with reading interventions: fully technology-led instruction, technology-conveyed teaching contents, and technology as instructional tools. Conclusion: Based on this review, we realize that few studies have examined the effects of these reading programs and other programs on student outcomes. Although we only examined SSD studies, our search also yielded few quasi-experimental or experimental studies. Our plan is to increase the number of eligible studies taking into account their quality.

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Investigating the effectiveness of morphological instruction for fourth grade students with dyslexia

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Purpose: Many interventions exist for dyslexia. However, almost all of these interventions are based on one premise discovered in 1936 (Gillingham & Stillman): improve phonological processing. However, a one-size-fits-all approach does not always work. Not all children with dyslexia have deficits in phonological processing, and similarly, not all children with dyslexia benefit from interventions designed to improve phonological processing (e.g., Snowling & Hulme, 2012; Vidyasagar & Pammer, 2010). Thus, we investigated an alternative instructional strategy focused on morphology to support students with dyslexia.
Participants: Participants in our study were 28 students diagnosed with dyslexia. Twelve students were assigned to the intervention group (in in-tact instructional groups) and 16 students were in the control group and received business-as-usual phonological instruction. They were in Grade 4 at the time of the study and ranged in age from 9.4 to 10.9 years old. Eight students were boys and 20 were girls. They all attended a specialized school for students with dyslexia.
Research Method: Over 16 weeks, the intervention group (n=12) received instruction on morphemic patterns and strategies to explore word meaning; the control group (n=16) received standard phonology-based reading instruction. We administered pre- and post-tests that assessed phonological awareness, vocabulary, decoding, and spelling.
We modeled item responses using multilevel difference-in-difference logistic regression to compare pre-to-post changes in students' latent abilities between the two conditions for students at different levels of phonological awareness, accounting for item difficulty. In contrast to analysis using raw scores, this allowed us to capture nuanced change patterns. For example, some students improved on easy items but did not demonstrate substantial growth in latent ability, whereas others improved on difficult items which translated to latent ability growth.
Findings: The intervention group improved by 1.06 logits above and beyond the control group on vocabulary, among students at the 30th percentile (mean score for this sample) for phonological awareness. The difference in difference effect increased as students' phonological awareness decreased. In other words, students weaker in phonological awareness benefited more from the treatment on the vocabulary outcome measure. For example, students at the 10the percentile for phonological awareness in the control group decreased by 0.67 logits ($p < 0.001$) on vocabulary whereas their counterparts in the treatment group increased by 2.75 logits ($p < 0.001$). Additionally, students with higher phonological awareness benefited more from the intervention for spelling and decoding outcomes. Control group students whose phonological awareness was at the 30th percentile and above did not make significant improvements on spelling and decoding, whereas students in the treatment group with the same sound awareness level improved their spelling and decoding significantly.
Our study provides preliminary evidence for the effectiveness of a morphological intervention for students diagnosed with dyslexia. Certain ability profiles correlated with more gains, suggesting that this intervention may be more effective for students with a particular ability profile.

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Effects of reading and reading plus behavior for students with ASD: An alternating treatment

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Background: To better understand the heterogeneous challenges of students, research has examined the relationship between academic performance and problem behavior (McIntosh et al., 2008; Morgan et al., 2008). Findings indicate that there is a relationship between academic performance and problem behavior, therefore simultaneously addressing reading and problem behavior might be beneficial. A group of students who have persistent challenges in reading and high rates of problem behaviors are students with ASD (Alberto & Troutman, 2013; American Psychiatric Association, 2013). As the number of students with ASD increases, research examining reading and problem behavior becomes important to ensure that students with ASD receive the best possible interventions (https://www.cdc.gov/ncbddd/autism/data.html). Study purpose/Research questions The purpose of the study is to compare the relative effects of a reading only intervention to a reading plus behavior intervention on student engagement through a secondary analysis of an alternating treatment SCD study. The reading intervention included vocabulary, fluency with text, and main idea lessons (Solis et al., 2022) and the behavior intervention consisted of behavior expectations (e.g., sit or stand with a calm body) and a visual schedule. The study addresses the following research question: Does a reading plus behavior intervention result in higher levels of engagement compared to a reading only intervention? Participants The participants included five students with ASD in grades 6-8. Out of the five student two were females and three were males. Two were Caucasian, two were Hispanic, and one was Asian. All the participants scored a severity level two on the Gilliam Autism Rating Scale (GARS).
Measures: Dependent measure: direct observation of student engagement with 100% IOA. Descriptive measures: The Gilliam Autism Rating Scale (GARS-3), AIMSweb Oral Reading Fluency (AIMSweb ORF), Woodcock-Johnson IV - Letter Word-Identification (WJ-LWID), Woodcock-Johnson IV - Passage Comprehension (WJ-PC). Data Collection Procedures Participants were administered a battery of assessments to determine reading level and ASD symptom severity. Student engagement will be measured by coding 100% of the session video recording and utilizing a 15-second momentary time sampling procedure. The definition of student engagement is as follows: (a) Sitting on the chair, floor, or bed and/or standing with a calm body, (b) Eyes on the computer screen, tutor, and/or lesson materials, (c) Using the lesson materials appropriately, and (d) Asking lesson related questions or having a lesson related conversation. Data Analysis Visual analysis of the data including an analysis of level, trend, variability, immediacy, and overlap will be conducted. Percentage of non-overlapping data (PND) and Tau-U will be used to calculate overlap.
Results and Discussion: It is hypothesized that the reading plus behavior intervention will result in higher levels of engagement compared to the reading only intervention (Kamps et al.,1995; Roberts et al., 2021; Sinclair et al., 2019; Solis et al., 2016). Findings will provide insight of the impact of embedding behavior supports and further understanding of potential techniques to increase levels of engagement for students with ASD.

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Stealth Morph - A Pilot Study of a Greek and Latin Morphemic Intervention for Twice Exceptional Elementary Students

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This study examines the effects of a reading fluency intervention that explicitly teaches morphology using Greek and Latin roots to Twice Exceptional (2E) students at risk for reading difficulty. 2E students may not be recognized as at risk for reading difficulties compared to the average student but may be seen as severely struggling compared to a neurotypical gifted student (Fugate et al., 2020). As time passes, 2E students at risk for reading difficulty fall further behind academically, not having the tools to reach their gifted potential (Fugate et al., 2020). Often, gifted students are not screened for potential learning disabilities, and educators often look for giftedness or disability but do not look for both (Assouline et al., 2006). There is a discrepancy between these students' expected and actual achievements. Various interventions exist for learners who struggle with dyslexia, but very few have been found to work with 2E learners. Rather than focus on the gifts or talents of the learner, interventions focused on the remediation of the reported disability. Introducing Latin and Greek roots in the fourth through eighth grades helped students understand word origins, which helped with decoding (Henry, 1989). Understanding the origins of words may help older students analyze longer, more complex words as they read (Henry, 1989). This study's participants include gifted and talented elementary students, grades 4-6, both gifted readers and those at risk for reading difficulty. Participants were given a fluency pre-test and then enrolled in a 10-lesson explicit instruction morphology intervention using Greek and Latin roots. A fluency posttest was given at the end of the lessons to determine if the morphemic intervention increased reading fluency in both groups. An ANOVA and descriptive analyses will be conducted as the study is ongoing. The participants will be surveyed after the study's conclusion for social validity. Data collection will take place at the beginning of the 2022 school year.

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Teacher Education Tool for Assessing Reading Errors using Oral Reading Fluency Measures

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Teachers conduct oral reading fluency (ORF) measures to make data-driven decisions about future reading support (Wayman et al., 2007). Consequently, the accuracy with which teachers collect ORF data can determine whether a student receives additional or more intensive support.
In ORF measures, students read aloud while the teacher evaluates whether the child has read the words correctly. Although accurate identification of reading errors enables teachers to derive specific support strategies from the diagnostic data (Coulter et al., 2009), there is a lack of both studies that examine the accuracy of teachers' judgement of reading errors using ORF measures and economical training tools for teacher education.
Research Question: We present a one-minute web-based ORF tool to practice assessing reading errors in teacher education. We ask: How sensitive and specific are student teachers in detecting reading errors? Do sensitivity and specificity change with more practice?
Methods: A total of 225 student teachers from German universities participated (90% female, ⌀22.8 years old). 35% specialized in special education and 65% in elementary education. Each participant had to do four different and standardized ORF measures in a row. On a screen, participants viewed single pseudowords and listened them to an audio track simultaneously for one minute per measure. The order of the four ORF measures was randomized. Reading errors were classified as (1) hesitations, (2) mispronounced singletons, (3) omitted singletons, (4) transposition of sound order, and (5) guessing known words. All participants received a brief introduction to reading error scoring before the first measure. After each measure, participants received standardized feedback on sensitivity (i.e., ratio of items without reading errors to number of items rated as read aloud correctly) and specificity (i.e., ratio of mispronounced items to number of items rated as read aloud incorrectly) of their judgement.
Results: Student teachers find it easy to identify correctly read items as such (sensitivity: .94 - .98). When identifying reading errors, the specificity is lower (.69 - .85), which represents greater difficulty. Detecting transpositions was the easiest on average (Hesitations: Pi = .84(.12); mispronounced Pi = .83(.21); omissions: Pi = .94(.16), transposition: Pi = .96(.07); guessing Pi = .92(.16)). Significant differences in item difficulty among the reading error types were observed ($F(4,130) = 3.26$, $p < .05$, $\eta 2 = .091$). Among participants who completed a test in first or fourth place in the row, no significant differences were observed in sensitivity and specificity for any test (test1: $F(1,73) = 1.10$, $p = .34$; test2: $F(1,74) = 0.39$, $p = .68$; test3 $F(1,56) = 0.43$, $p = .65$; test4: $F(1,68) = 0.89$, $p = .41$).
Conclusion: The results show that inexperienced student teachers recognize correct reading aloud. However, both the low specificity and the different challenging error types suggest that student teachers need more intensive training for assessing reading errors. In addition, participants claimed that they were unaware of the relationship between types of reading errors and appropriate support strategies. For teacher education, the tool should offer student teachers a link between specific reading difficulties and intervention additionally.

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Profiles of Reading, Numeracy, Writing, and Computer Skills-Use Engagement with Low-Skilled Adults

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Purpose: A growing body of research has investigated the reading component skills (e.g., oral language, decoding) of struggling adult readers to inform literacy interventions (e.g., Nanda et al., 2010; Sabatini et al., 2010); however, these studies do not provide specific information related to the living conditions and activities of this population (Nienkemper & Grotlüschen, 2019). Practice Engagement Theory (PET) postulates that improving adult literacy outcomes relies on understanding literacy skills as well as engagement in daily practices that involve reading, writing, numeracy, and computer skills-use (Reder, 2009). PET also suggests that skills-use within the adult population is heterogeneous and that there are subgroups of individuals who share similar practices within similar social contexts. The current study extends past literature with struggling adult readers by using the Program for the International Assessment of Adult Competencies (PIAAC) dataset to examine latent profiles of engagement in reading, writing, numeracy, and computer skills-use. We also examined whether subgroups of engagement and demographics (LD, native speaker status) predicted the literacy performance of low-skilled adults.
Method: PIAAC participants included 12,330 adults (age range 16-74) across the United States. We analyzed 7,357 that met our criteria of low-skilled (at or below Level 2 in literacy). The participants completed a background questionnaire that contained several items pertaining to engagement in reading, writing, numeracy, and computer skills-use at home and at work. We also used native English speaker status and self-reported learning disability in our analyses.
Results: The results indicated five distinct profiles: High Engagement (8%), Average Engagement (44%), Average-Low Engagement (40%), and two generally Low Engagement profiles that were most differentiated on numeracy engagement skills-use (5.5%, 2%). The High and Average Engagement profiles had higher probabilities of adults scoring at a higher literacy levels than the remaining profiles. Native English speakers and non-learning disabled adults have higher probabilities of higher literacy for the Average, Average-Low, and one of the Low Engagement profiles.
Conclusion: The results support PET, such that adults that reported higher engagement across all skills-use types had higher literacy performance than adults with lower engagement. One critical facet of PET is the contextualization of skills-use in day-to-day life, both at work and in the home. Thus, our findings emphasize the importance of investigating "literacy-in-use" (PIAAC Literacy Expert Group, 2009) in future interventions studies with low-skilled adults enrolled in adult literacy programs. Specifically, literacy-in-use is a framework that practitioners can use to help adult literacy students improve their literacy skills in various contexts, or different types of scenarios that require reading, problem-solving, or numeracy-related tasks (Trawick, 2019).

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The Impact of the COVID-19 Pandemic on Children's Early Reading Development

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Research Purpose and Questions: The proposed poster will present a study that used state-wide, longitudinal data and a quasi-experimental study design to examine the impact of the COVID-19 pandemic on the early reading development of children who transitioned from kindergarten to first grade from the spring to fall of 2020. It asked the following questions: 1. What was the causal effect of the pandemic on the fall, first-grade decoding skills of children in the 2019-20 kindergarten cohort in Virginia? 2. How did the pandemic differentially impact the decoding skills of students with and without economic disadvantage?
Participants This study analyzed longitudinal demographic and literacy data on 716,899 students who entered public school in Virginia from the fall of 2007 through the fall of 2019. This includes 63,409 members of the 2019-20 cohort of kindergarten for whom we estimate the pandemic's effects on decoding skills in the fall of first grade. Of these 63,409 students, 38.3% were classified as economically-disadvantaged.
Method: This study used a short, interrupted time series (ITS) study design (Bloom, 1999). ITS designs involve repeated measurement of an outcome of interest over time within a population, prior to and following some "treatment" that is: 1) experienced by the entire population and 2) suspected to affect the outcome (Bernal et al., 2018; Wong et al., 2015). Pre-treatment data demonstrate how the outcome of interest varies over time within that population. This pre-treatment historic trend is then extrapolated into the treatment period to predict what the mean outcome would have been, should there have been no treatment (i.e., the counterfactual). The estimated treatment effect is the difference between this counterfactual and the observed mean outcome for the population following treatment.
In this study, treatment was defined as exposure to the COVID-19 pandemic as a first-time kindergartener. Thus, all students in the 2019-20 kindergarten cohort (N=63,409) belonged to the treated group, and all students in the 12 pre-pandemic cohorts (i.e., 2007-08 through 2018-19; N=653,490) were members of the control group, whose data were used to predict the counterfactual.
To reduce bias to the treatment effect estimate, introduced by changes to sample composition over time through either selection or attrition, we used student-level demographic data and a measure of students' foundational code-related skills at kindergarten entry to improve group balance within cohorts across timepoints. We also relied on inverse probability of treatment weights (IPTW) to adjust our estimates for differential attrition across cohorts (Austin & Stuart, 2015; Rubin, 2001).
In addition to examining the average impact of the pandemic on the decoding skills of the 2019-20 kindergarten cohort, we also examined heterogeneous treatment effects for students with and without economic disadvantage.
Findings: The COVID-19 pandemic caused children in the 2019-20 kindergarten cohort to experience an average decline of 5.25 points in observed scores on a universal literacy assessment, relative to predictions based on historic trends (d=-.32). On average, students from economic disadvantage experienced a greater decline in observed scores in the fall of first grade (B=-6.33), relative to non-disadvantaged students (B=-4.34; d=-.38).

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Comprehension Processes Through Eye Movement and Think-Aloud Tasks

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In this study, we examined the differences in reading comprehension processes between students with and without reading difficulties. A total of 72 students from third and fourth grades in South Korea participated in the study. Multiple types of tasks were administered to evaluate the participants' eye-movement and think-aloud behaviors, including reading two types of texts (e.g., narrative and expository texts) and answering questions. A series of analyses were conducted to investigate the differences in comprehension processes between and within groups. First, Mann-Whitney U tests were conducted on eye movement to examine the differences between students with RD and those without RD. Eye movement data included fixation duration and fixation frequency on two types of texts. Second, we used Wilcoxon signed-rank tests for each group of students with or without RD to compare their eye movements before and after a question was asked. Third, we conducted Mann-Whitney U tests to compare the think-aloud responses of students with RD with those of students without RD. The results showed that students with reading difficulties fixated significantly longer and more frequently on both narrative and expository texts than those without such difficulties. Moreover, students without reading difficulties had significantly decreased reading comprehension processing times after a question-answering activity for all types of passages, whereas students with reading difficulties had decreased processing time only for a whole passage reading of narrative text. In addition, the two groups differed significantly in terms of three inferential responses to tasks requiring them to think aloud, including valid elaborative inference, predictive inference, and bridging, as well as non-inferential responses such as repetition and meaningless responses. These results suggest that educators should be aware of differences in comprehension processes among students and compose differentiated instruction plans for students struggling with reading.

A Korean Response-to-Intervention Model revisited: S.A.B.U.

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This study was to examine the effectiveness of the Response to Intervention(RTI) model implemented to improve reading skills in 3rd grade to 6th grade students at risk in South Korea. We introduce how RTI was carried out and describe the main outcomes over three years, 2019-2021. Several previous studies pointed out potential problems to implement RTI in South Korea due to a lack of awareness of the field of learning disabilities(LD) between parents and schools, especially regarding diagnosis criteria, procedures, and assessments to identify LD. However, we have carried out a Korean RTI model implemented in six elementary schools across six different areas for 4 years since 2019. We describe the Neo Learning model named S.A.B.U. (SAera BaeUm, Neo-learning program for underserved students with learning challenges), the Korean RTI model and investigate the effects of the program. The main features of S.A.B.U are including the standardized assessments(reading comprehension, vocabulary, and LD screening tool) for school and reading intervention for students at risk carried out every year, based on the partnership between the local university and community. S.A.B.U. provides 15 intervention sessions with pre-post tests and monitoring for each semester for a year. We also describe the procedure and the results of Tier 1, Tier2, and Tier3 in S.A.B.U; the effects of S.A.B.U found in the replication studies. These replicated findings suggest that the RTI model enhances reading skills in students at risk in South Korea. Implications regarding the use of RTI to improve reading skills in the elementary school context in South Korea are discussed.

Kindergarten Executive Functioning Skills Predict Reading Success for Students with Learning Disabilities

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Background: Students with learning disabilities (LD) are at increased risk for experiencing reading failure, yet LD is often not identified until later in schooling, after the window for students to participate in the most effective reading interventions has closed. Assessing young students' executive functioning skills (e.g., working memory and cognitive flexibility) may be a way to determine which students are at higher risk for struggling to read, before they even begin to read, so they can participate in early interventions. Because learning to read requires strong EF skills (i.e., working memory helps students hold information in mind while learning to read, and cognitive flexibility helps students map different sounds onto the same letter), lower EF skills can be an early predictor of which students will struggle with reading. These early indicators may be especially helpful for students who go on to be identified with LD because the nature of their diagnosis increases their risk of struggling to read. However, to what extent EF skills are predictive of reading performance for all students, particularly students with LD, has not been thoroughly explored, especially in large, nationally representative samples. To fill in these gaps, the current study asks: How do kindergarten EF skills influence students' reading performance in 5th grade, particularly for students with LD?
Method Dataset: This study used the restricted version of the Early Childhood Longitudinal Study, Kindergarten Class of 2010-2011 (ECLS-K:2011), a nationally representative dataset that follows the same cohort of children from kindergarten through fifth grade across nine time points.
Participants: The analytic sample included students 1) whose parents or special education teacher reported that the student had a diagnosis of LD and 2) whose parents specified at all nine time points to have no known diagnoses. Analysis To investigate early predictors for reading performance in 5th grade, multiple regression and interaction analysis were conducted with the entire sample. The predictor variables were: students' LD diagnosis, race, sex, socioeconomic status, and EF skills (i.e., working memory (WM) and cognitive flexibility (CF) performance measured in kindergarten). We also investigated the relationship between two interaction terms (i.e., (WM, CF) * (LD) and our outcome variable. (i.e., students' reading scores in Spring of 5th grade).
Results: While advanced working memory and cognitive flexibility skills upon school entry were found to predict all students' higher reading scores in Spring of 5th grade ($p<0.001$), advanced working memory was particularly helpful for students with learning disabilities ($p=0.001$).
Implications: Our results suggest that measuring all students' EF skills, starting in kindergarten, may be helpful, especially for students who are at risk for developing LD. Results from these assessments can support teachers in determining which students may be the best candidates for early interventions. Additionally, our results showing the predictive power of working memory have implications for the widespread use of interventions that aid in children's development of their working memory skills (e.g., Tools of the Mind; Blair, 2017).

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Acculturation and Gender Difference: Korean Immigration Parents of Child with Developmental Disabilities

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Purpose: Korean immigrant mothers of child with developmental disabilities in the United States experience acculturative stress while adapting into different value, linguistic barriers and new culture. Gender difference and the duration of residence have been known as significant predictors of acculturative stress among Asian immigrant women. Yet, limited information is known about how acculturative stress shows significantly different between mothers and fathers according to the length of stay in U.S. This quantitative survey study aims to compare how Korean immigrant mothers and fathers of children with disabilities have different level of acculturative stress with varying length of stay.
Method: A total of 64 South Korean immigrant parents (43 mothers and 21 fathers) who have child or children with developmental disabilities participated in the study. Parents reported their level of acculturative stress using Korean cultural adapted version of the National Latino and Asian American Study (NLAAS) survey (Lueck& Wilson, 2010). A two-way analysis of variance (ANOVA) is examined to compare mean on how acculturative stress shows significant difference between mothers and fathers according to the duration of U.S. residence.
Results: The findings indicate that there were main effects for the level of acculturative stress and gender difference on the residence years. Especially, parents who stay 0-5 years and 6-10 years show higher acculturative stress compared to the parents with long-term of stay in U.S. In results, the Korean parents' long-term adaptation and gender differences are associated to decrease the degree of acculturative stress.
Implications: The research findings suggest how the long-term stay reinforces to adapt the U.S. culture and plays an important role in reducing acculturative stress. Future studies also need to be elucidated whether the length of stay in the U.S. influences on the level of acculturative stress of Korean immigrant parents who have child or children with different types of disabilities.

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Curriculum-Based Measures for Children with Intellectual and Developmental Disabilities: An Assessment of Criterion-Validity

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Reading instruction for children with intellectual disabilities increasingly incorporates curriculum-based measures (CBM), which allow educators to monitor progress over time and make instructional decisions based on student performance. CBM has become a fixture of universal screening, multi-tiered systems of support (MTSS), data-based individualization (DBI), and other promising special education practices designed to provide appropriate reading instruction for all students (e.g., Van Meveren et al., 2020). However, much of the research supporting the use of CBM stems from work with children with learning disabilities and other populations who do not share the cognitive profile of individuals with intellectual disabilities (Snyder & Ayres, 2020). There is therefore little evidence to support the suitability of CBM as an assessment or decision making tool for children with intellectual disabilities. Research validating the use of CBM is needed if children with intellectual disabilities are to be responsibly included in large-scale systemic education initiatives predicated on CBM (Hosp et al., 2018). Demonstrating the validity of reading CBM for children with intellectual disabilities will likewise support the use potentially effective approaches to instruction among this population (e.g., DBI; Fuchs et al., 2020). One approach to validating CBM involves comparing outcomes to standardized assessments with established validity (i.e., criterion measures).

Researchers have extensively validated reading CBM for children with learning disabilities and children without disabilities; however, research regarding the suitability of CBM for children with intellectual disabilities is limited. Hosp and colleagues' (2014, 2018) demonstrated that CBM used in many instructional settings predicted the performance of post-secondary students with intellectual disabilities on standardized measures of reading. Yet data obtained from older students has limited bearing on elementary school students with disabilities who are more likely to be exposed early reading CBM (Snyder & Ayres, 2020). Given their use in screening, assessment, and decision making in many elementary schools, validating CBM for children with intellectual disabilities represents a priority for the field. The current study examined whether CBM outcomes for children with intellectual disabilities predicted performance on standardized criterion measures. Research questions included: (1) To what extent are reading CBM outcomes significantly correlated with criterion measures and (2) are some CBM outcomes significantly better at predicting performance on criterion measures than others?

We addressed the research questions using a quantitative correlational design (Thompson et al., 2005). We recruited children (average age 9.2 years) diagnosed with ID who demonstrated an ability to benefit from vocal reading instruction from multiple states. Assessments were administered by qualified staff during 90-min, 1:1 sessions. Participants (n = 60) completed a battery of assessments that were then examined using descriptive and inferential statistics.

Associations between reading CBM (e.g., letter reading fluency) and criterion measures (e.g, Woodcock-Johnson IV) were examined using bivariate correlations and Meng's z test. Results suggest CBM predicted performance on content-appropriate criterion measures. Analyses revealed no differences in terms of predictive power. Findings provide further support of CBM for children with ID and suggest teachers may use CBM among this population with confidence.

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Predicting Word Problem Outcomes: Supporting Emergent Bilingual Students with Mathematics Difficulties

Presenter(s): Sarah G. King, The University of Texas at Austin (sarah.gorsky@utexas.edu)

When considering instruction in mathematics to support emergent bilingual students, a combination of academic and linguistic supports is imperative to ensure all students can access the material and have the necessary instructional supports to effectively learn. The combination of linguistic and academic instructional components provides students with the best chance of acquiring new knowledge of mathematics content, while also preserving and honoring their language and cultures (Slavin & Cheung, 2005). Unfortunately, extant research suggests that for many emergent bilingual students with mathematics difficulties, the inherent linguistic complexity of word problems is an ongoing barrier to effective and efficient mathematical learning (Morin & Franks, 2010; Thomas et al., 2015; Vukovic & Lesaux, 2013).

A well-known misconception is that mathematics is a universal language accessible to all students, regardless of linguistic background (de Araujo et al., 2018), however, this claim is heavily criticized because it (a) seemingly ignores the relationship of mathematics and culture and (b) fails to acknowledge the linguistic complexity of mathematical practices (de Araujo et al., 2018). Looking at today's curriculum, the level of rigor from grade to grade continues to increase, requiring students to employ multiple cognitive processes simultaneously in order to successfully problem solve (Lemke, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). Despite an increase in research on word problems in mathematics, there is still much we do not know about the relationship between mathematics word-problem solving and language proficiency.

Prior research that examined the role of language in word-problem solving identified linguistic factors believed to impact students' word problem proficiency, which included skills across the domains of listening, speaking, reading, and writing (Pongsakdi, 2019). Despite this knowledge, the individual skills within each of these domains are often underdeveloped in students who are dually identified as emergent bilingual and have mathematics difficulties (Swanson et al., 2011). With knowledge of the importance of language for mathematics acquisition, the current study aims to contribute to the current evidence base by gaining a deeper understanding of the complexities of language proficiency within each of the language domains and their individual impact on students' word problem outcomes.

In the current study, we examine the relationship between students' English language proficiency scores, as measured by the Texas English Language Proficiency Assessment Standards (TELPAS) and their mathematics word-problem solving on a measure of word problem accuracy following the implementation of an evidence-based word problem intervention. The following questions guide our research: (1) Is there a relationship between emergent bilingual students' scores on the TELPAS for the language domains of Listening, Speaking, Reading, and Writing and post-test scores on a measure of word-problem solving? (2) What is the predictive value of TELPAS scores in the areas of Listening, Speaking, Reading, and Writing for determining emergent bilingual students' word problem outcomes? Results of this study are forthcoming and will be reported at the time of this poster presentation.

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Multiple Modalities of Coaching to Support Teacher Candidates Implementing Evidence-Based Reading Intervention

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Purpose: To improve TC knowledge, skills, and use of evidence-based practices, we provided coaching support during a coursework-aligned, embedded early clinical experience. During this clinical experience, TCs were trained to implement an evidence-based reading intervention with elementary aged students identified as in need of support in foundational reading skills. We provided coaching support during TCs' implementation of the reading intervention via two modalities including supervisory coaching and side-by-side coaching. The purpose of this study was to investigate the effects of the coaching package on TCs' fidelity of implementation. We also examined TCs' perceptions of the coaching package on their knowledge, skills, and use of evidence-based practices.
Research Questions: 1. What are the effects of a coaching package intervention on TCs' fidelity of implementation of an evidence-based reading intervention? 2. What are TCs' perceptions of the coaching intervention related to their knowledge, skills, and ability to implement an evidence-based reading intervention?
Methods: Three TCs in Reading and Elementary Education participated in this study. Each TC implemented the reading intervention one-on-one with an elementary-aged student. We implemented a multiple baseline across participants design to investigate the effects of the coaching package on TCs' fidelity of implementation. Prior to baseline, TCs participated in asynchronous and synchronous training sessions with opportunities for practice and feedback. Then, TCs entered baseline concurrently and received supervisory coaching which consisted of email feedback delivered after each tutoring session (i.e., twice weekly). Email feedback was based on TCs' fidelity of implementation after viewing video-recorded tutoring sessions. Each TC then entered the intervention phase in a time-lagged manner. During intervention, TCs received side-by-side coaching in addition to supervisory coaching. Side-by-side coaching consisted of in-the-moment coaching in which the coach provided prompts or modeled adherence to the components of the reading intervention.
Findings: During the baseline phase, data for two TCs were stable with no baseline trend. For the third TC, an increasing trend was observed; however, this TC entered intervention last, and there was a change in level prior to entering the intervention phase. During intervention, the first two TCs met criteria for reaching fidelity (i.e., at least 80% across three consecutive sessions or at least 90% for one session) when receiving the coaching package. The third TC met requirements for fidelity when the time during side-by-side coaching was increased. Due to attrition, maintenance data was collected only for the second and third TCs to enter the intervention phase. Maintenance data indicated the second TC maintained fidelity and the third TC's fidelity score dropped slightly below the goal of 80%.
Findings from the social validity survey indicated that TCs enjoyed receiving both modalities of coaching support. One TC indicated, "As someone who thrives off of feedback, I loved getting such specific feedback after each and every tutoring session. I can't imagine the experience being as positive as it was if I hadn't received as much feedback as I did." Findings also indicated that having a coach who modeled strategies improved TC perceptions of their knowledge, skills, and instructional behaviors.

How do self-determination skills support adolescents with disabilities learning to read?

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Most eighth grade students with disabilities in the United States are not proficient in reading and understanding grade level texts (National Assessment of Educational Progress, 2019). About 20% of struggling adolescent readers drop out of high school before completing their sophomore year (Dalton et al., 2009). Identifying maximally effective, evidence-based interventions to keep adolescent students with disabilities engaged in reading is a national priority. Effective reading interventions delivered to adolescent struggling readers and those with disabilities have been identified (Edmonds et al., 2009; Scammacca et al., 2015). However, progress is slower than for elementary students, and multicomponent interventions may need to be delivered across longer periods of time to see effects in reading achievement (Wanzek et al., 2013). Supporting students' self-determination has been highly effective in their achievement of academic, transition and employment related goals, but instruction in self-determination skills have not yet been widely integrated with reading instruction for adolescents with disabilities. As defined by Causal Agency Theory, self-determination includes exploring and setting a goal, monitoring progress, problem solving when barriers arise, and reflecting upon one's agency in accomplishing the goal (Shogren et al., 2015). Practicing related component skills (choice making, problem solving, goal setting and attainment, self-awareness, self-advocacy, positive attributions of self-efficacy and expectancy, self-regulation) supports development of self-determination (Algozzine et al., 2001; Burke et al., 2020). The purpose of this systematic review was to examine how these self-determination component skills have been integrated with reading instruction for adolescents with disabilities and struggling readers, and to examine effects of these strategies on reading achievement.

Didion and colleagues (2021) conducted a similar systematic review to examine how self-determination component skills were utilized to increase reading achievement among elementary students with or at risk for learning disabilities. We used similar methodology to explore our research questions, but reviewed studies that included adolescent and older students with or at risk for disabilities. Online databases and published relevant systematic reviews were searched for peer-reviewed literature and dissertations. Eligible studies included (1) experimental, quasi-experimental, or single case designs, (2) reading interventions that included a self-determination component skill as the independent variable, (3) an outcome measure of reading achievement, and (4) participants who were students with or at risk of disabilities in grade six through adult education. Thirty articles were identified and coded; interrater agreement was collected for 20% of articles. Studies were coded to examine study features, including information about the independent variable, participants, settings and implementers, and effects using a code sheet developed for use in other syntheses on reading interventions (Vaughn et al., 2014). Studies were also assessed using the Council for Exceptional Children Quality Indicators for group design and single case designs (Cook et al., 2015). This poster will display a summary of self-determination component skills used in identified studies by type and in alignment with essential characteristics of Causal Agency Theory. A summary of effects on reading achievement using effect size measures and study quality will be displayed.

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Use of a refutation text to correct misconceptions about dyslexia

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Many students with language impairment have co-occurring dyslexia (Catts et al., 2005), but most speech-language pathologists (SLPs) report insufficient training for supporting these children and demonstrate variable knowledge about dyslexia (Blood et al., 2010; Krimm et al., 2021). Refutation texts, which follow an argument structure that explicitly refutes common misconceptions, are useful for correcting students' misconceptions about dyslexia (Peltier et al., 2020c; Tam & Krimm, 2022). The purpose of this study was to determine whether the refutation text is effective for correcting practicing SLPs' misconceptions about dyslexia.

Participants. Participants were 31 SLPs recruited from a list of registered attendees for a professional development conference geared towards school based SLPs in the southeast.

Measure. The primary measure was the Dyslexia Knowledge Questionnaire (Peltier et al., 2020a). The Dyslexia Knowledge Questionnaire contains 10 true statements and 10 false statements about dyslexia. Participants indicated their agreement with each statement by dragging a slider along a visual analog scale. False statements were reverse-coded.

Procedure. Participants completed the Dyslexia Knowledge Questionnaire online using Qualtrics (pre-test; Peltier et al., 2020a). They were randomly assigned to read a refutation text (n = 19; Peltier et al., 2020b) or a control text (n = 12; International Dyslexia Association, 2020). Group sizes are uneven because graduate students were also recruited to complete the study but their results are not reported here. After completing the reading, participants repeated the Dyslexia Knowledge Questionnaire (post-test; Peltier et al., 2020a). Maintenance data will be collected four weeks after participants complete the post-test.

Results: Preliminary data were analyzed using a two-way repeated measures ANOVA. There was a statistically significant main effect of time ($F(1,37) = 271.77$, $p < .05$). There was no statistically significant main effect of group ($F(1,37) = 2.60$, $p > .05$). There was a statistically significant group-by-time interaction ($F(1,37) = 26.01$, $p < .05$). The interaction was probed using t-tests with a Bonferroni correction for multiple comparisons (alpha = .01). There was a statistically significant difference between pre-test and post-test for the refutation text group ($t(18) = 8.56$, $p < .01$) and for the control group ($t(11) = 6.08$, $p < .01$). Both groups performed better at post-test than they did at pre-test. There was not a statistically significant difference between groups at pre-test ($t(23.67) = 0.52$, $p > .01$). There was a statistically significant difference between groups at post-test ($t(19.56) = 2.78$, $p < .01$); the refutation text group outperformed the control group. Conclusion: Refutation texts may be viable means for correcting SLPs' misconceptions about dyslexia.

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Examining Instructional Components of Rational Number Interventions for Struggling Students: A Meta-Analysis

Presenter(s): Sarah Krowka, Instructional Research Group (sarah.krowka@inresg.org)
Additional authors (if any): Kelly Haymond, Instructional Research Group; Rebecca Newman-Gonchar, Instructional Research Group

Several studies have demonstrated that knowledge and understanding of fractions is predictive of mathematics performance in middle and high school above and beyond intellectual abilities, general mathematics achievement, and socioeconomic status (Siegler et al., 2012). Unfortunately, many students are not adequately learning fractions and other rational numbers topics when they are introduced in the mathematics curriculum. There has been a recent outpouring of evidence focused on rational number interventions as their importance gained increasing attention from educators and researchers. The goal of this project was to examine this body of work and to explore which aspects of rational numbers interventions were associated with positive student outcomes. We examined which instructional components, intervention characteristics, and study design features may have contributed to the effectiveness of intervention.

We searched for studies that focused on teaching rational numbers concepts to students experiencing mathematics difficulties in Grades 3 through 9. Our search yielded 1,654 candidate reports. Following title and abstract screening, 1,553 reports were excluded, leaving 101 reports to be screened at the full-text level for final eligibility status. After full-text screening, 52 reports were excluded. An additional 21 studies did not meet WWC standards and were excluded after the quality appraisal stage. A total of 28 studies with 3,853 unique participants. These samples provided a total of 90 effect sizes.

Across all studies, we found significant mean effects favoring intervention. The estimate of the mean effect size across all 28 studies (90 effect sizes) included in the analysis was 0.68 and differed significantly from zero (SE = 0.08, $p < .001$, 95% CI [0.51, 0.85]). We used a multivariate meta-regression model with robust variance estimation (RVE) to assess the possible moderating effects of instructional components. The between-study heterogeneity was large ($\tau_B^2 = 0.28$). In this study, the 95% prediction interval is [−0.36, 1.8], indicating the presence of wide heterogeneity and also suggesting that although the average study had large and positive impacts on student learning, for some studies the effect was much larger while for others, the true effect was negative. Using meta-regression models, we explored instructional components, intervention characteristics and study design features as moderator variables. The teaching and use of accurate mathematical language predicted large effect sizes ($b = 0.50$, $p = .042$) when controlling for other instructional components (visual representations, review, student explanations, and fluency activities) and three control variables (group size, duration, type of comparison condition). Group size, duration, ongoing training, and measure type were also identified as important predictors.

Mathematical language is a type of abstract academic language-terms such as equivalent, reciprocal, circumference--that helps students learn mathematics concepts more precisely. The results from this meta-analysis suggest that intervention programs devoting time to teaching and use of mathematical language can substantially enhance outcomes. When students understand and use mathematical language, it is believed that the students will more deeply understand the mathematics they are learning.

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Impact of dynamic assessment on writing skills of Pakistani high school students

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Dynamic assessment (DA) promotes interaction between learner and teacher in which the teacher employs an implicit level of assistance and gradually increases to an explicit level if needed by the students (Kazemi et al., 2020). Although forty years of research on DA is available there is a lack of empirical research on the DA in ESL classrooms, particularly its effect on ESL writing skills (Mauludin, 2018). In this study, I investigated the effect of DA on 30 homogenous Pakistan High school ESL learners identified through Oxford Placement test (OPT). The participants' primary languages were Sindhi, Saraiki, and Urdu and their ages were between 16 and 18. Those 30 participants were randomly assigned to experimental and control groups. As the intervention was assessment, not intervention, all participants were taught the same topics in different time slots and separate classrooms across six weeks. However, the assessment procedures for each group was different. After teaching them a particular topic they were asked to write an essay incorporating the learning related to the topic taught. Writing outcomes were measured at pretest, during intervention, and at posttest for all participants by counting errors in across six categories: Personal Pronouns, Subject-verb agreement, Tenses, Articles, Conditionals, and Prepositions. All of these were taught to the participants during six weeks.

The teacher collected the essays from both groups. The essays written by control group students were assessed traditionally as per the general practice going on the institute and returned with a score (out of 20 possible points) with no further interaction or scaffolding between teacher and students. The essays of the experimental group were assessed through a rigorous process of DA where students had an opportunity to interact with their teacher. These interactions were guided by an adaptation of the Regulatory Scale-Implicit to Explicit (Aljaafreh & Lantolf, 1994; Poehner, 2005). The difference between pre- and posttest mean scores between control and experimental groups were analyzed.

The findings showed a significant difference between control and experimental group in their essay writing skills. Based on the p-values of all the categories i-e. Pronouns ($t(28) = 4.306$, $p = .000<0.05$), Subject-verb agreement ($t(28) = 3.180$, $p = .004<0.05$), Tenses (($t(28) = 3.440$, $p = .002<0.05$), Articles ($t(28) = 4.482$, $p = .000<0.05$), Conditionals ($t(28) = 2.499$, $p = .003<0.05$), Prepositions ($t(28) = 2.303$, $p = .001<0.05$) are lesser than 0.05 which means the difference between both groups is significant. Based on this significant difference between the groups, it was concluded that the experimental group outperformed the control group. That is to say, the DA and scaffolding remained effective and productive which resulted in the significant decline of experimental group's errors in the posttest as compared to the pretest. To conclude, the current study confirmed DA as an effective approach to improve ESL learners' essay writing skills.

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Identifying risk factors for poor reading performance among 1st graders in Iceland

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Students with exceptional learning needs are entitled to a high-quality equitable education. To provide this, schools need to identify students requiring moderate and intensive support to be successful early on in their education. Despite a historically high literacy rate, Iceland has seen an increase in students not meeting expected benchmarks for reading, and since 2009, reading comprehension scores have been below OECD´s average. In addition, Iceland has a high percentage, 31.2, of elementary students requiring special education or support, an increase from 21.4% of students in 2005 (Statistics Iceland). Most of these students need reading support. In addition, the Icelandic education system is becoming increasingly diverse, with the number of students with linguistically and culturally diverse backgrounds increasing from 3.6% of students in 2005 to 12.4% in 2021. At the same time, there is no required systematic approach to identification or intervention for students at risk for learning disabilities within Iceland's compulsory schools.

This study examined the reading performance and growth scores of approximately 300 students in 1st grade in eight schools in the capital area of Iceland across the 2021-22 school year. Data from assessments in September, January, and May were analyzed to identify predictive risk factors of students who may require a more intensive level of support to improve reading performance. Predictive variables analyzed were student age, gender, language background, and initial letter naming fluency at the beginning of school in September. Outcome variables analyzed were early reading skills, including oral reading fluency, sight-word fluency, and nonsense word fluency which were assessed with a validated and reliable assessment from the Directorate of Education.

Early analysis indicated that the youngest students, students with a native language other than Icelandic, and students with initial low letter naming fluency had significantly lower oral reading fluency growth and achievement as compared to their peers across 1st grade. Initial letter naming fluency was found to be the best predictor of at-risk reading performance in the sample. The gap between these at-risk student groups and their peers widened as the year went on. Additional analysis will examine outliers and any factors contributing to potential sub-categories of at-risk groups as well as analyze rates of growth among risk groups under different instructional conditions. While academic gender gaps are a consistent topic of discussion in Iceland no significant differences in reading performance or growth were observed between girls and boys in this sample. Implications for changes to practices as well as additional research will be discussed.

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Concept-Focused and Procedure-Focused Instruction for High School Students' Algebra Achievement

Presenter(s): Jihyun Lee, University of Wyoming (jlee59@uwyo.edu)

This study examined: (a) whether teachers' reported use of concept-focused instruction (CFI) and procedure-focused instruction (PFI), that ninth graders received in their mathematics classrooms, differed depending on students' mathematics difficulty (MD) status and (b) whether ninth-grade mathematics teachers' self-reported use of these two types of instructional approaches are associated differently with ninth graders' algebra achievement after 2.5 years depending on students' MD status from a longitudinal perspective. Data for this study were drawn from the High School Longitudinal Study for the years 2009-2010 and 2011-2012 (N = 19,104). The results from an independent samples t-test indicated that students with MD were more likely to be educated in ninth grade mathematics classrooms where teachers provided less CFI and more PFI compared to students without MD. Multiple regression analyses indicated that students with MD who were educated in ninth grade mathematics classrooms where teachers provided less CFI and more PFI were more positively associated with having higher algebra achievement after 2.5 years. By contrast, students without MD who were educated in ninth grade mathematics classrooms where teachers provided more CFI and less PFI were positively associated with having higher algebra achievement after 2.5 years. This study has implications for future researchers, practitioners, and policymakers.

The Predictive Nature of Early Numeracy Performance: A Research Synthesis

Presenter(s): Yuting Liu, The University of Texas at Austin (yuting.liu@utexas.edu)
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The purpose of this study was to explore the predictive nature of early numeracy skills for later mathematics achievement by integrating all longitudinal studies in mathematics. Specifically, we addressed the following three research questions: 1、 How predictive is early numeracy on mathematics achievement six months or more later? 2. Which early numeracy domains (numbering, relations, and arithmetic operation domains) are more predictive of later mathematics achievement? 3、 Are early numeracy skills a "stepping stone" or a "snowballing effect trigger" for mathematics development

We have reviewed the studies published from January 1990 to May 2022 that focused on the prediction of early numeracy in longitudinal mathematics achievement. Our search began in 1990, following the 1989 release of the National Council of Teachers of Mathematics curriculum standards (1989). we searched the literature across the Education Resources Information Center (ERIC) and PsycINFO by using the combinations of the following search terms: (math*) AND (longitudinal OR growth OR predict* OR traject*) AND (numeracy OR cardinality OR counting OR number OR comparison OR "quantity discrimination" OR early OR preschool OR preparatory OR preK OR Kindergarten OR childhood).

We screened the studies at the full-text level to examine if they met the following inclusion criteria: (a) The authors examined a longitudinal trajectory of mathematics achievement in which mathematics measurements were administered at least at two different grade levels. (b) The study's first measurement of mathematics performance occurred in informal schooling or first-year formal schooling. If the study did not specify the grade level, we defined participants aged 3-5 years as preschoolers and participants aged 5-6 years as kindergarteners. We excluded studies in which participants included both kindergarten and preschool. (c) The mathematical content of the study's first measurement was early numeracy. We excluded studies that included both early numeracy and other mathematics domains in the measures. (d) The authors used mathematics tests or scales to measure mathematics achievement, rather than perceived mathematics performance by parents' or teachers' ratings. (e) The study employed an experimental or quasi-experimental group design. We excluded single subject, single group, qualitative, and case study designs. (f) The study provided data for the calculation of effect sizes, such as the direct bivariate correlation between starting and later mathematics measurements. We excluded studies that relied solely on multiple regression analysis or structural equation modeling for correlations. (g) The study was a peer-reviewed publication or dissertation. Finally, a total of 58 studies met the inclusion criteria.

The results showed that early numeracy played a significant and moderate predictive role in mathematics achievements at six months or later (r = .51, 95% CI [.46 .56]). The moderators' results revealed the following findings: (a) the comprehensive skill of early numeracy was the most significantly predictive of later mathematics performance than arithmetic operation skills, numbering skills, and relations skills, (b) early numeracy is more predictive of higher mathematics skills, such as word problems, algebra, geometry, comprehensive domains, than fundamental mathematics skills, (c) the predictive effect of early numeracy grew non-linearly and acceleratingly over time.

How Unique Components of Preschoolers' Problem Behaviors Relate to Developing Early-Literacy Skills

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Children's externalizing problem behaviors, such as those associated with Attention-Deficit/Hyperactivity Disorder and Oppositional Defiant Disorder, are related to many negative outcomes, including significant academic difficulties. Behaviors across these domains, however, are highly correlated, making it difficult to identify which domains are primarily responsible for the overlap between problem behaviors and academic difficulties. Recent statistical modeling approaches allow the clear separation of domains in multidimensional constructs, like problem behaviors. Additionally, much existing research on problem behaviors and academic skills has focused on the overlap between problem behaviors and academic difficulties. Problem behaviors may be a marker of more broad-based impairment rather than an impediment to learning. Examining how problem behaviors relate to academic-skill growth over time can help clarify the nature of the relation. The purpose of this study was to determine if and how unique components of problem behaviors were related to preschoolers' early-literacy skills and the growth of these skills over time.

Data from 1,080 preschoolers (55% boys) who ranged in age from 48 to 63 months of age (M = 55.15, SD = 3.65) were used for this study. Children were recruited for the project because of higher-than-average risk for academic difficulties. The sample was diverse in its racial and ethnic make-up (i.e., 48% white, 42% black/African American, 4% multiracial, 2% Asian, 2% other/unknown; 3% Hispanic/Latino). Children completed tests of early literacy skills as measured by the Preschool Comprehensive Test of Phonological and Print Processing at the beginning, middle, and end of the preschool year. In the fall, both children's classroom teachers and parents were asked to complete a version of the Connors Rating Scale, which measures externalizing behavior problems (i.e., inattention, hyperactivity/impulsivity, and oppositionality). The measurement model for both teacher-report and parent-report of behavior problems was an S-1 bifactor model in which Specific-Inattention, Specific-Oppositional-Behavior, and Hyperactivity/Impulsivity-Reference factors were represented. Latent-growth-curve models were used to characterize the development of early-literacy skills across the preschool year.

The same factors across teacher and parent models were not highly correlated (rs = .22-.39). For most early-literacy outcomes, all three behavior-problem dimensions were significant unique predictors of intercept (i.e., where children started at the beginning of preschool) using either teacher- or parent-report; however, only the inattention dimension was predictive of the rate of growth across the preschool year (accounting for growth predicted by starting point). When teacher-report and parent-report were examined together, all three behavior-problem dimensions from both teachers and parents were significant unique predictors of intercepts; however, except for print knowledge, only teacher-reported specific-inattention was a significant predictor of growth. For print knowledge, both teacher- and parent-reported inattention was a significant predictor of growth. The results of this study indicate that although all aspects of problem behaviors are associated with preschool-early-literacy skills, only inattention-specific problems are associated with growth in early-literacy skills across the preschool year. These results suggest that behavior problems in general may mark a broader impairment, but inattention-specific behavior problems impede development of early-literacy-skills. Moreover, inattention-specific problems apparent to teachers are a better indicator of this underlying problem.

Math and Self-Monitoring: A Quantitative Systematic Literature Review

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Purpose/RQs: Self-monitoring is a well-established instructional strategy that has been investigated as an intervention component across academic subjects (Guzman et al., 2018, Perry et al., 2012). Most definitions of self-monitoring include two general processes: (1) students observing their own behaviors and/or (2) students evaluating and/or recording their behaviors (Briesch & Briesch, 2016; Guzman et al., 2018). Depending on the targeted skill and the individual needs of the student, self-monitoring protocols may vary considerably. For example, researchers have embedded self-monitoring into academic interventions by using self-monitoring checklists, using prompting hierarchies led by the student, parent or teacher, and having students graph their own performance (e.g., Dunlap & Dunlap, 1989; Jitendra et al., 2009). Self-monitoring strategies have been implemented to assist students in attending to academic tasks and have been found to be an effective strategy for students with and without disabilities (Holifield et al., 2010; Perry et al., 2012). The purpose of the current study was to identify studies that implemented a self-monitoring procedure that was integrated into mathematics instruction (including math interventions and programs supplemental to Tier 1 instruction). The present study addresses the following research questions: (a) For whom and in what contexts have self-monitoring interventions in mathematics been implemented?, (b) What types of self-monitoring procedures have been evaluated in the research on mathematics interventions and supplemental programs including the type of self-monitoring procedure, protocols, and materials used?, (c) What trends emerge related to dependent variables including, academic achievement, self-monitoring, and social validity?, and (d) What is the methodological quality of existing studies examining the relation between self-monitoring and mathematics based on What Works Clearinghouse standards for single case and group design studies?
Method: To answer the proposed research questions a systematic literature search was conducted using the following keywords in both ERIC (Educational Resource Information Center) and Google Scholar: math* (math, mathematics, mathematical), AND self-manage* (self-manage, self-manages, self-management, self-managing) OR self-monitor* (self-monitor, self-monitored, self-monitors, self-monitoring). Following the database search a journal search was then conducted using the same search terms across nine journals likely to publish relevant literature. A total of 2,493 articles were screened based on title, abstract, and keywords which led to a pool of 96 articles to be reviewed for inclusion. After applying inclusionary criteria 21 studies were included. These studies are currently being coded for study characteristics, outcomes, and quality by two independent coders.
Findings: Results from this study will synthesize characteristics across studies, including study design, participants, fidelity, interventionist and setting as well as emerging trends related to dependent variables of interest and methodological quality. The results of this study will synthesize the current literature on self-monitoring strategies embedded within mathematics instruction and have the potential to inform future research on the topic.

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Development of the SDLMI-R: Psychosocial Mechanisms to Intensify Intervention

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National data indicate that two-thirds of upper elementary students struggle with reading (NCES, 2019) and students with persistent reading challenges are at increased risk for negative outcomes in school and beyond. Thus, it is imperative to identify effective supports to intensify reading interventions for students in the upper elementary grades before they enter secondary settings and face increased educational demands. The evidence regarding the relation between reading achievement and motivation presents an opportunity to explore mechanisms through which we can facilitate motivational processes. We contend that facilitating students' self-determination, as operationalized by Causal Agency Theory, has the potential to enhance motivation by promoting self-regulated goal setting and attainment in the context of reading intervention.
The purpose of this session is to present an overview of an IES-funded project that aims to develop and test the Self-Determined Learning Model of Instruction for Reading (SDLMI-R) to increase self-determination and reading achievement among 4th and 5th graders with or at-risk for reading disability (RD). Self-determination has been recognized as a key social-emotional outcome in education, particularly for students with disabilities (Shogren et al., 2016), and has been shown to be predict post-school transition outcomes for students with disabilities (Mazzotti et al., 2021; Shogren et al., 2016). The SDLMI-R builds on the evidence-based Self-Determined Learning Model of Instruction (SDLMI), which has focused primarily on transition outcomes for secondary students. Through a four-year iterative development process, we build from the structure of the SDLMI to inform the SDLMI-R, ensuring alignment with reading content and the developmental needs of elementary-aged students. This project is conducted in four phases. In Year 1, we engage in a design-analysis-redesign process to develop SDLMI-R lessons. In Year 2, we conduct feasibility trials and further revise SDLMI-R instructional materials. In Year 3, feasibility of the SDLMI-R intervention is explored through a pre-post single-group design study. Findings from each year of the project will support the iterative process to refine and improve the SDLMI-R. In Year 4, we will conduct a randomized controlled trial pilot study comparing student outcomes following reading intervention with and without the integrated SDLMI-R. Across all years, interventions are researcher-delivered which allows for experimental control by minimizing effects of variables other than the independent variable. In the pilot study, the SDLMI-R will be delivered alongside a standard reading intervention as the content will be explicitly connected to students' reading practice and their goals related to reading performance. For the purposes of our work, this intervention is REWARDS, but the SDLMI-R will be designed to be feasible for implementation with any reading curriculum. This session will outline the intervention design and development process, varied research methodologies used, and future directions for addressing self-determination (and other motivational processes) within reading instruction.

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Teacher Perceptions of District Restraint Policies: A Pilot Study

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Physical restraint is an emergency procedure restricting the movement of an individual and often used in events where students pose an imminent threat of physical harm to themselves or others (U.S. Department of Education, 2012). However, students with disabilities are subjected to these procedures at a much higher rate than typically developing students. In the 2017-2018 school year, 80% of reported restraint events involved students with disabilities (U.S. Department of Education, 2020). Over the past decade, there has been a substantial policy reform on the use of restraint; however, policies still vary across the country (National Association of State Boards of Education, 2021). Additionally, the research on perceptions of policy on and the use of restraint in school settings, especially from those implementing the procedure, is incredibly limited. The proposed study is a pilot study and aims to expand the current body of literature on perceptions of the use of restraint by investigating teachers' perceptions of school district policy. Hence, the study seeks to answer four research questions: 1) what are teachers' current perceptions of district restraint policies; 2) how often do teachers report following district restraint policies; 3) what perceived factors are associated with not following district policies; and 4) what socio-demographic factors are associated with teachers' perceptions of district restraint policies? The pilot study utilizes mixed methodologies to obtain and analyze quantitative and qualitative data to determine teachers' perceptions of school district policies on the use of restraint. Factors associated with perceptions will also be explored. For the purposes of this pilot study, 20 participants from a sample of P-12 teachers working in a variety of school settings across the United States will be asked to complete a self-report online survey, "Teacher Perceptions of Policy and Use of Restraint". The survey consists of a total of 86 items, including demographics (e.g., age, teaching position, type of school). For the purposes of this study, 27 items will be analyzed to address the proposed research questions. Results of the pilot study will be discussed, as will implications for policy and practice and areas of future research.

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Supporting Adolescent English Learners With and Without Disabilities in Social Studies Classrooms

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WorldGeneration is a literacy intervention embedded within 6th and 7th grade social studies classrooms in which there are a high number of English learners (ELs). It stems from work done through the Center for the Success of English Learners (CSEL; IES Grant No. R305C200016). Moreover, it builds upon previous content-embedded literacy interventions and lesson enhancements for students with and without disabilities, namely Word Generation (Lawrence et al., 2012, 2015), those done through the Center for Research on the Educational Achievement and Teaching of English Language Learners (CREATE; Vaughn et al., 2009; Snow et al., 2009), and Promoting Adolescents' Comprehension of Text (PACT; Vaughn et al., 2013, 2015, 2017; Wanzek et al., 2014). Building on the findings of aforementioned empirical studies, WorldGeneration consists of four approximately 2-week units, for which the purpose is to improve language and literacy outcomes for ELs with and without disabilities by: -
-Foregrounding content knowledge: Building background knowledge by teaching specific academic vocabulary and relating content information to students' lived experiences
-Leveraging purposeful engagement: Developing curriculum and modeling instructional practices that promote student engagement, including frequent opportunities to read, write, and talk
-Incorporating social and language supports: Organizing learning in heterogeneous grouping structures to promote collaboration, discussion, and social motivation while completing team-based learning activities; Providing visual and linguistic supports to improve understanding of content -Integrating formative assessment: Increasing teachers' responsive instruction by calling for frequent small-group and whole-class checks for student understanding, followed by differentiated instruction, as needed on a case-by-case basis Research questions were: 1.What are the effects of the WorldGeneration intervention on the content knowledge and vocabulary of middle school students? 2. To what extent do teachers perceive the instructional practices and materials are usable and feasible? A randomized control trial including 522 students and 7 teachers across three middle school campuses was used to consider these questions during the Year 1 pilot study. Following random assignment at the class level, 269 6th and 7th grade participants were included in the treatment group and 253 were included in the control group. 48% of participants were considered English learners at the point of randomization. An assessment designed to measure participants' general social studies knowledge was administered prior to beginning instruction and following completion of the intervention. Additionally, participants also took a content-specific assessment that included key vocabulary items following each unit. Results indicated that participants in the intervention group outperformed peers in the control group at post-test on measures of content knowledge (ES = .29) and vocabulary (ES = .14). Moreover, teachers reported that the instructional practices and materials had high usability and feasibility. Further results will be reported at the time of presentation.

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Establishing and Sustaining a Research-Practice Partnership: Taking the Long Route, On Purpose

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The purpose of this poster is to describe our process establishing a research-practice partnership with a local middle school and their mathematics instructional coach. Although research-practice partnerships (RPPs) are becoming a more common way to characterize the type of community-engaged work that researchers are aiming to conduct, RPPs can vary along a range of dimensions, such as the goals of the project and, relatedly, how groups approach research (Farrell et al., 2021). Attending to this variation can highlight relations between the features of a partnership and the outcomes of the research. This work necessarily asks questions about the history of school-based research and the dynamics that have existed between those conducting research and those being researched. The question guiding this work is, how do researchers experience and perceive the development of an interdisciplinary RPP?

Northeast Middle School (a pseudonym) is located in a small city in the Midwest and has approximately 850 students. The principal and instructional coach at this school reported a history of frustrating interactions in which researchers would do research "at" them or the outcomes of the research were never felt by those at the school. With this in mind, this partnership was initiated in Fall 2021 and involved the university-based team (one faculty person, one doctoral student) volunteering for one school year at Northeast with the explicit purpose of getting to know the community and culture of the school while purposefully not initiating a research study. In Spring 2022, we met with Loraine (pseudonym), the mathematics instructional coach, to co-design a research study for the following school year around a topic that she identified as a priority: reimagining the mathematics intervention space at Northeast. In conversation with Loraine, we agreed that school-based research takes an extraordinary amount of time. And within such a reality, we agreed that the first phase of the project would be to gather observational, interview, and artifact data about what was currently happening in the intervention space. We agreed this data collection should be across the 2021-2022 school year and should, to the extent possible, include all mathematics teachers (general education, n = 10; special education, n = 7).

The study just described will be happening in the background of the study pertinent to this proposal. Over the past school year we have been memoing (Saldaña, 2021) as a form of reflexivity and analysis. For this proposal, we will continue memoing and will conduct two interviews with each other as part of an autoethnography (Poulos, 2020), specifically investigating our experiences and perceptions related to the development of this interdisciplinary RPP (pending IRB approval). Fall data will be analyzed by the time of this poster presentation. We are using concept coding (Saldaña, 2021) and thematic analysis to reflect the unique experiences this type of RPP is affording, the drawbacks we perceive, and our noticings about the power dynamics typically at play in school-based research.

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Is Behavior a Problem for Word-Problem Solving?

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Nationwide, 60% of fourth-grade students fail to achieve proficiency in mathematics (NAEP, 2019). Moreover, nearly one out of every four students meet diagnostic criteria for depression, anxiety, behavior, or conduct problems (Ghandour et al., 2019). Research suggests that mathematics difficulties (MD) and emotional-behavioral difficulties (EBD) are interrelated and, indeed, serve as risk factors for each other (Morgan et al., 2016). Third-grade students with MD are on average 1.5 times more likely to exhibit task management problems, interpersonal problems, and internalizing behavioral problems. Students with MD exhibit higher rates of internalizing and externalizing behaviors and are less responsive to mathematics interventions (Lin et al., 2013; Morgan et al., 2009, 2016; Benz & Powell, 2021). These trends warrant further attention as they may serve as critical intervention targets for students with MD in third grade. The goal of this presentation is to investigate behavioral patterns in students with and without mathematics difficulties and to examine the influence of behavioral difficulties on mathematics performance in a word-problem intervention. RQ1: Are there differences in the behavioral patterns between students with and without mathematics difficulties? RQ2: Is there a differential response to a word-problem intervention for students with higher rates of internalizing and externalizing behaviors? Mathematics difficulties frequently co-occur with behavioral difficulties. In this randomized controlled trial, we explored the behavioral patterns of 575 third-grade students with and without mathematics difficulty (MD). We randomly assigned 181 third-grade students with MD to receive 45 30-minute triweekly sessions of a word-problem intervention or to be in a business-as-usual comparison group. This intervention comprised three schemas (total, difference, change) with 5 intervention components (fluency-building, pre-algebraic reasoning, tutor-led, skills practice, and one-on-one lessons). Students with MD demonstrated higher levels of externalizing behaviors than students without MD, $F(1, 573) = 46.41$, $p < 0.001$ (ES = 0.61) and internalizing behaviors, $F(1, 573) = 28.79$, $p < 0.001$ (ES = 0.48). To examine the influence of behavior on response to intervention, we compared the performance on double-digit word-problems with students in the intervention group ($n = 82$) to students in the comparison group ($n = 59$). Results indicated significant differences for externalizing behaviors between low, moderate, and high-risk on mathematics performance, $F(2, 136) = 10.11$. A regression model demonstrated that as externalizing scores increased by one point, performance on double-digit word problems decreased by one point, $F(1, 137) = 17.865$, $p < 0.001$. Students with MD with higher externalizing problems did not achieve the same gains as peers with fewer externalizing symptoms.

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Effects of Multimedia Vocabulary Instruction for Linguistically Diverse Fifth-Graders in Rural Settings

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As K-12 classrooms across the U.S. grow in linguistic diversity, the language and literacy development of multilingual students becomes an especially important topic for research, policy, and practice. However, significant disparities in reading performance exist between English learners (ELs) and non-EL students in the U.S (August & Shanahan, 2017), particularly throughout upper-elementary grades (Kieffer, 2011).
Multimedia instruction, which involves the "presentation of material using both words and pictures... to promote learning" (Mayer, 2020, p. 22), is a promising option for improving vocabulary knowledge for linguistically diverse students (Alsowat et al., 2020). However, there is a dearth in literature examining such approaches and questions remain regarding the degree to which evidence-based multimedia vocabulary instruction generalizes to rural communities that are often underrepresented in research (Reed et al., 2012). In light of these uncertainties, authors conducted a secondary data analysis of a previous quasi-experimental study (Kennedy et al., 2022) to examine the efficacy of a multimedia vocabulary approach (CAP-S) on the academic word learning of ELs, non-ELs, and students with disabilities in upper-elementary school settings. Teachers were randomly assigned to deliver approximately 20 minutes of daily vocabulary instruction for 100 academic words over eight weeks under one of two conditions: evidence-based vocabulary practices with high intensity and with integration of multimedia features (CAP-S), or typical word-learning routines (BAU). The research questions were as follows: Will linguistically diverse fifth-graders who receive multimedia-based, vocabulary instruction in a rural setting outperform their counterparts in a business-as-usual condition (BAU) on a custom measure of words taught and a standardized measure of general vocabulary? Does student language status differentially predict learner response to treatment on either of these measures? In total, 418 fifth-grade students and 20 teachers across 9 schools participated in this study. The student sample comprised 44 ELs and 374 non-ELs, 53 of which were students with disabilities.
Researchers used hierarchical linear modeling to estimate intervention effects while accounting for students nested within teachers. Results indicated that student groups receiving CAP-S significantly outperformed their counterparts in the BAU condition on both custom ($p<.001$) and standardized ($p<.001$) measures of word-learning. Further, based on the custom vocabulary measure, ELs benefited more than non-ELs from CAP-S instruction, relative to their counterparts in the BAU condition. Findings suggest the potential advantages of integrating effective and efficient multimedia vocabulary approaches into literacy instruction within linguistically diverse, upper-elementary classroom environments. Implications for research and practice are discussed.

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Approximate Number Sense (ANS) Acuity in Pre-K Does Not Predict Kindergarten Math Achievement in the Presence of Domain-General Cognitive Skills

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Prior research suggests that ANS acuity, the ability to process numerosity without symbols or counting, is a factor in typical and atypical math development. In ANS acuity tasks (i.e., dot set comparisons), items can be grouped into two general categories: congruent, in which non-numerical cues (such as area) are positively correlated to dot size, such that the more numerous dot set takes up more area; and incongruent, in which non-numerical cues are negatively correlated with numerosity. Students with dyscalculia tend to do just as well as their typically developing peers in performance on congruent trials and have significantly lower scores on incongruent trials. However, the association between performance on incongruent ANS trials and math group diminishes when controlling for domain-general executive functions such as visual spatial working memory (Bugden & Ansari, 2016) and inhibitory control (Fuhs & McNeil, 2013). In contrast, other research has shown the persistence of a congruency effect in the presence of working memory and inhibition (Wilkey et al., 2020). If cognitive skills account for the differences on incongruent trial performance in children with dyscalculia compared to peers without math difficulties, then domain-general cognitive abilities, and not ANS acuity, may account for individual differences in early math. One limitation of prior studies is that analyses often involve the use of cut-points to form categories of children with and without dyscalculia, which results in small sample sizes and constrained variability. The purpose of the present study was to take a continuous rather categorical approach to this question using quantile regression analysis to determine if ANS acuity on congruent and incongruent trials measured at the end of pre-K uniquely explains kindergarten math achievement in the presence of domain-general cognitive factors (attention, inhibition, and visual spatial working memory). We used a data from 495 children who were involved in a pre-K math intervention study and kindergarten follow-up. Children were screened for eligibility based on low math ability at the beginning of pre-K. At kindergarten, the sample encompassed the theoretical range of early math achievement (from 0.1 to the 98th percentile) and 34% of the sample fell below the 25th percentile on the TEMA-3, a test of formal and informal early math competencies. Cognitive skills and ANS acuity measured at the end of pre-K were used to predict math achievement in the middle of kindergarten. To examine the theoretical difference of this relation in lower performers versus their typically developing peers in a continuous fashion, we ran a series of quantile regressions. Results show that ANS acuity does not predict math achievement across a range of math ability levels in preschool children, not even in the lowest two quantiles of the sample, which represent achievement at and below the 7th and 14th percentiles on early math ability, respectively. Inhibitory control in pre-K is a significant predictor of math achievement in kindergarten. The results from this analysis suggest that ANS acuity deficit may not underly math difficulty or dyscalculia. Inhibition, a domain-general skill, may explain individual differences in early math.

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Factors Predictive of Being Bullies or Victims of Bullies in U.S. Elementary Schools

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Study's Purpose We examined whether and to what extent individual and family socio-demographics, school contexts, parental stress, and children's academic achievement, externalizing and internalizing problem behaviors, and behavioral self-regulation in kindergarten-2nd grade predicted their risks for being bullies or victims of bullying in 3rd-5th grade.
Method We analyzed the Early Childhood Longitudinal Study: Kindergarten Cohort of 2010-2011 (ECLS-K: 2011), a dataset maintained by the National Center for Education Statistics (NCES). The ECLS-K: 2011 followed a nationally representative cohort of U.S. children from the fall of kindergarten until the spring of fifth grade. Information about the ECLS-K: 2011's design, procedures, and participation is available at https://nces.ed.gov/ecls/kindergarten2011.asp. We used individual and family socio-demographics, parental stress, and children's achievement and behavioral functioning measured during K-2nd grade to predict both bullying and victimization scores averaged across 3rd-5th grade. We received institutional review board approval for the study's analyses.
Data were cleaned in Stata v. 14.1 and analyzed in Mplus v. 8.0. We used full information maximum likelihood (FIML) to adjust for missing values. We used sampling weights to ensure the estimates were nationally representative of U.S. schoolchildren entering kindergarten in the fall of 2010 whose parents responded to the kindergarten questionnaires. We preregistered our coding and analytic decisions at https://osf.io/bg2sm/?view_only=d91ea193ecd94f5bab16a3e4bc5c3d16.
Findings Findings from the block recursive structural equation model (SEM) indicated that the strongest relation was from externalizing problem behaviors during K-2nd grade to bullying perpetration during 3rd-5th grade. This coefficient was .56 (p=.000), a very large ES. There was also a strong relation between externalizing problem behaviors and being a victim. This ES was .29 (p=.000). Children who were already displaying externalizing problem behaviors during the primary grades were at greater risk of being bullies or victims in analyses accounting for many potential confounds, consistent with prior research (Kumpulainen et al. 1998). Children whose parents reported parenting as difficult were more likely to display externalizing behaviors, which fully mediated this association with bullying (ES = .05, p=.000). The indirect effect estimates further indicated that children who engaged in externalizing problem behaviors during K-2nd grade were more likely to be bullies or victims of bullies during 3rd-5th grade.
Implications Results from our SEM of a nationally representative sample of U.S. elementary schoolchildren indicated that children who more frequently engaged in externalizing problem behaviors in K-2nd grade were especially likely to be bullies during 3rd-5th grade. Children who frequently engaged in externalizing problem behaviors during K-2nd grade were also more likely to be victims during 3rd-5th grade. Thus, an especially strong risk factor for being a bully or victim is upper elementary grades is engaging in externalizing problem behaviors during the primary grades. We also observed that the strongest indirect paths from prior variables to the 3rd-5th grade bullying perpetration and victimization were through externalizing behavior problems.
Our results provide strong support for the importance of identifying and then assisting children who are frequently engaging in externalizing problem behaviors by the primary grades. An implication of these findings is that school personnel including teachers, counselors, and administrators should pay close attention to children frequently engaging in externalizing problem behaviors by the primary grades. Attempting to address their aggressive or impulsive behavior in the early elementary grades might be guided by the concepts of proactive and reactive aggression to better understand and prevent the bullying-victimization-bullying cycle.

Cognitive profile of 7th graders with and without mathematics learning difficulties

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The purpose of the study was to compare the cognitive and behavioral profiles 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 134 seventh-grade students from four middle schools in a midwestern state and one middle school from a southern state. Of the those, 78 students were identified with MD (<25th %tile) and 56 students (35th-75th %tile) without MD were identified based on their performance on an on-grade level screener. Students were assessed on working memory, cognitive flexibility, inhibition, processing speed, language, and foundational mathematics skills. Their parents completed a behavioral rating form of attention. Data analysis is ongoing with no preliminary findings to report at this time, but findings will be presented and discussed in terms of cognitive strengths and weaknesses of students with MD compared to those without MD and implications for instruction/intervention.

Question Reading Behavior: An Eye-Tracking Study

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Taking a reading comprehension (RC) test is a task-oriented activity that calls for reading a text to gather information to complete a predefined task-correctly answering multiple-choice (MC) questions. It is assumed students' response accuracy to MC questions represents their ability to engage in the multidimensional and complex processes involved in RC. Students, however, engage in various test-taking strategies (TTS), some of which do not include efforts to comprehend the text. These choices include whether to read the entire passage before moving to questions (passage first complete (PFC)), read part of the passage before shifting attention to questions (passage first incomplete (PFI)), or read one or more questions before reading any part of the passage (question first (QF); Vidal-Abarca & Cerdán, 2013).

Although students might engage in different TTS and vary the extent to which they read and comprehend texts, they must read the MC questions and response options to answer questions correctly. Despite these being the only test components all students must read, there is an absence of research evaluating the RC processes students engage in when answering MC questions. To fully understand what students do when taking RC tests, we employed eye-movement records to code and measure students' behavior as they responded to MC questions. We measured the total time they spent reading in the question region (questions and response options) as a function of student characteristics (reading achievement and working memory) and TTS. We also conducted exploratory analyses to examine whether question difficulty was associated with time spent reading the MC questions and each response option. Participants included third (n = 76), fifth (n = 86), and eighth (n = 86) graders. All participants read six grade-level passages and responded to the associated MC questions while having their eye movements recorded. Eye movements were coded and analyzed.

Findings were generally consistent with studies examining students' reading of texts. For instance, higher-achieving students in the current study spent less time in the question region than students with lower reading achievement. Better reading skills likely enabled students to develop a more coherent understanding of texts, facilitating their (a) understanding of questions, (b) elimination of incorrect responses, and (c) identification of correct responses. Analyses of time in the question region also revealed that higher-achieving 3rd graders, 5th-grade students who engaged in PFC, and 8th-graders, except those who engaged in QF, spent more time in the question region when answering questions incorrectly. These findings provide evidence that some students under specific test conditions recognize when they are uncertain of an answer. Other students, possibly due to a lack of comprehension of the text or failure to read passages for comprehension, spend the same amount of time on questions regardless of their response accuracy. For these students, it would be interesting to examine whether they reread the text and, if they did, how precise their search was. Failure to reread may indicate a lack of motivation to achieve a high score.

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Differences and Relations Among Teacher Confidence, Use, and Data-based Decision-Making Literacy

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Purpose: Teacher data-based decision-making is a critical component of RTI/MTSS models. This poster presents findings on the relations among teachers' use, confidence, and performance on data-literacy tasks.
Method: Teacher data from 450 elementary teachers was analyzed using ANOVA and regression on measures of teacher confidence, use of progress monitoring (PM) data, and their performance on 14 graph literacy items. Items included graphically presented student data with questions about slope, intercept, response, and decision making.
Results: ANOVA's indicated statistically significant differences on five interval-scaled confidence ratings (e.g., confidence in data interpretation) among teachers with different amounts of PM data use (i.e., weekly, twice-monthly, monthly, or once a semester). Subsequent regression analysis found some of the five item-specific confidence ratings (e.g., confidence in graphicly presented data interpretation) were positively and statistically significantly related to graph literacy. However, there were no statistically significant differences on graph literacy based on frequency of PM data use.
Conclusions: Prior research has found a link between teacher confidence and using student data to make educational decisions. Teachers who used student data more frequently were more confident in some RTI and graph literacy processes. Subsequent analysis indicate there was statistically significant but weak relations among confidence and data literacy. This indicates frequent use of PM data may increase confidence but that increased confidence may not meaningfully improve actual graph literacy, which is problematic when teachers are confident but make incorrect decisions. Our findings support possible Dunning-Kruger effects of teachers being unaware of their own (in)ability.

Early Numeracy Intervention for First Grade Students With Mathematics Difficulties

Presenter(s): Soyoung Park, Western Kentucky University (soyoung.park@wku.edu)

The goal of this study is to conduct an initial evaluation of an early numeracy intervention for students with mathematics difficulties (MD) in first grade. The movement for evidence-based interventions arose because experts claim that nationwide underachievement may result from a lack of quality programs and access to evidence-based mathematics intervention programs, due to limited resources and understaffed schools. Researchers have investigated the effects of mathematics interventions on the performance of at-risk first grade students, resulting in findings that have impacted the design and delivery of interventions (Bryant et al., 2011; Doabler et al., 2019). Although advances have been made, more research into evidence-based mathematics intervention is necessary to address national concerns about student mathematics proficiency (National Center on Intensive Intervention, 2016). Similarly, despite an increase in studies assessing mathematics achievement for all students, this field has focused on typically developing students rather than those with MD (Morgan et al., 2009, 2015). Given that there is a persistent achievement gap between students with and without MD, students with MD need intensive intervention to prevent further learning difficulties. To close this achievement gap, it is imperative to provide early numeracy interventions for students with MD. Without early intervention for MD, difficulties will accumulate through later grades (Claessens & Engel, 2013; Jordan et al., 2009). Thus, this study provides support to educators in local school districts to teach mathematics to small groups of students identified as needing intervention for MD, based on state achievement testing results. The purpose of this study is to answer the following research question: Does the implementation of an early numeracy intervention improve mathematics outcomes for first-grade students identified as students with MD when compared to students with MD receiving business-as-usual instruction? The research takes place in elementary schools in Kentucky. The sample includes approximately 100-150 students with MD randomized to either the treatment group or the control group. Students with MD are those who fell in the category of "Did Not Meet Grade Level" in the previous year's diagnostic assessment (i.e., school-wide assessment for academic readiness). Researchers will use multilevel modeling to determine whether participation in an early numeracy intervention was effective for students with MD as compared to a business-as-usual comparison group. Student mathematics outcomes will be assessed using the Test of Early Mathematics Ability and the AIMSweb Mathematics Computation. It is hypothesized that the treatment group will outperform the comparison group on the given measures. This study contributes to the field of special education by adding to the body of work that supports evidence-based mathematics intervention for students with MD in the early grades.

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Synthesizing Academic Interventions for Secondary Students With Cooccurring Behavioral and Learning Difficulties

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

This synthesis explores the effects of academic interventions (i.e., reading, writing, and mathematics) on the academic outcomes for high school students (i.e., grades 9 - 12) with cooccurring behavioral and learning difficulties (BD/LD). Although previous syntheses examined the impacts of one academic domain (e.g., reading) on the academic outcomes for students with BD/LD, no previous synthesis has targeted the overall impacts of academic interventions for this population of students or examined how academic interventions specifically impact high school students with BD/LD. The purpose of this synthesis is to address these gaps in research and to better understand how to support the academic needs for students with BD/LD through the following research question: What academic, instructional practices are associated with improved academic outcomes for high school students with cooccurring BD/LD?

To identify studies for this synthesis, an electronic database search was conducted using PsycINFO, Educational Administration Abstracts, SocINDEX, ERIC, Education Source, and ProQuest Dissertations. The independent variable was the academic intervention, instructional strategy, or curricula put in place to improve academic outcomes (i.e., dependent variable) for the participants. Studies were included in the synthesis if they met the following inclusion criteria: 1. The manuscript was available in English. 2. The study was a dissertation or published in a peer-reviewed journal. 3. The study took place during typical school hours (i.e., not before or after school) in a typical school environment (i.e., juvenile justice facilities were not included). 4. Study participants were in grades nine through twelve, including transition aged (i.e., ages 14 - 21). 5. The study utilized an academic (i.e., reading, writing, or mathematics) intervention, instructional strategy, or curricula with an academic dependent variable. 6.Study participants had a cooccurring BD/LD, as identified by their Individualized Education Program, their school, or by the study author team using assessments. 7.The study used an experimental design (i.e., randomized control trial, quasi-experimental design, or single subject design).

Following the database search, a backward and forward citation search and a table of contents search were conducted to identify studies. In sum, 11 studies met inclusion criteria for the synthesis. Across studies, five studies examined mathematics, two studies examined writing or spelling, and four studies targeted reading. All studies were single case design and represented 38 total participants. Beyond academic content area, four studies integrated technology and three utilized graphic organizers. The interventions which incorporated technology not only demonstrated improved outcomes across academic content areas but high social validity as well. The interventions with graphic organizers supported students' ability to read and respond to grade-level texts. Although all included studies demonstrated positive outcomes for targeting the academic needs of students with BD/LD, additional research is needed for how to sustain academic achievement long-term and specifically support the emotional and behavioral needs for students with behavioral difficulties, as no study included additional methods or interventions for doing so. Overall, initial findings suggest that explicit, academic interventions delivered one-on-one or in small groups can positively impact the academic outcomes for students with BD/LD.

"We are the Bridge": Community-based Services for Black Autistic Children

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Historically marginalized families face service utilization barriers and cultural perspectives of disability that impact their decisions to seek and utilize autism support services. Black parents raising autistic children and youth encounter challenges with educators, related service providers, and healthcare providers who are not responsive to the needs of their families (Pearson & Meadan, 2018; Pearson et al., 2020; Pearson & Meadan, 2021). These challenges and other barriers to service utilization have harmful impacts on outcomes for Black children with autism, such as delayed communication (Constantino et al., 2020). To address the needs of Black families raising autistic children, Pearson developed and facilitated the FACES (Fostering Advocacy, Communication, Empowerment, and Support) intervention (Pearson & Meadan, 2021). While elements of the FACES pilot study resulted in increased service utilization and strengthened perceptions of advocacy, training community-based parent educators to deliver FACES is the next critical step for program sustainability. Making FACES more widely available to Black families will require demonstrated promise that the intervention can be replicated, scaled, and implemented with fidelity by community-based parent educators from diverse racial and ethnic backgrounds.

The first step in scaling, testing, and manualizing FACES is to gain a better understanding of (a) community-based parent educators' current practices and knowledge of autism-related strategies and resources and (b) barriers to supporting Black autistic children and their families. Data obtained from this qualitative, exploratory study will be used to refine the FACES parent curriculum, develop the FACES train-the-trainer protocol, and to pilot test the revamped FACES intervention to measure its promise.

The research team, overseen by the PI, was composed of three doctoral research assistants and one undergraduate research assistant. Study participants included 32 parent educators from the Exceptional Children's Assistance Center (North Carolina's PTI) and the Autism Society of North Carolina.

The research questions for this qualitative focus group design were: (1) What are the experiences of parent educators who provide support for Black families of children with autism in NC? (2) To what extent do parent educators feel confident in their knowledge of autism-related strategies and resources? (3) To what extent do parent educators feel prepared to address the needs of Black families of children with autism through parent-training? During each focus group, participants discussed their experiences supporting families of children with autism in NC, and identified their perceived needs for both parents and parent educators. Each focus group interview lasted 1-2 hours.

Our data analysis procedures followed a constant comparative method: First, our team read and recorded memos for each transcript independently. We then met to reach a consensus on initial categories, revised the categories as needed, developed emerging themes across the data, and conducted level-two member checks. Our preliminary data highlight barriers that community-based providers experience with respect to supporting Black autistic children and their families, as well as nuanced perceptions about why these barriers persist. This poster session will detail how our focus group findings will inform the next steps for refining the FACES curriculum to be effectively delivered to Black families by community-based providers.

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Improving home reading of struggling readers through video-modeling of PALS for parents

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When students struggle in learning to read, additional support and effective interventions are crucial. One way to provide students with additional practice and support is through home reading sessions conducted by parents, as is often expected as part of school-home collaboration. However, when children experience reading difficulties, parents often find it challenging to conduct home reading sessions. This can cause struggling readers to get less practice at home than typically performing readers, further widening the gap between the groups. Thus, it is important to support parents in conducting home reading sessions with struggling readers, as early in their schooling as possible. In this study, parents were provided with reading materials matched to their children´s skill levels and clear instructions on how to conduct home reading sessions using First-grade Peer-Assisted Learning Strategies (PALS). First-grade PALS materials are well suited for individualized support as lessons are structured and sequential to promote cumulative letter sound knowledge, word recognition, reading fluency, and reading comprehension. The strategies involve clear instructions, frequent positive feedback, immediate error correction, and sufficient repetition to build lasting skills. Participants were parents of three students in 2nd grade (one girl and two boys, 7-8-year-old) who were among the lowest performing in their classrooms on standardized reading assessments. Parents were asked to audio-record home reading lessons and send to the researcher for evaluation. After several baseline measures, parents were sent links to a video demonstrating the PALS strategies and students were sent home with worksheets matched to their skill level. Parents were requested to conduct PALS lessons for home reading lessons and continue sending recordings to the researcher for evaluation. A multiple baseline design across parents was used to assess the effects of video-modeling on parents´ implementation/instructional fidelity of First-grade-PALS lessons with their children and other factors related to effective reading intervention (such as opportunities to respond, positive feedback, immediate corrective feedback, repetitions, and practice duration). Parents were found to apply First-grade-PALS lessons with good instructional fidelity (ranging 90 to 95% correct/as planned). Implementation of First-grade PALS resulted in immediate and clear increases in opportunities to respond, positive feedback, corrective feedback, repetitions, and duration of reading practice. On average, opportunities to respond increased from 70 to 209 (or by 238%), positive feedback increased on average from 0.5 to 3.3 instances per minute. Errors decreased on average from 4.5 to 1.4 per minute (or by 73%). Non-corrected errors decreased on average from 3.8 to 1.1 errors (or by 29%). Repeated reading increased from an average of 0 to 1.5 repetitions. Duration of reading practice increased on average from 176 sec to 637 sec or from nearly 3 minutes to 10 and a half minute (an increase of 332%). Multiple baseline design across students showed increases in letter sound knowledge and word reading accuracy. Social validity assessments revealed that parents found the video-based instruction of First-grade-PALS useful and considered the strategies easy to implement at home. These initial findings indicate that First-grade-PALS lessons at appropriate difficulty levels can be helpful to support parents in conducting effective reading sessions at home and thereby support their childrens´ reading progress.

The Integrated MTSS Fidelity Rubric: Measure Development and Validation

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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 wellness (SEBW) 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 information from a five-year study on the development and 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 SEBW student supports. 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, 1989).

After summarizing the IMFR development process, the poster will offer examples of the rubric content, including core constructs and the rubric scale. The poster will also include information about data collection procedures (e.g., data collector training, processes for administering the IMFR to school MTSS teams) to ensure poster viewers understand how the tool has been used during the study. Analytic activities and initial psychometric findings will be displayed to illustrate how validation results have shaped year-to-year IMFR revisions.

Given that the tool has demonstrated promising content, substantive, and structural validity and strong inter-rater reliability results, the poster will conclude with implications for researchers and practitioners. For example, the IMFR has the potential to be a valuable tool for schools to assess their integrated MTSS implementation and move toward an effective, efficient integrated system that supports students with both academic and SEBW needs, such as students with disabilities (SWD). Researchers may also find the tool meaningful when conducting studies on I-MTSS implementation, particularly examinations that aim to uncover links between I-MTSS and outcomes for SWD. Poster viewers may also hold insightful implications and therefore will be asked to suggest their reactions to the presented information.

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Examining the Treatment Paradox in the Context of Early Literacy Screening

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Schools have increasingly begun to use curriculum-based measures (CBMs) within multi-tiered systems of support in reading (MTSS-R) to early identify and provide instructional supports to students at risk for reading difficulties (Gersten et al., 2009). Evidence supporting CBM validity for decision-making rely on diagnostic accuracy statistics derived from samples with widely varying instructional contexts. Diagnostic accuracy studies in medicine identify the treatment paradox as a form of bias which may systematically alter diagnostic accuracy statistics when a treatment is implemented between screener and outcome measure administrations (Cohen et al., 2016). However, the impact of the treatment paradox on early literacy screener diagnostic accuracy within MTSS-R is unknown. Studying diagnostic accuracy statistics within the context of a randomized controlled trial may help to illustrate the extent to which diagnostic accuracy varies based on the effectiveness of the instruction that is provided. Within this context, a clearer comparison can be made regarding how the accuracy of a screening tool may appear to differ between settings in which all variables are controlled for apart from the instruction being provided. The present study examines how instructional effectiveness may impact the diagnostic accuracy of the DIBELS 6th Edition Nonsense Word Fluency early literacy screening measure predicting to two different outcome measures (DIBELS 6th Edition Oral Reading Fluency and Stanford Achievement Test Series, 10th Edition) within the context of a large-scale cluster randomized controlled trial where schools received either a highly explicit and systematic, evidence-based reading intervention called Enhanced Core Reading Instruction (ECRI) or continued with business-as-usual (Fien et al., 2015; Smith et al., 2016). This study aims to address the following research question: Does the evidence for an early literacy CBM's diagnostic accuracy within the context of MTSS-R meaningfully differ based on a setting's instructional effectiveness? Participants in the current study included 1600 first grade students assigned to Tier 1 or Tier 2 who attended either a treatment (N = 787) or comparison (N = 813) school. DIBELS 6th Edition Nonsense Word Fluency was administered to all participating students in the fall, winter, and spring of 1st grade. DIBELS 6th Edition Oral Reading Fluency and SAT-10 were administered to all students in the spring of 1st grade. A series of ROC curves will be generated examining the diagnostic accuracy of fall, winter, and spring Nonsense Word Fluency cut scores for predicting to the 40th normative percentile on spring Oral Reading Fluency and SAT-10 in the treatment (i.e., higher instructional effectiveness) and comparison (i.e., lower instructional effectiveness) conditions. Overall accuracy, sensitivity and specificity values, and positive and negative likelihood ratios will be examined for meaningful differences between ECRI treatment and business-as-usual comparison conditions.

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What it takes to think college: Inclusive college program admissions criteria

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Introduction: Young adults with intellectual and developmental disabilities (IDD) have historically been excluded from opportunities to pursue higher education. However, since the Higher Education Opportunity Act passed in 2008, college opportunities have grown exponentially for aspiring students. Inclusive postsecondary education (IPSE) programs aim to increase levels of independence for young adults with IDD across the domains of academics, employment, social skills, and independent living. Given the diversity of programs, more information is needed about the specific eligibility criteria that each program requires. The purpose of this study is to use a mixed-methods approach to (a) understand the eligibility criteria and academic skills required for students with IDD to attend IPSE programs and (b) understand perspectives of IPSE staff regarding the appropriateness of these criteria for success in college.
Method: IPSE program staff and faculty were recruited to complete the online survey which included items about program-level data for descriptive purposes, eligibility criteria, and respondents' perspectives of the admissions criteria. Of the 87 survey respondents, most were program directors and coordinators, the majority (76%) of whom had served in their role for at least one year. This winter, we will conduct interviews with program staff to understand their perspectives regarding the skills needed for success in college for students with IDD.
Results: Respondents indicated the admissions criteria required for students to gain entry into their program across domains. Most respondents indicated their program did not have a specific requirement regarding minimum levels of reading comprehension (n = 51), reading fluency (n = 55), or math comprehension (n = 61). Of the programs with academic admissions requirements, the most common criteria were: 3rd grade reading comprehension level (n = 11), 3rd grade reading fluency level (n = 10), and functional math skills (n = 7). The most common non-academic admissions criteria that were required across multiple programs included: documented disability diagnosis (n = 75), desire to attend college (n = 83), desire to attain a job upon program completion (n = 72), reliable communication (verbal or speech-alternative; n = 74), family's support of student entering program (n = 51), manages unsupervised time appropriately (n = 62), and minimum age requirement (n = 69). Many programs also required independence in: daily living skills (n = 76), administering medications and dietary needs (n = 66), following a schedule (n = 52), and basic technology needs (n = 58).
When asked the extent to which respondents considered admissions criteria to be essential for success in college, academic skills (e.g., reading comprehension and fluency, math) were most commonly considered moderately important. In contrast, social skills (e.g., communication) employment (e.g., desire to attain a job upon program completion) and independent living skills (e.g., basic daily living skills, administering medications) were considered extremely important.
Discussion: Compared to other subdomains, only a minority of IPSE programs require applicants to demonstrate minimum academic skills (e.g., reading comprehension, fluency, mathematics). Overall, findings from this study reveal a comprehensive understanding of the eligibility criteria and requirements for students with IDD who are interested in attending IPSE programs.

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Supporting Dual-Language Learners Mathematical Development: Lessons Learned From a Systematic Literature Review

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The number of students in public K-12 education who are bilingual or multilingual continues to grow (NCES, 2022), and understanding how to support these dual-language learners (DLL) effectively has become a prominent issue in research and practice. Within multi-tiered systems of support (MTSS) and response to intervention (RTI) frameworks educators must consider the unique needs of English learners (ELs). Classroom teachers and interventionists need specific assessments that are appropriate for ELs and pedagogical training that meet the needs of the DLL population (Orosco & Klingner, 2010). Research over the past few decades has highlighted effective instructional practices to support DLLs' learning in the classroom (Abdulrahim & Orosco, 2020; Baker et al., 2014; Sanford et al., 2012). A guide from Richards-Tutor and colleagues (2016) recommended that struggling ELs be provided with small-group explicit intervention at Tier 2 and that these interventions be developed specifically for, or be assessed for appropriateness for, ELs. This recommendation is a natural extension of MTSS processes, but requires administrators, interventionists and educators to have access to academic interventions that have demonstrated effectiveness for DLLs. Within the domain of mathematics instruction, identifying these interventions can be challenging, as research examining the effectiveness of mathematics interventions for DLLs is limited and still developing (Arizmendi et al., 2021; Richards-Tutor et al., 2016). The purpose of this study is to explore the recent evidence for effective mathematics interventions for DLLs via a systematic literature review. This study addresses the following research questions: (a) To what extent do recent studies of Tier 2 or 3 mathematics interventions disaggregate and examine outcomes for DLLs? (b) Which Tier 2 or 3 mathematics interventions have produced mathematics gains in DLLs? (c) What are the study and intervention characteristics of effective mathematics interventions of DLLs? A systematic literature review of peer-reviewed research articles published between 2010 and 2022 was conducted. First, an electronic database search was performed using the ERIC (Educational Resource Information Center) database using terms related to math intervention, EL status, grade level, and math difficulty or risk. A hand search of six prominent research journals that publish math intervention studies was also conducted. Finally, an additional search of the entire works of three prominent authors in the area of math intervention for ELs was conducted. Eighty articles were identified for inclusion coding. Two independent coders reviewed the articles for predetermined inclusion criteria. Initial agreement was 92.5% with final agreement of 100% after discussion of discrepancies. Thirteen articles were included in the review. All participants were between kindergarten and third grade, and eleven of the interventions were delivered in English. This review is ongoing and in the following months the article coding will be finalized for additional characteristics. Important emerging qualities include student language proficiency, intervention focus, and intervention characteristics specifically designed to meet the needs of DLLs. Final results will summarize the included studies and explore various implications for educators and future research.

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Secondary Educators' Writing Practices for Students with Disabilities: Distance and In-Person Instruction

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Summary of Relevant Literature: Once students reach high school their success depends on learning key concepts and content material within core subjects. Writing is an important tool to promote learning that is emphasized by the Common Core State Standards, and which seeks to prepare them for post-secondary success. Writing skills are essential to secondary and post-secondary success, but most students, especially students with disabilities, significantly underperform in writing (U.S. Department of Education, 2011).
Research Question: What types of instruction, assignments, and adaptations do high school teachers utilize when teaching writing in-person and via distance learning?
Study Design: A survey on high school writing instruction was developed. Most of the survey replicated the questions from Kiuhara et al. (2009) with the expansion of asking about both in-person and distance learning instruction and incorporating special education teachers. In the survey, we asked teachers about their experience delivering distance and in-person instruction during the COVID-19 pandemic. We specifically focused on three broad areas: writing instructional practices, adaptations used to support students with disabilities, and writing assignments. We also collected information about teacher characteristics, technology use, and teacher attitudes and self-efficacy about writing. The electronic survey was sent to a random sample of high school special education and language arts teachers across the United States.
Results: Fifty high school teachers from 27 different states responded to the survey. Teachers reported minimal preparation during their preservice teacher preparation in teaching writing. Teachers reported using 16 different writing instructional strategies, with teachers more frequently incorporating writing instructional strategies and methods when teaching in-person ($p < .001$). Teachers reported using 22 different writing assignments across in-person and distance learning with teachers assigning writing more frequently when teaching in-person ($p < .001$). Fewer than half of the teachers reported using technology on at least a weekly basis to teach and support writing for both in-person and virtual learning. Teachers reported using 15 different writing adaptations to support students, with teachers more frequently incorporating writing adaptations when teaching in-person ($p < .001$).
Discussion: This study addressed an understudied topic (e.g., adolescent writing and distance writing practices) and one needed for advancing the teaching of writing instruction in the years to come. It has opened an opportunity for understanding how instruction broadly-and more specifically writing instruction-must adapt to encompass the multimodal technologies that may continue to be available in classrooms for supporting students with and without writing disabilities. The use of distance instruction cannot limit the specially designed instruction that students with disabilities need and are required to receive. Thus, ensuring teachers are delivering accommodations and supports in writing consistent with students' IEPs, underscores the importance of maintaining a variety of individualized practices that can remain and become a part of effective, evidence-based distance learning.

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Measuring underlying linguistic growth in sentence-level writing curriculum-based measures

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Writing curriculum-based measures (CBM-W) are technically sound measures that provide formative, global indicators of proficiency and are often used to develop and track writing intervention goals. (Allen et al., 2020; Deno, 1985). Picture word (PW) CBM-Ws can be used to track growth in sentence-level writing in first through third grade writers with or at-risk of learning disability (Allen et al., 2018; 2020). 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), syntactic complexity, and grammar (morphology, morphosyntax) that underlie written expression, many of which have been associated with writing quality in elementary-aged learners (Dockrell & Connelly, 2009; Scott, 2020). As such, complementary measures to PW CBM-W that provide this targeted linguistic information are indicated, as they may help inform writing intervention goals and practices that are more targeted to specific areas of underlying linguistic need.

In this exploratory alternate scoring investigation, we examined discrimination among typically developing first through third grade writers across fall and spring semesters when applying language sample analysis metrics with evidence of sensitivity to growth (Scott, 2020) to PW CBM-W. Metrics included the production measures number of different words written (NDW; lexical diversity) and mean length of T-Unit (MLTU; syntax); the syntactic complexity metric mean number of clauses per T-Unit (CPT) and the accuracy metrics total morphemic, sentence-level punctuation, capitalization, and spelling errors.

Research questions included: when applied to PW CBM-W, a) are there significant differences in language sample analysis metrics between first, second, and third grades, and b) within grades, are there significant differences in language sample analysis metrics between fall and spring semesters? PW CBM-W samples from a larger normative dataset were rescored using language sample analysis metrics. 375 PW CBM-W samples from 99 typically developing students in first (N= 30), second (N= 37), and third grades (N= 32) across fall and spring semesters were rescored by the first author using Systematic Analysis of Language Transcripts software. Two PhD students in special education trained to 90% inter-rater reliability scored 40 randomly selected transcripts (20% of samples) (IRR= 88.9%; range 80-100%). Results will reveal whether students showed evidence of growth in the discussed language sample analysis metrics as applied to their PW CBM-W samples, using both between grade and within grade, between semesters analyses. We are currently analyzing descriptive statistics and testing assumptions to determine an appropriate analytic approach.

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A Systematic Review of Reading Comprehension Instruction Utilizing Adolescent Literature

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The ultimate goal of reading instruction is to gain meaning from text, but very few students in the U.S. can adequately comprehend grade-level texts. The 2019 National Assessment of Education Progress (NAEP) Report Card documents that only 35% of fourth-grade students, 34% of eighth-grade students, and 31% of twelfth-grade students were able to comprehend text at or above a Proficient level. Most recently, their 2022 long-term trend reading assessment for age nine students revealed a five-point decline in average scores compared to 2020 which is the largest average score decline in reading since 1990. Reading comprehension can break down as a result of difficulties with word reading and/or problems connected to language comprehension (Snow, 2002). With adolescent readers specifically, reading is also impacted by self-regulation, motivation, and engagement (Guthrie et al., 2013).

As students progress from primary to secondary grades, they are expected to read and comprehend a variety of text types and genres that increase in complexity. Unfortunately, students with reading comprehension difficulties may find reading lengthy literary texts particularly challenging and have likely experienced insufficient support or instruction in the skills needed to comprehend such texts (Hall et al., 2011). Adolescent literature, also known as young adult (YA) literature, are books written for an audience of 11- to 21-year-olds (Dagostino et al., 2021). There are several defining characteristcs of YA with the prominent one being that the subject matter is written from the viewpoint of young people (Nilsen & Donelson, 2008). YA literature appeals to young readers and can bolster reading motivation and engagement when in the classroom (Graves & Philippot, 2002; Ivey & Broaddus, 2001).

The purpose of this systematic literature review is to build on the existing knowledge base regarding reading comprehension instruction by specifically examining the impact of instruction which utilizes adolescent literature for students in grades 4-12. The specific questions guiding this systematic literature review are: What are the characteristics of reading comprehension instruction that utilizes adolescent literature? What are the effects of reading comprehension instruction utilizing adolescent literature on the reading comprehension outcomes of fourth through twelfth grade students with reading difficulties?

A systematic search of electronic databases including ERIC, PsychINFO, Academic Search Complete, and Education Research Complete will be completed to identify all relevant studies published between January 1990 and March 2020. The primary search terms will capture what was being read (i.e., adolescent literature, chapter books), the secondary search terms will identify studies focused on reading comprehension, the tertiary search terms will identify studies investigating the effects of reading comprehension instruction utilizing adolescent literature for students with or at risk for reading disabilities, and the final search terms will capture the method of instruction.

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Universal Screening for First Grade Writing

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Universal screening of reading disabilities receives unprecedented attention and could now be considered a standard educational practice. However, universal screening of writing disabilities has been largely ignored in early elementary grades. In an earlier study (Ritchey & Coker, 2014), we investigated early identification of writing disabilities. First-grade students (N=150) were administered a set of early writing and reading measures in January. Sentence Writing Quality and Oral Reading Fluency demonstrated strong classification accuracy when a Teacher Rating was used to identify students with writing disabilities (AUC >.90), and the combined measures yielded high classification accuracy (sensitivity and specificity > 0.90). The combined reading and writing measures yielded higher classification accuracy than individual measures when norm-referenced writing subtests were used to identify writing disabilities (AUC ~.80 range). While the findings suggest that it may be possible to accurately identify which students may be at risk for writing disabilities within first grade, there were several limitations of this initial investigation of early identification of writing problems. We propose to address the limitations by (a) including reading and writing measures at the beginning of first grade as predictors of writing disabilities, (b) including measures of oral language and working memory, and (c) examining sight word reading fluency as an additional reading predictor.
One hundred forty-two first-grade students were assessed using TOWRE Sight Word Efficiency, WIAT Alphabet Writing Fluency, Regular Word Spelling (words that follow phonetic patterns), Irregular Word Spelling (high frequency words that do not follow phonetic patterns), Sentence Writing, CELF Formulated Sentences, Recalling Sentences, and Word Classes, and CTOPP Memory for Digits. Fall DIBELS scores were also collected. At the end of first grade, students were assessed on WIAT Sentence Composition and Sentence Writing and Picture Story Writing, two curriculum based measures. Students are identified as at risk based on below average standard scores and low performance on CBM Measures.
In this poster session, we will present findings related to the optimal set of measures to include in a universal screening process to identify first grade students for writing. We will report classification accuracy for individual and combined measures.

A Qualitative Exploratory Analysis of the Selection of Instructional Programs in Schools

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Before schools can implement empirically-supported programs, they must first select a program that fits their needs (Fixsen et al., 2019). Metz et al. (2013) describe four stages of implementation: exploration, installation, initial, and full. The process of selecting instructional programs for use in schools corresponds to the exploration stage. Little research has been conducted on the exploration and selection of empirically-supported programs in schools. To learn more about this process, we asked the following research question: What is the process for adopting empirically-supported programs in schools? We explored this research question using semi-structured interviews. We used a purposive sampling method to recruit administrators from across the United States. Potential participants were known to members of the research team through professional connections. We recruited the participants through email. Twenty-one district and school administrators responded to the email and agreed to participate. Participants completed an online demographic questionnaire and then participated in a semi-structured interview about the process of selecting programs in their schools and/or districts. Each interview lasted approximately 30-60 minutes. Audio recordings of the phone interviews were transcribed, and the participants were invited to verify the accuracy of the transcriptions. Members of the research team used inductive thematic analysis to analyze the data (Braun & Clarke, 2006). Preliminary results indicate that the process for selecting programs is frequently idiosyncratic to specific contexts and often unsystematic. Generally, one or more representatives from a Local Education Agency (LEA) determines a need, explores potential options, makes a decision about which program to select, and disseminates the program to end-users (e.g., teachers). The processes for engaging in each of these activities range widely from one individual acting independently to a committee of representatives from the LEA systematically and collectively making a decision. Notably, a plan for determining the effectiveness of the program(s) after implementation was usually missing from the reported adoption process. The results suggest that LEAs may benefit from additional guidance in selecting and implementing effective instructional programs. Future research is needed to document any differences in the process(es) for selecting instructional programs in different domains (e.g. reading, mathematics, social and behavioral) and to determine the best possible supports for LEAs when selecting instructional programs.

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Reading Growth of Struggling Readers and their Typical Peers in Grades1-3

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Children who experience early and persistent reading difficulties develop negative reading and achievement-related self-beliefs within the first year of schooling (Chapman & Tunmer, 2003). These reading difficulties can become life-long struggles; more than 70% of students with reading disabilities (RD) in 3rd grade will struggle in 12th grade (Fletcher et al., 2006). Converging evidence has documented the positive effects of early reading intervention on short and long-term reading achievement (e.g., O'Connor et al., 2005; Simmons et al., 2008). To prevent reading disabilities, the Reauthorization of IDEA in 2004 strived to address the needs of struggling readers through the Response to Intervention (RTI) process of systematic identification, progress monitoring, and intervention, with data-driven adjusting of intervention based on student performance. Project FOCUS, a large-scale exploratory study supported by the Institute of Education Sciences, endeavored to develop a broader understanding of school-wide RTI implementation across the U.S. and to learn which factors are associated with stronger reading outcomes for elementary-aged students with or at-risk for reading disabilities in Tier 3 or special education. RTI/MTSS has been implemented in all 50 states; however, evidence-based recommendations have not been consistently applied and vary significantly from state to state and even from district to district (Jenkins et al., 2013). The schools that participated in the larger Project FOCUS represent various RTI models, geographic locations, and socioeconomic differences to examine a range of potential risk factors. Using computer-adaptive tests (CAT) for screening and progress monitoring has become more common within RTI/MTSS models. With CAT, it is now possible to have continuous progress monitoring assessments that can provide real-time information about a reader's specific areas of struggle and the degree of intensity of instructional support needed. This substudy analysis includes Istation's Indicators of Progress-Early Reading (ISIP-ER) (data is collected and cleaned, but planned analyses are not yet completed) and will explore the data from 4,181 students in grades 1-3 in a large and diverse suburban (albeit near urban) school district in Texas. The research questions to be examined are: Do struggling readers in grades 1-3 experience differences in growth patterns based on initial tier status identified by a school-based computer-adaptive measure of reading performance (ISIP-ER) compared to typically performing peers? Further, does growth differ based on student characteristics: grade, initial tier status, gender, ethnicity, special education eligibility, or SES? Our planned data analyses include an initial examination of the mean reading outcomes across student-level characteristics to provide a preliminary examination of the nature of the relationship. We then intend to estimate a series of fixed effects models (FEM) interacting student fixed effects with tier status and student characteristics to assess differences in reading trajectories. This fixed effects approach, giving each student their own intercept, is advantageous in as much as it permits controlling for all sources of student level heterogeneity, observed and unobserved, by allowing every student to essentially act as their own control.

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Project SPARK and Paraprofessional Virtual Coaching and Professional Development: Processes, Successes, Obstacles, and Recommendations

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We investigated paraprofessionals implementing reading or math interventions to kindergarten through eighth grade-aged students with intellectual disabilities or developmental delays (IDD) and the impact professional development and virtual coaching had on paraprofessionals' instructional knowledge and skill and students' reading and math performance. Paraprofessionals participated in Project SPARK for 1-2 academic years and were randomly assigned to either a reading or math condition. Prior to instruction, paraprofessionals received instructional kits that included the curriculum (i.e., SPARK for reading and Whole Numbers Foundation for math), tip sheets, worksheets, manipulatives, and behavioral reinforces. Additionally, they received Chromebooks to record their instructional sessions, upload their videos for Project SPARK coaches to view, write or read project related emails, and participate in virtual coaching sessions via Zoom. Further, they reviewed online content-specific professional development trainings in preparation of implementing instruction. During instruction, it was expected paraprofessionals would teach their student four times a week for 20 - 40 min sessions and these sessions would be recorded and uploaded to a secure website. Once a week the paraprofessionals met with Project SPARK coaches for approximately 18-min coaching sessions. During the coaching sessions, Project SPARK coaches provided either general or specific feedback (depending on the condition) and set goals for the paraprofessionals to strive for before their next coaching session. In this presentation, we share the processes, successes, and challenges of providing virtual coaching and professional development to paraprofessionals and provide suggestions for future research.

Studying Virtual Representations for Teaching Computation Skills to Children with Mathematics Difficulty

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Early success in mathematics in elementary grade levels can have a profound impact on students in secondary education (Bailey et al., 2012; Booth & Newton, 2012). For students at this age who exhibit mathematics difficulty, teachers often turn to technology to make mathematics curricula more accessible. One such technology witnessing notable growth in research and practice in the field of Special Education is virtual manipulatives. As previous studies demonstrated the benefits of concrete manipulatives for teaching early numerical skills to students with a learning disability (e.g., Flores et al., 2014; Flores & Hinton, 2022), similar research is needed with virtual manipulatives to provide educators a robust accounting of how this new form of representational learning can be used with young children.

To advance knowledge in this line of research, this presentation will address the following research question: How effective are virtual manipulatives paired with explicit instruction as an instructional strategy to teach computations with whole numbers and fractions to children with mathematics difficulty? To address this question, two single subject multiple-probe designed studies will be reviewed that examined the performance of six elementary students using virtual manipulatives to multiply whole numbers and add and subtract fractions with like and unlike denominators (Satsangi & Raines, in press; Satsangi & Sigmon, in progress). The goal of this presentation will be to highlight the manner in which this strategy was employed by researchers and its impact on student performance. The independent variables in both studies were app-based virtual manipulatives paired with explicit instruction, while the dependent variables measured percent accuracy, percent independence, session duration, and social validity. Findings from both examinations confirmed a functional relation between the treatment condition and all six students' percent accuracy scores solving problems. Data also showed all students demonstrated the ability to maintain their performance over time and shortly thereafter generalize the ability to solve problems without the treatment present.

This presentation will provide participants the opportunity to learn of and discuss the significance and broader role of adopting assistive and instructional technology such as virtual manipulative representations as part of the educational programing of students with mathematics difficulty. Participants will learn how this instructional strategy can be adopted in classrooms for modeling and guided practice from teachers, while also gaining insight on how autonomous young children can be when solving problems during independent practice (as illustrated by the prompting levels of students in both studies), their timeliness (as illustrated by the duration of sessions) and their preferences and biases towards technology use (as illustrated by social validity responses). Participants will have the opportunity to ask questions related to each of these topics while also providing recommendations on areas of future exploration in this line of research.

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Career Development in Rural Schools: Implications for Supporting Students with High-Incidence Disabilities

Presenter(s): Michele Schutz, University of Illinois Urbana-Champaign (maschutz@illinois.edu)

Rigorous career development instruction, experiences, and linkages for students with high-incidence disabilities often requires collaboration between special education staff (e.g., special educators, paraprofessionals, related service providers); general education staff with expertise in preparing all students for work (e.g., career technical education teachers, school counselors, administrators); and partners beyond the school (Milsom, 2007; Morningstar et al., 2012; Schmalzried & Harvey, 2014). These partnerships are particularly important in rural school districts, who often possess rich social capital but may face logistical and financial barriers to connecting students to postsecondary opportunities (Rowe et al., 2021; Test & Fowler, 2018). Although professional organizations guiding career technical educators, related service providers, school counselors, and others broadly suggest possible contributions in this area, there is a dearth of empirical literature examining these staff roles. Staff are often unsure of their specific roles in this work or how they could collaborate with one another to connect these students to employment. This poster illustrates findings from a multi-phased mixed-methods study examining (a) the roles that rural staff perform to support career development for students with disabilities, (b) how they came to assume these roles, and (c) the extent to which the contributions of various staff jointly facilitate (or limit) the work preparation of students with high-incidence disabilities. The perspectives of 291 school staff (i.e., 68 special educators, 57 CTE educators, 56 administrators, 54 paraprofessionals, 21 school counselors, 17 related service providers, 18 others) from across 10 rural districts were captured through quantitative survey data and qualitative interview data on staffing and role allocation for career development. Findings suggest that - although special educators and paraprofessionals perform many tasks within this area - CTE educators, school counselors, related service providers, administrators, and others can contribute to career development for students with disabilities by connecting them to opportunities and supports that are available in the school and local community but rarely tapped into for these students. Further, data indicate that staff tended to self-decide their own roles or take on tasks upon collaborating with others; these findings suggest that training and time allotment for cross-departmental collaboration and community partnership could ensure that staff develop capacity to prepare all students with disabilities for work. Finally, in some cases, administrator-imposed infrastructure (i.e., staffing allocation, scheduling) with intensions to adhere to the guidance of state and federal mandates for special education services inadvertently hindered the career development of students with disabilities. Future research is needed to fully characterize the extent to which students with disabilities participate in district career development activities and the ways in which staff beyond special educators could contribute within this area. Moreover, policymakers should ensure that the ways in which they evaluate the quality of transition planning and inclusion for students with disabilities incentivizes rural districts to utilize individualized transition planning and career development that is tailored to the interests and preferences of each student with disabilities, rather than sacrifice quality for mere compliance.

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Training Special Education Teachers to Take Person-Centered Approach to Transition Assessment

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As part of the Britt Henderson Training Series for Educators, our team facilitated a four-session workshop for special educators which focused on utilizing the LifeCourse Trajectory Tool as a transition assessment to help identify person-centered goals and plan for smooth transitions for from high school to adulthood for students with disabilities. This study took a mixed-methods approach to evaluating the attendees' views of the workshop.
Our research questions included: (1) What are special educators views about taking a person-centered approach to transition assessment and planning? (2) Do special educators find using the LifeCourse Trajectory Tool in their work with students to be an effective way to make the transition planning process more person-centered?
Procedure: This training series consisted of 4 sessions, 2 in-person and 2 over Zoom, which focused on person-centered practices for transition planning. Specifically, during our sessions we shared strategies for utilizing the Trajectory Planning Form from the LifeCourse Tools to identify factors that would lead to a "good life" for individuals with IDD with employment options and support services being a main focus. Attendees were asked to fill out a survey prior to participating in the first session (i.e., "pre-survey"), and immediately following participation in the second session (i.e., "post survey"). Each survey consisted of both open-ended and Likert-scale items addressing attendees' views of the workshop, person-centered planning, and the LifeCourse Trajectory Tool.
Participants: Special educators were invited from rural and urban school districts in Middle Tennessee to attend the workshop. 27 attendees participated in the workshop. 21 attendees completed the pre-survey. 12 participants completed both the pre- and post-surveys. Attendees consisted of special educators, administrators, and other professionals who work with special education students (i.e., Speech and Language Pathologists, Physical Therapists, and Occupational Therapists).
Findings: The training sessions were well-received with overwhelmingly positive feedback reported on our post-surveys. Attendees reported having an increase in knowledge or skills, increasing their understanding of the benefits of using person-centered practices, feeling more equipped to apply person-centered practices in their work, planning to use the LifeCourse Tools in their work with students, and overall being satisfied with the training. One participant indicated, and others echoed this sentiment, that their one main takeaway was how much it benefits their students "to move from a systems-centered to a person-centered approach" to transition planning.

Classwide Inclusive Fraction Intervention to Address Mathematics Learning Disabilities: Pilot Year

Presenter(s): Pamela M. Seethaler, Vanderbilt University (pamela.seethaler@vanderbilt.edu)
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Fractions are important for later school success and employment. Intermediate-grade fraction knowledge predicts 10th-grade math achievement and algebra knowledge, while controlling for whole number calculation skill, IQ, reading comprehension, working memory, race, ethnicity, and parental education and income (Siegler et al., 2012). Yet, traditional fraction instruction fails many students. A significant portion of the population struggles to understand the magnitude of individual fractions and the magnitude of fraction calculations, while failing to operate with fractions accurately (Durkin & Rittle-Johnson, 2015; Jordan et al., 2013; Lortie-Forgues et al., 2015; Newton et al., 2014; Siegler et al., 2011). According to Namkung et al. (2018), 4th graders identified with poor whole-number knowledge are 32 times more likely than students with adequate whole number knowledge to struggle with fractions. The level of this increased risk is especially notable, because difficulty with fractions also commonly occurs among learners who have adequate whole number knowledge.

In this 5-year, 5-cohort randomized control trial, we will study the effects of an existing fractions intervention (Super Solvers; Fuchs et al., 2022), found to be effective for teaching fraction magnitude, fraction comparison, and fraction calculations to students with or at-risk for mathematics learning disabilities (MLD) when delivered by research staff in small groups. The present intervention is re-engineered for delivery in the whole-class, inclusive setting rather than small groups, guided rehearsal and practice conducted via peer-assisted learning strategies.

Students are identified with MLD if they enter 4th grade with low-mathematics performance (below the study's mathematics screening cut-point) and are paired with non-MLD classmates to practice and explain the types of problems learned in each lesson, as well as given opportunity to solve problems independently. We hypothesize superior fraction knowledge for MLD students who receive Inclusive Fraction Intervention compared to MLD students who receive the school's standard program. We also expect superior fraction knowledge for non-MLD classmates who receive Inclusive Fraction Intervention compared to non-MLD classmates who receive the school's standard program.

In this poster session, we present results from our first year, with students from 8 classrooms in 3 schools of a large metropolitan school district. Students were pretested on measures of whole-number math calculations and fraction understanding. Classrooms were randomly assigned to Inclusive Fraction Intervention or Control. The Inclusive Fraction Intervention was conducted twice/week, for 20 weeks; each session was designed to last approximately 35-40 min. Each session begins with a 15 -min teacher-delivered whole-class lesson, addressing fraction magnitude, fraction comparisons, and fraction calculations. Next, students worked in pairs (10 min) to solve and explain problems using specific ways to provide and ask for assistance. Finally, students worked independently (10 min) on interleaved problem sets. Pairs corrected each other's work and provided constructive feedback.

Outcome measures aligned closely with intervention as well as more distal measures were administered upon completion of the entire intervention. First-year results will be discussed as a function of study condition and students' MLD status on various types of proximal and distal fraction measures.

Effects of an Intensive Early Writing Intervention on Students' Reading Outcomes

Presenter(s): Emma Shanahan, University of Minnesota-Twin Cities (shana055@umn.edu)
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Difficulties in writing can emerge as early as preschool, and often coincide with developing difficulties in reading (Puranik & Lonigan, 2012; Costa et al., 2016; Graham et al. 2020b). Reading and writing are fundamentally connected skills; therefore, intervention in one domain may support the development of the other (e.g., Fitzgerald & Shanahan, 2000; Kim et al., 2022). Writing instruction has been found to improve students' reading skills (Graham & Hebert, 2011; Graham & Santangelo, 2014). However, more research is needed to examine the effects of writing interventions on the reading skills of elementary students with literacy difficulties. In particular, investigating the effect of intensive writing interventions is necessary, given that students with co-occurring reading and writing difficulties may require individualized, multi-component, sustained interventions (e.g., Graham & Perin, 2007). Thus, the current study is guided by the following research question: What is the effect of an intensive, early writing intervention on students' reading outcomes? This study was a randomized control trial that included 128 students with significant writing difficulties in Grades 1 to 5. The treatment condition was a writing intervention individualized and delivered by their teachers across 20 weeks. Teachers received ongoing professional development to support their (1) initial selection of lesson activities based on students' needs, (2) monitoring of student progress using curriculum-based measures (CBM) in writing, and (3) data-based decision-making to further intensify interventions if needed. The control condition was teachers' typical writing instruction. Students' early reading was assessed at pre- and posttest using two FastBridge reading CBM measures of letter sound knowledge and decoding. I will analyze the effects of the writing intervention on each reading outcome using hierarchical linear modeling, which accounts for the clustering of students within teachers' caseloads/classrooms (Raudenbush & Bryk, 2002). Findings from this study are forthcoming and may shed light on the importance of including writing activities in intensive literacy interventions for elementary students. If a positive effect is found, these findings could inform the development of effective, multicomponent intensive interventions for students with reading and writing difficulties. If no effect is found, further research may be needed to understand the learner profiles of students who could benefit from intensive writing interventions to increase reading outcomes, and which specific writing skills should be targeted. In either case, these findings will contribute to ongoing efforts (e.g., Shanahan, 2016; Graham et al., 2020a) to identify catalysts for the mutual development of reading and writing skills for students with literacy difficulties.

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Effect of manipulative-based interventions on whole number computation

Presenter(s): Zhina Shen, The University of Texas at Austin (zns@utexas.edu)
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The evidence for the effects of using manipulatives to support student mathematics achievement exists for both group design studies and single case design studies. Despite there is an increasing number of group design studies and single case design studies, no meta-analytic review that used a comparable metric to compare or combine the effect sizes of group design and single case design studies exists.

In the current meta-analysis, we identified 32 articles. Ten of the studies were group design studies, and 22 of them were single case design studies. We adopted random effects meta-regression model to address the following research questions: 1. What is the effect of manipulative-based interventions on improving whole number computation (WNC) outcomes for students with mathematics difficulties (MD)? 2. Do effects differ based on methodology characteristics (study design, implementer, and study quality)? 3. Do effects differ based on the content of the measure: addition, subtraction, multiplication, or division? 4. Do effects differ based on instructional characteristics (grade level, proportion of males)?

We determined large average effect size for both group design studies (d statistic = 1.356), and single case design studies (d statistic = 2.518). In moderation analysis, implementer moderated the effectiveness of manipulative-based interventions significantly. The mean effect size estimate was larger for researcher and special education teacher-implemented studies than that for general education teacher-implemented studies. Content of measure also moderated the effectiveness of manipulative-based interventions significantly. Among the four operations, addition and division had smaller effect sizes, whereas multiplication and subtraction had larger effect sizes. We also determined grade level significantly impacted the effectiveness of manipulative-based interventions. As grade level increased, the estimated effect size of whole number computation also increased.

Whereas, study design, study quality, and proportion of males were not identified as moderators on the effectiveness of manipulative-based interventions. Results from this meta-analysis will aid researchers and practitioners in intervention design, and estimate students' mathematics performance based on instructional features and students' demographic characteristics.

Exploring Mathematics Vocabulary Terms and Semantic Mapping: NAEP Text-to-Speech Items

Presenter(s): Mikyung Shin, West Texas A&M University (mikyung.shin@wtamu.edu)

Although researchers have examined the relationships between students' mathematics achievement and related factors such as mathematics curriculum (Nargi, 2018), school sector (Lubienski & Lubienski, 2006), and trends (Kaplan & Huang, 2021), these previous studies are based on student data that do not consider text (mathematics questions) as data. With the implementation of the text mining technique, unstructured text data can be transformed into a meaningful unit of a structured format. However, the manual extraction of information, including text data from the metadata, requires extensive effort and time. Hand coding can also cause extraction errors in the process (Mathes et al., 2017). Recently, as an alternative to manual extraction, Anglin (2019) suggested a web-scraping method for locating and processing policy documents online. Given the advancement of technology, there is a continuous need to validate these techniques further in large public datasets such as NAEP data.

Mathematics vocabulary is a critical indicator of success in verbal and written mathematical performance (Adams, 2003). Students' knowledge of mathematics vocabulary is related to mathematical achievement in various mathematical domains, such as their arithmetic and computation skills (Powell et al., 2017) and proportional reasoning (Vanluydt et al., 2021). As the Common Core State Standards for Mathematics (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010) emphasizes in the Standards for Mathematical Practice, students are expected to use a clear mathematical definition in their discourse and reasoning. Thus, for teaching mathematics vocabulary, teachers and practitioners must understand the frequently observed vocabulary words and their relationships considering the characteristics of questions such as mathematical content areas and grade levels on mathematics assessments.

In this session, the researcher aims to unfold the complex mathematics problem structures of on fractions domain in fourth and eighth-grade NAEP items. The NAEP Questions Tool (National Center for Education Statistics, 2021), an online database, provides NAEP data (e.g., questions and student responses) on mathematics assessments from 1990 to 2017. Applying recent technological innovation through a web scraping method, the researcher will automatize the process of extracting information, including text data (1,135 mathematics questions). Considering that Text-to-Speech (TTS) functionality is one of the commonly used accommodations and essential features of accessibility in the digital assessment, the researcher targets the extracted scripts (text data) from these TTS items. In measuring the relevance of mathematics vocabulary terms to certain mathematics questions, the researcher will calculate the term frequency–inverse document frequency (tf–idf), adjusting for how rarely each word is included within the document (mathematics questions). As a follow-up study, the researcher will apply word next work analysis in investigating the semantic mapping among the common and distinctive words within the fractions domain. Then, using two-level multilevel modeling, the researcher will examine the impacts of using relevant mathematics vocabulary words and grade levels on students' correct mathematical responses. Across mathematics questions, a varying intercept and varying slopes will be assumed. Findings and data analysis scripts will be shared with the public through an open-source repository and a reproducible web document.

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Reading Intervention Research with Emergent Bilingual Students: A Meta-analysis

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This meta-analysis' purpose is to examine the extent to which reading practices tested in experimental or quasi-experimental treatment-control group studies improved emergent bilingual students' reading of English. We felt this meta-analysis was needed because previous quantitative syntheses provided limited information on students' English proficiency level. In this review, all participants were in the process of learning English. This meta-analysis also included a greater number of investigations (32 publications with 38 reading instruction/control comparisons) across all grades (Pk-12). The following research questions were proposed: (RQ1), To what extend does teaching reading improve emergent bilinguals'overall reading across all grades and specific grades on standardized and unstandardized reading tests?; (RQ2), To what extent does teaching reading improve emergent bilingual students' reading comprehension, vocabulary, reading fluency, and word reading across at all grades and specific grades on standardized and unstandardized reading tests?; (RQ3) Is variability in reading treatment effects related to study characteristics? We applied a shifting unit of analysis approach to determine if reading instruction enhanced the reading of emergent bilinguals. An applied weighted random effects model was used instead of a fixed effects model. For (RQ1) we predicted that across all grades, teaching reading would have positive, but small effects on reading. Our findings indicated that for the strongest measures of reading, standardized tests, this was the case across grades and most measures. Statistically significant average weighted ESs for standardized reading assessments were 0.24 for all grades, 0.17 for preschool to grade 3, 0.30 for grades 4 to 8, and 0.26 for grades 9 to 12. With the exception of reading fluency, statistically significant average weighted ESs of 0.21, 0.17, and 0.22 were also obtained for standardized tests of reading comprehension, vocabulary, and word reading. Contrary to predictions, reading instruction for emergent bilingual students did not yield statistically significant average weighted ESs for unstandardized reading tests when all grades were examined collectively, specific grades were considered separately (e.g., grades 4 to 8), or different types of reading measures were examined. These outcomes were surprising because unstandardized tests are consistently associated with larger ESs than standardized tests. Although we had predicted that emergent bilingual students in the earliest grades (preschool to grade 3) would reap the strongest benefits from reading instruction, this proposition was not supported (Willingham, 2006). As anticipated for (RQ2), student and treatment characteristics were associated with magnitude of effects. For (RQ3) we examined if excess variability was related to identified reading difficulties (students with reading difficulties evidence slower academic growth than peers without such difficulties; Swanson et al., 2014), types of reading instruction, and duration of reading instruction (larger effects are expected when there are greater opportunities to learn; Carroll, 1989). As predicted, study quality was also related to magnitude of effects. Collectively, study design, reliability of measures, proportion of standardized tests, pretest equivalence, and treatment fidelity accounted for 36% of the variance in reading outcomes. In this meta-analysis, teaching reading had positive and statistically significant effects on emergent bilingual students' English reading on standardized reading tests across grades and most treading measures (the only exception involved reading fluency).

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

Presenter(s): Cassandra Smith, University of Missouri (cmmmcb@mail.missouri.edu)

Algebra is the "gatekeeper" to post-secondary schooling and employment (NMAP, 2008). However, only 4% of students with learning disabilities (SWLDs) are proficient in mathematics (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 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). The purpose of this study is to examine the following research questions: 1. What percentage of systems of equations problems do SWLDs solve correctly when using VMs? 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? This study employs a single-subject, multiple baseline across students design. Participants are three midwestern high school SWLDs who are enrolled in a mathematics course that covers algebra and have a mathematics IEP goal. The intervention is implemented by a researcher in a separate setting.

The VRA-I intervention consists of five lessons addressing solving systems of equations and follows the CRA-I process as used by Strickland and Maccini (2013a) but using VMs. Each lesson uses the VRA-I process with explicit instruction, virtual algebra tiles, and a graphic organizer outlining the strategy (Strickland, 2019). The first lesson familiarizes students to the VMs and the remaining four lessons address solving systems of linear equations. Each lesson is approximately 45 minutes and is video recorded for fidelity checks. The dependent variable is measured by performance assessments (PAs) consisting of six solving systems of linear equations problems (Illustrative Mathematics, 2019). Ten parallel versions were created and reviewed for content validity by an expert in the field. Students have access to VMs on the PAs. Generalization of the DV is measured via the PA; however, the students do not have access to VMs. Each item on the PA is scored as correct or incorrect (possible total score of 6 points; accuracy percentage calculated). Students are also given a six-item Likert scale social validity survey after the intervention to determine the students' perceived value of the intervention.

The study follows a staggered schedule consisting of three phases-baseline, intervention, and generalization (Horner et al., 2005). Following completion of the intervention, the students complete the social validity survey.

Results from this study include visual analysis of the percentages of systems of linear equation problems solved correctly and two effect size metrics-a Percentage of Non-overlapping Data and Tau-U. The visual analysis and effect size metrics will determine if the intervention was effective. Descriptive statistics of the social validity survey will be provided. Findings from this study may provide initial evidence for VRA-I as an effective algebra intervention for secondary SWLDs.

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Relation of Educator Certification to the Development of Reading Knowledge and Practice

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Purpose: Associations between teacher knowledge and student reading achievement involves complicated relationships among multiple factors, including individual teacher qualifications and experience, clustering of high-knowledge teachers within schools, amount and content of school-provided professional development (PD), and availability of coaching or other supportive resources (Kelcey, 2011).
One key malleable factor in improving student reading achievement is educators' use of research-supported reading instruction practices. Educators with strong knowledge display in-depth understanding of subject matter, represent content in easy-to-understand ways, respond effectively to student errors, and teach essential foundational skills to mastery (Shulman, 1986). Educators receive various PD opportunities aimed at improving their reading content and pedagogical knowledge and practice (Shulman, 1986). This study was conducted in the context of an online reading endorsement PD program, Flamingo Literacy Matrix (FLM). FLM educators complete 300 in-service hours of asynchronous coursework and pass five reading knowledge and practice assessments (RKPAs;120 items) across an introductory course and four competencies (Foundations of Reading, Instructional Practices, Assessment, Intervention). Yet, how educators acquire, apply, and retain what they learn in FLM may depend on several factors, including educational certification status and type of certification(s), the main factors examined in this study.
Our research questions asked: What is the relation between educator certification and initial performance on RKPAs? What is the association of educator certification on mastery of RPKAs?
Participants: Educators (N = 1,276) participated in this study and educators completed demographic surveys and all five RKPA assessments upon FLM enrollment. They took RKPAs again after each course. Educators who achieved <80% reviewed the course content and retook necessary RKPA(s).
Method and Results: FLM RKPAs included content from phonological awareness, early and advanced decoding, fluency, vocabulary, and comprehension reading domains. RKPA mastery was scored as 80% or higher. Educator certification (1=professional certificate, 0=temporary/no certificate) was our primary predictor of interest. We also explored certification types (1=certified, 0=not certified): early childhood education (ECE), elementary education, middle school education, English for Speakers of Other Languages (ESOL), and special education. Covariates included educator gender, current instructional role, education, and experience.
Inferential linear regression analysis of pretest RKPA scores showed that educators without a professional certificate and ECE-certified educators scored lower on all competencies after controlling for other certifications and covariates.
Inferential logistic regression analysis of posttest RKPA mastery scores showed that educators without a professional certificate were less likely to achieve mastery on their first RKPA attempt for Foundations of Reading. Educators with ECE, middle school, or ESOL certifications were less likely to achieve mastery on their first attempt of the introductory course and Instructional Practice and Assessment competencies after controlling for other certifications and covariates. Nonetheless, essentially all educators were able to pass the RKPAs at retake.
Implications: Nearly all educators, regardless of certification status/type, eventually mastered essential reading endorsement content. However, pre/posttest performance on RKPAs suggest important differences in educator knowledge acquired via their certification training. Robust PD experiences focused on developing knowledge of effective reading instruction may be necessary to help smooth out these differences.

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A Conceptual Replication Investigating the Role of Initial Word Reading Skills

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As the field of intervention research for older students continues to mature, a necessary step that has gained attention recently is the necessity of conducting different types of replication studies, especially for understudied areas of the literature (Coyne et al., 2016; Therrien et al., 2016). The aim of this study was to examine the impact of preintervention word reading ability on the differential response to treatment and comparison conditions on reading comprehension outcomes for 9th graders with learning disabilities, reading difficulties, and English learners. We conducted repeated measures analysis of covariance (RM-ANCOVA) as a secondary data analysis for two separate but related experimental studies (Study One, Study Two) of intensive reading interventions for high school students. Two research questions were posed for this study: (1) When controlling for linguistic comprehension, are there significant differences in favor of the treatment for reading comprehension outcomes when taking into account pre-intervention word reading ability? (2) When controlling for linguistic comprehension, are there significant differences in favor of the treatment for reading comprehension outcomes when taking into account pre-intervention word reading ability modeled as a continuous variable? We view the findings of this investigation as contributing to the interpretation of studies investigating outcomes for adolescents with significant reading difficulties and disabilities and also as meaningful to practitioners who can consider preintervention performance to potentially inform and customize intervention approaches. Study One participants (N = 91) included students with learning disabilities and reading difficulties. Study Two participants (N = 85) included English learners with disabilities and reading difficulties. Both Study One and Study Two provided year-long intensive reading interventions to 9th grade students. For both studies, the secondary data analysis included the replication of a post hoc analysis employed in previous study of high school students who also received one year of intervention (Solis et al., 2015). Contrary to findings from the original study (Solis et al., 2015), results from both studies demonstrated that the effects of treatment were not moderated by decoding level for reading comprehension measures, though main effects of decoding and/or treatment were found for some reading measures. There were also statistically significant effects of verbal ability. These findings suggest effectiveness of intervention and that higher verbal skills improve students' comprehension, though the effects were more pronounced for Study One when compared to Study Two.

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The ACE Literacy Project: A Family Literacy Intervention

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Recent research by Wijekumar et al. (2020) reports important findings related to the importance of foundational comprehension skills such as main idea generation, summarization, inferencing, and vocabulary knowledge. Accumulating evidence about the text structure strategy used in the Knowledge Acquisition and Transformation (KAT) Framework shows that students can be taught to learn and use these strategies to effectively overcome their comprehension challenges at all grade levels (WWC, 2022). While these interventions focus on school-based instruction, families are the first and continuing support for children's literacy development.

The Advancing Comprehension and Engagement (ACE) Literacy Project brings the evidence-based Knowledge Acquisition and Transformation (KAT) Framework into homes through podcasts and text messaging as a means of overcoming barriers to high-quality literacy activities for all students. ACE materials are available in both English and Spanish.

Families were recruited through partnerships with schools, community centers, and rotary organizations. Seventy-nine families elected to enroll in ACE, with children in kindergarten through 7th grades. Participants engaged in weekly 15-20-minute podcasts or video podcasts and responded to a texting survey to measure progress over a course of 15 weeks.

Initial findings indicate a low rate of participation with the texting survey. For the first 15 podcasts, only 3% of families accessed one of the texting surveys with a 0% completion rate. The podcasts, however, are being accessed with a total of 1,454 podcasts downloaded and 1,010 video podcast views in the first 10 months of ACE.

Family engagement remains critical to student success, and we believe the ACE Literacy Project has the potential to support literacy development within the home. As we move into the second year of ACE, our pilot year findings highlight the need for us to look for ways to improve family engagement.

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Teacher Knowledge of Reading Instruction for Students with Inattention

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According to the National Assessment of Educational Progress (NAEP), nearly two thirds of students in upper grades do not read at a proficient level (National Center for Educational Statistics; NAEP, 2019). These data are concerning given upper elementary and secondary reading expectations, which require content acquisition using informational text. In fact, many upper elementary and secondary teachers focus heavily on content without providing instruction on how to read for understanding (Snow, 2002). Various subpopulations of students served in general education settings face challenges when asked to comprehend informational text. Students identified as having Attention Deficit/Hyperactivity Disorder (ADHD) with inattentive and combined presentations, for example, score significantly lower on measures of reading fluency and comprehension compared to their typically developing peers (Ghelani et al., 2004; Martinussen & Mackenzie, 2015). Because these students experience challenges comprehending text, they face subsequent difficulties in upper-elementary and secondary grades, and many fall considerably behind their peers (McGee et al., 2002).

Although many students with or at risk of ADHD receive instruction in the general education setting for the majority of their day (e.g., Rowland et al., 2015), little evidence documents teacher perceptions of how to deliver effective reading instruction for these students (Mulholland et al., 2015). Moreover, of the literature that does exist (e.g., Jenkins & Demaray, 2016; Mulholland et al., 2015), none specifically documents teacher knowledge of reading instruction for students with or at risk of inattentive or combined presentations of ADHD. Specifically, studies document teacher perceptions related to students with behaviors associated with ADHD, in general; however, findings yet to highlight how perceptions may differ across ADHD presentation (e.g., Jenkins & Demaray, 2016). Mulhollund and colleagues (2015) posit an increase in teacher knowledge of ADHD is related to higher levels of teacher self-efficacy. Moreover, teachers with increased knowledge of ADHD report a desire to be more effective in their teaching of these students (Mulhollund et al., 2015); however, teacher knowledge of various ADHD presentations (e.g., inattentive, combined) were not considered when discussing findings, suggesting a need for more research in this area. Because inattention is significantly related to lower reading outcomes, PD targeting reading instruction (e.g., Stewart et al., 2022) known to support students with inattention is particularly warranted.

We conducted a survey study to gain insight on teachers' knowledge of ADHD presentations as well as their perceptions surrounding reading instruction for students with inattention. We also included items examining the types of instructional practices teachers implement to support reading instruction in their classrooms. The 45-item survey was sent out on multiple social media platforms in an effort to elicit responses from teachers across content areas. Grade 4-12 teachers who engaged in any type of vocabulary instruction were invited to respond. Forty-one teachers from various geographical locations in the U.S. responded to the survey. Responses are currently being coded to produce both quantitative and qualitative findings. Survey responses can inform future research targeting professional development and teacher preparation, particularly as it pertains to supporting students with inattention.

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Parametrics and Parents: Outcomes from an Advocacy Intervention for Black Families

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Despite increased diagnostic prevalence, Black parents raising autistic youth still experience additional and unique barriers to accessing and using autism-related services compared to their non-Black peers. Increasing parent advocacy capacity may be one way to reduce these disparities. This efficacy study examined the effects of the FACES program on advocacy capacity for Black parents raising autistic youth. Sixteen parents and caregivers participated in four training sessions using a quasi-experimental design. The following research questions (RQ) guided our study: (1) Does the FACES program increase empowerment and perceptions of advocacy ability in Black parents raising autistic youth? (2) Does the FACES program increase parents' understanding of autism, social communication, and behavior strategies? (3) Does the FACES program affect parent-professional communication? Intervention participants demonstrated increases in family empowerment, school communication, and perceptions of advocacy ability. Findings offer emergent evidence of advocacy programs for Black families raising autistic youth.

Impact of COVID-19 on the Reading Achievement of Elementary Students with Disabilities

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Elementary students experienced less growth in reading achievement during the 2019-2021 school years due to COVID-19 school closures and shifts to remote and hybrid instruction (Goldhaber et al., 2022; König & Frey, 2022; Kuhfeld et al., 2022). However, large-scale studies have not disaggregated data by special education status, leaving the question of how students with disabilities fared in their reading achievement during the pandemic. The purpose of this study was to determine the impact of shifts to remote and hybrid instruction in fall 2020 and the return to face-to-face instruction in fall 2021 on the reading achievement of elementary students receiving special education services in one urban elementary school with a strong research-practice partnership with a local research university.
We analyzed reading achievement data from 1,660 students in kindergarten through fifth grade during the 2019-2022 school years. The school reported that 9.5% of these students were receiving special education services at some point during the three-year study period. Students were 45.8% male, 38.9% Black, 26.4% Hispanic/Latino, 13.0% White, 8.9% Asian, 7.1% Multiracial, and 0.9% Native American. The gender and race/ethnicity were unknown for 4.8% of students. Also, 5.5% of students were classified as English Language Learners (ELLs), and 59.9% of students were eligible for free/reduced-price lunch (FRL). The ELL, FRL, and special education status was unknown for 15.8% of students. We conducted multilevel piecewise linear growth modeling with increment (decrement) models (Raudenbush & Bryk, 2002) of i-Ready Diagnostic (Curriculum Associates, 2015) scale scores with up to eight data points per student to plot growth trajectories at three points in time: pre-COVID instruction in fall 2019, the shift to remote and hybrid learning in fall 2020, and the return to face-to-face instruction in fall 2021. To explore differential growth rates between special education and general education students, the linear growth models included a dummy variable for special education status and a time by special education status interaction term. Results indicate that students receiving special education services experienced 4.57 points less growth in overall scale scores at each time point under pre-COVID instruction (after fall 2019) and 3.11 points more growth (−4.57+7.68) at each time point under remote and hybrid instruction (after fall 2020) than general education students. Growth rates between students receiving special education services and general education students after returning to face-to-face instruction in 2021-2022 were not significantly different. Students receiving special education services experienced significantly less growth than general education students in phonics, high-frequency word, vocabulary, comprehension: literary, and comprehension: informational scale scores under pre-COVID instruction; significantly greater growth in phonics, vocabulary, comprehension: literary, and comprehension: informational scale scores under remote and hybrid instruction; and significantly less growth in comprehension: literary scale scores after returning to face-to-face instruction. These surprising results indicate that pre-COVID reading instruction was not necessarily effective for students receiving special education services, and some elements of remote and hybrid instruction, such as small group work and differentiation, may be worth further examination as schools return to face-to-face instruction.

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The Iterative Design and Development of a Second Grade Mathematics Intervention Program

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It is well-established that strong, stable relationships exist between early and later mathematics achievement (Bodovski & Farkas, 207; Morgan et al., 2009). Unless the needs of students with low initial mathematics achievement are addressed in the early grades, they are likely to persist and become more difficult to remediate as students fail to develop a solid foundation upon which to build an understanding of increasingly complex mathematical concepts (Jordan et al., 2007; Morgan et al., 2009). The current state of the research shows significant advances in evidence-based intervention programs targeting kindergarten and first grade, but there is a pressing need to extend intervention development efforts to second grade with the introduction of more advanced whole number concepts.

This project presents the design, development, and initial feasibility of a Tier 2 second-grade mathematics intervention program focused on building students' understanding of whole number concepts. Mathematics intervention programs should be developed using a scientific approach that draws from the existing research on effective instructional practices, utilizing cycles of development, field-testing, analysis, and revision. We used the Curriculum Research Framework (CRF; Clements, 2007) to guide the iterative development of the intervention program. The CRF includes three categories of development activities: a priori foundations, learning models, and evaluation. These categories are further specified into phases that describe the integration of evidence-based practices into curricular design, the development of prototype activities to test out critical concepts and skills, as well as the formative evaluation cycle.

Contextualizing our cycles of curriculum development and evaluation using the CRF, we present an overview of our 60-lesson program. Based on the Common Core State Standards for Mathematics (2010; Operations & Algebraic Thinking and Number & Operations in Base Ten domains), our program addresses mathematical content across 5 strands: Place Value, Number Combinations, Problem Solving, Multi-digit Addition and Subtraction, and Foundations for Multiplication. We provide examples of evidence-based teaching approaches embedded within the lessons, including schema-based instruction, fluency-building activities, and the integrated concrete-representational-abstract sequence. We share initial findings from the first two years of development, including (1) outcomes of our brief learning trials implemented in a second-grade classroom, and (2) our approach to examining the feasibility and usability of the program. Discussion will center on effective instruction for students with or at risk for mathematics difficulties, the development of whole number understanding in the early grades, and facilitators and barriers of implementing Tier 2 interventions within multi-tiered systems of support models.

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Measuring kindergarteners' writing mindset

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The purpose of this study is to explore how to measure kindergarteners' writing mindset. There have been a handful of studies on writing mindset in kindergarteners (e.g., Compagnoni et al., 2019; Schrodt et al., 2019), yet measuring writing mindset in young students continues to be a difficult task. In this two-phase study, we tested four different mindset measures to 1) assess how developmentally appropriate each measure is, 2) explore whether any of the measures correlate with writing ability, and 3) identify key takeaways that can inform the development of an improved mindset measure. In Phase I, 104 kindergarteners answered ten writing mindset questions on a four-point Likert scale (1 = Definitely Disagree!, 2 = Kind of Disagree, 3 = Kind of Agree, 4 = Definitely Agree!). Testers rated each students' level of understanding to determine data quality (1 = data unusable/student did not understand task, 2 = data questionable/student might not have understood the task, 3 = data usable/student understood task). We found that almost a third of the students (N = 32, 30.77%) did not understand the task. After removing this unusable data, we found that students with a higher writing score were more likely to have a more growth mindset, $F(1, 70) = 4.99$, $p = 0.029$, $r = 0.258$. Through consultation with testers from Phase I, we determined that a four-point Likert scale that asked students to agree or disagree to positively and negatively-worded statements was not developmentally appropriate. We addressed this main cause of confusion in Phase II through three different measures that were randomly assigned to 112 students: 1) a binary choice survey that presented two hypothetical characters (one with a fixed mindset and another with a growth mindset) and asked students to choose which character they were more like (N = 38); 2) a behavioral, challenge preference task in which students drew shapes or wrote letters or words, then decided whether to complete another task that was either more difficult or just the same (N = 37); and 3) a structured interview in which students gave verbal, open-ended responses (N = 37). A lower percentage of the data was unusable for all three measures (Binary Survey: N = 0, 0%; Behavioral Task: N = 2, 6%; Interview: N = 0, 0%), suggesting that these measures were more developmentally appropriate. Writing mindset scores (as measured by the binary survey and behavioral task) were not significantly related to writing ability, possibly due to oversimplifying the measures or small sample sizes. The interview further revealed some details that had been overlooked, including evidence of ways in which children misinterpreted some of the mindset questions that were also a part of the survey measures. Altogether, these findings may reflect the tough balance one must strike to create a measure that is simple enough for kindergarteners to complete, yet complex enough to fully capture the nuances of writing mindset. Future research may benefit from first conducting interviews and observations in this age group, rather than limiting themselves to purely quantitative ways of measuring mindset.

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Effects of Disability Awareness & Inclusive Teaching Training Videos for Postsecondary Instructors

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Students with disabilities continue to attend postsecondary education at increasing rates, but their academic outcomes lag behind their peers without disabilities (Newman et al., 2011). One reason that postsecondary students with disabilities identify as contributing to their negative outcomes includes postsecondary faculty members not understanding or possessing negative attitudes toward disability and accommodations (Murray, Lombardi, Seeley, & Gerdes, 2014). Providing postsecondary faculty with disability-related trainings is one potential way to confront this issue and make faculty members more familiar with disability, as well as inclusive teaching practices. This poster will present a description of a series of Disability Awareness & Inclusive Teaching training videos that were developed for postsecondary faculty and the research study that assessed the videos' effects on postsecondary instructors. A pre-post measure assessing Disability Self-Efficacy Scale (Murray, Lombardi, Seely, & Geres, 2014) was provided to instructors before and after viewing the training videos. Instructors also responded to a series of qualitative questions after viewing the videos explaining what components of the training were most impactful, as well as how they influenced their teaching practices. The study's research questions included: 1) How did participating in the Disability Awareness & Inclusive Teaching Training affect instructors' Disability-Related-Self-Efficacy? 2) Were there differences in Disability-Related-Self-Efficacy (after participating in the training) based on years teaching, rank, department or other factors? 3)How did participating in the Disability Awareness & Inclusive Teaching Training affect instructors' teaching practices? 4) What components of the training did instructors find most impactful? The study, which involved 100 postsecondary instructors participants, found that participating in the Disability Awareness & Inclusive Teaching Training caused a statistically significant increase in instructors' Disability-Related-Self-Efficacy; increases were greater for instructors who were graduate teaching assistants. Qualitative analysis revealed that instructor's felt that the most impactful aspect of the training was hearing the narratives of students with disabilities who explained what it is like to learn with a disability and how instructors can best assist them. This analysis also revealed that instructors found themselves incorporating more aspects of universal design of instruction into their teaching after watching the training videos, as well as were better able to identify barriers to accessibility in their courses.

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Barriers to the Concurrent Implementation of Integrated MTSS and UDL

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Multi-Tiered Systems of Support (MTSS) like Response to Intervention (RTI) and Positive Behavior Intervention Support (PBIS) have become widespread in schools across the United States in an effort to prevent and address academic and behavioral needs. These systems historically have operated in parallel, but with so many common features and underlying theories, there has been a recent push to integrate the systems (Utley & Obiakor, 2012) using the term Integrated MTSS (iMTSS). In an iMTSS, the quality of instruction at the universal or Tier 1 level is pivotal to the success of the system. When the core instruction is evidence-based and differentiated, the needs of the majority, including students with disabilities can be better addressed. Universal Design for Learning (UDL) can be especially helpful for increasing the range of students that can access the academic content, decreasing then the likelihood of problem behaviors (McIntosh & Goodman, 2016). UDL is a differentiated instructional framework that can support the needs of all students, including students with disabilities and culturally and linguistically diverse learners by building supports proactively into lesson goals, instructional materials, methods, and assessments (Meyer et al., 2014).

The goal of this original research was to determine the perceived barriers to implementing universally designed instruction within Tier 1 integrated MTSS classrooms in elementary schools across the United States. Semi-structured interviews were conducted with 12 elementary school MTSS teams, focused on their perceptions of UDL and iMTSS as well as their instructional practices in Tier 1 classrooms. Qualitative analyses of the interview transcripts, including a-priori codes based on the interview questions as well as open coding, was employed to both verify potential research-indicated barriers and determine additional school MTSS team perceived barriers. For schools and districts interested in embedding UDL in the Tier 1 instruction of their iMTSS, this study provides evidence that aspects the two initiatives are well aligned. The indicators of quality instruction (evidence-based, differentiated, delivered with fidelity) did not appear be pose innate barriers to concurrent implementation, however improving teacher understanding of the complexities of differentiation and fidelity of implementation can be supportive of the compatibility of UDL and iMTSS in Tier 1. In addition to the predicted barriers that were explored in this study, additional barriers to implementation of iMTSS and UDL were indicated by participating school teams. These include a lack of knowledge and awareness of the initiatives, a lack of shared terminology, a lack of staff buy-in, being overwhelmed/having too many initiatives prioritized, finding implementation unnecessary, or other school specific reasons.

Comprehensive school-wide initiatives like iMTSS and UDL present opportunities for large scale impact on improving teacher instructional practices and therefore student outcomes. Implementing these two initiatives concurrently presents an opportunity to enhance and improve universal instruction for all students. The school team-identified barriers to implementation found in this study are similar to those identified in other implementation studies (e.g., Castro-Villarreal et al., 2014; Sansosti et al., 2010), and should be considered by future researchers or practitioners interested in pursuing concurrent implementation of UDL and iMTSS.

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Designing Morphological Assessments and an Intervention for Struggling Adult Readers

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Purpose: A growing body of research suggests the importance of morphological knowledge, an understanding of basic units of meaning (e.g., prefixes, suffixes), to the word reading and comprehension skills of struggling adult readers (e.g., Tighe & Schatschneider, 2016). Yet, morphological knowledge has largely been ignored in previous intervention work with struggling adult readers. Instead, these interventions have primarily targeted decoding and fluency skills and have led to minimal gains in reading comprehension skills (e.g., Greenberg et al., 2011; Sabatini et al., 2011). In this project, we will present work from two ongoing grants. First, we will present sample items from a developed battery of 9 experimental morphological assessments. We will also present preliminary data from a sample of struggling adult readers who have completed this battery. Second, we will present sample lessons and activities from a morphological intervention we are currently developing and piloting. Collectively, this body of work addresses the need for more sensitive morphological measures and to integrate direct instruction in morphological knowledge to improve word reading and reading comprehension outcomes for struggling adult readers.
Method: We will present sample items from 9 morphological assessments, which include skills such as, using analogies to solve inflected word types, decomposing multimorphemic words, implicit processing of proper morpheme boundaries, and identifying morphological endings in pseudowords. We will also present preliminary correlational data on 38 struggling adult readers who completed the morphological battery and the relations to norm-referenced decoding, listening comprehension, oral vocabulary, and reading comprehension skills. Finally, we will present sample lessons and activities from our pilot intervention. This intervention integrates structured word inquiry techniques (e.g., word sums, word matrices, using an online etymology site) in the context of connected texts. Texts at 4th to 8th grade reading levels were selected that were adult-appropriate and relevant and contain morphologically complex words for students to analyze.
Findings: Preliminary results suggest moderate to strong correlations among all types of morphological measures and decoding, listening comprehension, oral vocabulary, and reading comprehension measures (rs = .35-67). Morphological tasks with pseudowords have slightly lower correlations with reading comprehension and vocabulary. The majority of our findings will be discussing items and sample lessons from our developed assessments and intervention content.
Conclusion: This work has developed a battery of morphological assessments that represent the multiple facets of the construct of morphological knowledge (e.g., explicit awareness and implicit processing) for struggling adult readers. We are in the process of assessing the validity and reliability of this battery with struggling adult readers. We are also in the process of developing and piloting a 7-week morphological intervention. Historically, struggling adult readers have been treatment resisters in previous reading intervention work (e.g., Greenberg et al., 2011). Morphological knowledge has been identified as a consistent contributor to the word reading and reading comprehension skills of struggling adult readers independent of other well-established reading correlates (e.g., vocabulary, phonological awareness). Thus, we think this work has important implications for potentially improving word reading and reading comprehension outcomes for struggling adult readers.

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Replicating the Efficacy of a Kindergarten Mathematics Intervention with Remote Professional Development

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This poster will present results from the second cohort of a multi-cohort, federally funded Systematic Replication in Special Education research project. The purpose of the project was to conduct an efficacy replication of ROOTS, a 50-lesson (Tier 2) kindergarten mathematics intervention, in which key variables related to intervention delivery were systematically varied from the original ROOTS efficacy trial (Clarke et al., 2012). Specifically, in the current study the format of all Professional Development (PD) for ROOTS interventionists was systematically manipulated from the original efficacy trial by providing all PD (i.e., training and ongoing coaching) virtually, as opposed to in person.

Prior evidence has shown ROOTS to be effective for increasing the mathematics achievement of kindergarten students at risk for mathematics difficulties (e.g. Clarke et al., 2016; Clarke et al., 2017). The current replication study sought to extend previous research by examining three research questions: (1) What was the overall impact of the ROOTS intervention with remote PD on student mathematics outcomes?, (2) To what degree do interventionists find remote training and coaching acceptable to support their implementation of ROOTS?, and (3) To what degree do interventionists implement the ROOTS intervention program with fidelity after receiving remote PD?.

Our sample consisted of 67 kindergarten students identified as at risk for mathematics learning disabilities (MLD). Participating students were drawn from nine kindergarten classrooms across three different elementary schools in Las Vegas, NV. Using a randomized controlled trial (RCT) design, we randomly assigned eligible students in each classroom to a treatment condition (using ROOTS with remote PD) or a control condition, blocking on classroom. Participating interventionists were nine kindergarten teachers working in the three participating schools.

This poster will explore the feasibility, acceptability, and impact of ROOTS with remote professional development in a small-scale randomized controlled trial. Results will indicate if children who received the ROOTS intervention outperformed their control group peers on post-test measures of mathematics achievement. Findings will also be presented to show whether interventionists receiving remote support for implementing ROOTS found training and coaching to be sufficient to deploy an early numeracy intervention, and whether implementation fidelity was consistent with previous research on ROOTS. The research presented will provide initial feedback about for whom and under what conditions ROOTS works (Miller et al., 2014) and information related to variables associated with sustained implementation and scalability of the intervention (Onken et al., 2014). Outcomes and implications for using remote professional development as a format for supporting educators in their use of early numeracy intervention programs will be discussed.

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Planning's Contribution to Persistence in the Writing Process

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Understanding the writing process provides insight regarding writing instruction. This study used a unique design to capture the amount of text produced at different times across a 15-minute period, allowing us to investigate the process of writing, specifically how students differed in their persistence in writing across a composition. Students with disabilities struggle most with persistence and terminate writing early (Graham, 1990; Thomas et al., 1987). One of the most promising ways to teach persistence is through goal setting by creating a structured plan for writing (Butler & De La Paz, 2021). Thomas et al. (1987) hypothesized that the difference between students who terminated writing early and those who persisted "suggested difficulties in retrieving and using relevant schemata from memory that might sustain their thinking and writing in a generative way" (p. 28). Written plans can be external schematic representations, providing structure that increases writing quality and quantity (Brown et al., 1983; Llaurado & Dockrell, 2019). This study examines the role of planning not just on writing performance, but how it contributes to persistence during the writing process.
Method: Eighty-one students in grades 4 and 5 responded to a passage-based informational prompt (see Truckenmiller et al., 2020 for validation study). Before writing, students were instructed to plan on blank paper. Students had up to 15 minutes to type their essay but could submit it at any time. As students wrote, the web-based application captured the Total Words Written (TWW) at 3, 5, 7, 10, and 15 minutes (or time of submission) to capture their process/persistence with writing. Planning was scored as: 0 (no plan), 1 (drafted text), 2 (reminders of what to write), or 3 (structural elements or graphic organizers). Students also completed a 90-second typing fluency task. Persistence was examined via multilevel growth models, with TWW as the dependent variable, typing fluency as the control variable, and five timepoints of the writing task (slope), nested within students and classrooms. This model was compared to a model that included planning to describe the degree of individual differences in persistence (slope) due to planning.
Results: A nested model comparison indicated adding planning to a model of written production across a writing task explains nearly ten percent additional variance of the slopes between students and 40 percent additional variance of slopes between classrooms. The best-fit model was a random intercept, random slopes model with statistically significant main effects for planning ($B01= 14.64$, $p = 0.02$) and typing fluency ($B02= 0.77$, $p <0.001$). The statistically significant interaction between writing time and planning indicates that a one-unit increase in planning is associated with students writing 1.2 more words per minute. While research has shown the influence of planning on writing composition quality and writing time (Limpo & Alves, 2013; Llaurado & Dockrell, 2019), this study models the writing process as it takes place. Results show that students who engage in higher quality planning have a different rate of production across the task, contributing to higher quantity and quality of their overall written product.

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Exploring the Role of Student-Level Moderators in a Second-Grade Science Program

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Few early elementary science programs have been tested to explore their impact on student science outcomes. In fact, no validated science programs are available for kindergarten through second-grade students (WWC, n. d.). To address the urgent need for evidence-based science programs, the Scientific Explorers-2 (Sci2) program was developed. Sci2 applies a guided inquiry-based curriculum that addresses core disciplinary ideas in earth science (Doabler et al., 2021). In addition to the lack of validated science programs, there are also stark achievement gaps in science, beginning as early as kindergarten and widening across grade levels (Morgan et al., 2016). Results from the fourth-grade 2019 National Assessment of Educational Progress (NAEP) science assessment corroborate such opportunity gaps. Data shows Black students scored 33 points lower than White students, students receiving free/reduced lunch (FRL) scored 29 points lower than their counterparts, and students with disabilities scored on average 32 points lower than students without disabilities (National Center for Education Statistics, 2019). Given these concerns, the current work sought to explore the differential impact a guided inquiry science program had on students with varying initial skill levels and sociocultural identities.
To determine the impact of Sci2 on science outcomes, a cluster randomized controlled trial was employed (Doabler et al., 2021). Students from 18 classrooms were tested on four measures of science achievement. Measures included a science vocabulary measure (SEVA), an interactive investigation (VISPA), a measure of geoscience (TEGL), and a distal science measure (CKSP). To examine the differential impact of Sci2, moderator analyses were performed with the following variables: initial mathematics, reading, and science skills, and sociodemographic factors, including ethnicity, gender, FRL, and disability status. Impact results indicated that students in Sci2 classrooms significantly outperformed students in control on three of the four outcome measures ($g = 0.48$ to 0.94). The fourth measure (CKSP) was not significantly different from the control group ($g = 0.02$). Results from the moderator analysis exploring sociodemographic variables indicated that all students benefited equitably from the Sci2 program (Rojo et al., 2022). When examining the impact based on initial skills, the results were mixed. First, response to Sci2 did not differ based on initial science knowledge (Doabler et al., 2021). Second, there were differential effects based on initial reading skills for one outcome measure, the SEVA, where students with higher vocabulary scores benefited more from the Sci2 program than those with lower scores (Rojo et al., 2022). Third, students with higher initial mathematics skills saw greater benefit on the SEVA and TEGL than students with lower initial mathematics skills (Rojo et al., 2022). Given the paucity of evidence-based science programs and the current opportunity gaps in science, we contend our initial work with the Sci2 program is encouraging. Students receiving Sci2 significantly outperformed their control peers on three out of four measures, and follow-up analyses revealed no moderating effects based on sociodemographic factors. We see this study as a starting point to promote diversity, equity, and inclusion in early science learning through the implementation of well-designed science programs.

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Literacy Profiles of Kindergarten Students with Emotional Disturbance

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Concerns regarding the comorbidity of emotional/behavioral disabilities (EBD) and reading difficulty are well-established. In a meta-analysis of 30 studies focused on the variables related to the treatment effectiveness of early literacy interventions, children's problem behaviors were more powerful predictors of literacy outcomes than phonological awareness, memory, and student demographics (Nelson et al., 2003). Although the concerns are well documented, very few studies have examined the early literacy development of students with EBD. The goal of this presentation is to share the results of a latent transition analysis (LTA) that establishes varying levels of strengths and challenges across early reading and language skills for students with EBD. Understanding the heterogeneous nature of this population may be helpful in designing interventions that are targeting the specific areas of need for these students.
In particular, the study asks:
RQ1: How many profiles of early readers would emerge in a large sample of young children with ED sample in the fall and spring of the kindergarten year?
RQ2: What were the proportions of students who transitioned between profiles over time (i.e. between fall and spring of the kindergarten year)?
Data for this study come from state-level data of approximately 545 kindergarten students with EBD from a southeastern state in the United States. Data were collected as part of the statewide Phonological Awareness Literacy Screening (PALS) assessment that screens for difficulties in and monitors progress across emergent literacy development in children in preschool through Grade 3. Measures included PALS-K rhyme awareness, beginning sound awareness, lower-case alphabet knowledge, letter-sound awareness, spelling, and pre-primer word recognition. Latent Profile Analysis (LPA) was used to examine if subgroups of children demonstrated varying levels of strengths and challenges across these early literacy skills. LTA was used to identify the proportion of students within each profile that transitioned to a different profile or remained in a similar profile over time. By utilizing empirically derived latent profiles of early readers, this study allowed for a more comprehensive and nuanced investigation of early literacy skills of children with EBD. Initial results support the emergence of tiered profiles based on differential performance across reading and language subtests. Profile analyses of Fall data generated four distinct profiles, whereas profile analysis of Spring data generated three distinct profiles. LTA indicated that profile membership was not stable across the school year. Differentiating subgroups of readers and assessing whether these profiles remain stable across the school year may be helpful in identifying students who require intervention and in designing interventions that are targeting the specific areas of need for these students.

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Effectiveness of Language Based Interventions for English Learners With or At Risk for Reading Difficulties: A Research Synthesis

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English learners (EL) constitute one of the largest and fastest growing student populations in public schools across the United States (National Center for Educational Statistics [NCES], 2022). Currently, there are over 5 million EL enrolled in U.S. schools; this accounts for 10% of the total K-12 student population (U.S. Department of Education, 2017). Nationally, the number of EL enrolled in schools grew 28 percent from the 2000 to 2016, with 43 states seeing an increase in their EL enrollment during this time, and this number is expected to continue growing (National Center for Educational Statistics, 2020).
National assessment data suggests that there are large and persistent discrepancies in reading achievement between ELs and their English monolingual (EM) peers. Long-term trend data from the National Assessment of Educational Progress (NAEP) demonstrates that ELs consistently scored significantly lower than monolingual English peers on the reading comprehension assessment in fourth, eighth, and twelfth grade (U.S. Department of Education, 2022). The gap between the average reading scores of the two populations of students widened in secondary classrooms compared to scores in the lower grades and troublingly, literacy scores for ELs in eighth and twelfth grade decreased in 2019 compared to their scores in 2015.
The Simple View of Reading ([SVR], Gough & Tunmner, 1986), posits that reading comprehension is the product of word reading (e.g., phonological awareness (PA), decoding) and linguistic comprehension (e.g., vocabulary knowledge, knowledge of syntax/language structures, literacy knowledge). In the SVR model, both word reading and linguistic comprehension are necessary for successful reading comprehension.
Research has also demonstrated that there are differences in the ways the SVR explains reading comprehension for EL as compared to EM students. There are differences in the relative contributions of word reading and linguistic comprehension to reading comprehension for all students. On average, vocabulary and other linguistic comprehension variables make a larger contribution to reading comprehension for all students as they progress beyond the primary grades and encounter more complex texts; however, this is especially true for EL. Cho and colleagues (2019) found that the effects of linguistic comprehension were greater than the effect of word reading for fourth-grade EL.
The purpose of this systematic literature review of studies published between 1980 and 2020 is to describe reading interventions that have a linguistic comprehension component and have been implemented with ELs with or at risk for reading difficulties, and to estimate mean effects of these interventions. The following research questions were addressed:
1. What is the mean effect of reading interventions that have a linguistic comprehension component on reading comprehension outcomes for ELs with or at risk for reading difficulties in Grades K-5?
2. What are the characteristics (e.g., methodology, participant sample, intervention components) of included studies that examine the effects of reading interventions on reading outcomes for ELs with or at risk for reading difficulties?

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Which is a stronger predictor of literacy growth: Teacher knowledge or fidelity?

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The Michigan Department of Education (MDE) is required to submit an annual report to the US Department of Education, Office of Special Education Programs on 17 indicators related to the education of students with disabilities. Indicator 17 requires data regarding the State Systemic Improvement Plan (SSIP). In the SSIP, MDE identified literacy outcomes for students with disabilities as the State Identified Measurable Result (SIMR) targeted for improvement and Data-based Individualization (DBI) as the evidence-based innovation to be implemented in hopes of impacting the SIMR. Michigan's Multi-Tiered Systems of Support Technical Assistance Center (MiMTSS) partnered with a district in Central Michigan to conduct a model demonstration project on behalf of MDE to support the SSIP and test the feasibility of, supports necessary for, and potential impacts of DBI implementation on literacy outcomes for students with and risk for disabilities.
At the start of the 2021-2022 school year, 202 of the 292 first and second grade students enrolled in the three elementary schools in the district demonstrated need for reading intervention as determined by below benchmark scores on Acadience Universal Screening measures. All identified students were placed in intervention groups and received daily intervention throughout the school year using Enhanced Core Reading Instruction (. At the conclusion of the school year 52% of first graders and 75% of second graders who participated in literacy intervention made above typical progress, and 28% of all intervention students achieved benchmark expectations. In this exploration study we will attempt to contextualize these results and examine potential relationships between teacher outcomes to inform future research and technical assistance efforts.
School and District staff received intensive technical assistance from MiMTSS. District leaders participated in readiness conversations and two formal training sessions with MiMTSS staff. During these sessions district team members worked to develop an implementation plan for intensifying literacy instruction, identify a coordinator to guide implementation efforts at the three schools, and selected members to serve on school multi-disciplinary teams (MDTs). Members of the MDTs participated in eight additional training sessions related to the oversight of an intervention system and intensification. Outside of these training sessions, a MiMTSS implementation specialist met with each school teams weekly, provided data coordination support, and engaged in systems level coaching. Additionally, all school staff were trained to implement the components of Enhanced Core Reading Instruction and received instructional coaching.
Several measures were used to evaluate school and teacher level outcomes. To assess system fidelity, MDT members at each school administered the Advanced Tiers Items on the Reading Tiered Fidelity Inventory, 2.0 (St. Martin, Harms, Walsh, & Nantais, 2022). Various dimensions of Instructional fidelity were captured through fidelity observation and daily implementation records submitted by interventionists. Impact on teacher knowledge and application of DBI was assessed using a center developed measure. We will analyze the potential relationships between these school and interventionist outcomes, and student level outcomes using hierarchical linear models with random effects for school and interventionist. Findings will be used to shape future coaching, professional development, and research inquiries.

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Examining Disproportionality in Florida's Special Education Enrollment for Asian American Students

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Asian American students with learning disabilities have been historically underrepresented in special education. Many relevant theories exist to explain this underrepresentation, from cultural and linguistic differences between students, families, and service providers, to teachers' perceptions of their Asian students as academically successful, a consequence of the model minority stereotype, and thus failing to recognize potential signs of disabilities.

This study seeks to provide a descriptive overview of the representation of Asian American students with SLD in Florida's public K-12 schools by asking the following research questions: (1) In Florida's K-12 public schools: (a) Is there a difference between the percentages of Asian students in general education versus special education within each of the 40 included counties? (b) Is there a difference between the percentages of Asian students in general education versus SLD within each of the 40 included counties?, and (2) In Florida's K-12 public schools, is there a difference between the proportion of students with SLD in special education who are Asian compared with that of other racial groups (White, Black, Hispanic/Latino, and Other) within each of the 40 included counties.

Student enrollment data was gathered from publicly available sources via the Florida Department of Education website. The data used in this study came from two sources, the 2017-2018 report on Membership in Programs for Special Education and the 2017-2018 report on Membership in Florida Public Schools. Florida was selected as the analysis state due to its unique population demographics and availability of publicly accessible data. Florida has the eighth highest Asian American population, and of the top 10 states ranked by the greatest population of Asians, is the only state located in the South. Asian Americans are reported to be the fastest growing minority population in the Southeast region, and play a key role in the future of Florida. Considering this demographic growth, Florida stood out as an excellent candidate for an exploratory study on its population of Asian students.

The analysis found that within the 40 counties, Asian students are underrepresented in special education and SLD compared to Asian students in general education (RQ1). Additionally, Asian students have a lower likelihood of having an SLD identification than students of other races (RQ2). It is critical to study underrepresentation in data because it is often indicative of a population of students who are not correctly identified and thus are not receiving appropriate educational supports.

The Development of a Coaching Intervention: Challenges and Directions for Intervention Research

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One way that instructional leaders (e.g., administrators) can support transformative change in teacher practice (i.e., improved knowledge and skill) is by providing teachers with effective professional development (PD) to support evidence-based instruction (Kennedy, 2014). Improved knowledge and skill can lead to improved fidelity of implementation of evidence-based practices (EBPs), which is associated with improved student outcomes (Vaughn et al., 2015). PD can not only act as a conduit in the transmission of teacher knowledge and skills, but it can ultimately lead to improved student outcomes (Garet et al., 2001). One widely used form of PD that is ongoing, extends support for teachers, and meets many of the characteristics for effective PD is instructional coaching (Joyce & Showers, 1982; 2002). While we know that coaching incorporates critical characteristics of effective PD, it is important to recognize and address the persistent challenges associated with the development, implementation, and evaluation of coaching programs. This is critical so that we can continue to grow the field's knowledge of coaching through rigorously designed applied research focused on investigating specific instructional coaching intervention methods and research that incorporates instructional coaching in a more tangential way (e.g., research focused on training teachers to implement a new instructional method that includes an instructional coaching element). Thus, the purpose of this poster presentation is to discuss the challenges that intervention researchers face when developing and evaluating coaching interventions, explain the implications of these challenges, and provide recommendations for researchers planning to conduct studies that investigate a coaching intervention specifically or incorporate coaching into a broader study. To illustrate these challenges, we use examples from the AIM Coaching project, a U.S. Department of Education Institute of Education Sciences (IES)-funded Development and Innovation grant (2020-2024; see aimcoaching.org). We describe an effort to improve literacy outcomes at the middle school level by developing the AIM Coaching Package, which comprises (a) AIM Coaching, an innovative adaptive coaching intervention to support teachers as they implement an evidence-based literacy instructional routine as part of a middle school Tier 1 (i.e., English language arts, science, social studies) school-wide literacy model, and (b) AIM Coaching PD (ACPD), an accompanying coach PD designed to provide coaches with guidance on how to implement the AIM Coaching intervention with fidelity. Both AIM Coaching and ACPD align with critical characteristics of PD by providing teachers and coaches, respectively, with ongoing support. We first provide background information on the need for coaching that supports secondary school-wide Tier 1 literacy models. Then, we describe the study context, including the research plan of the project; the literacy practices the AIM Coaching intervention supports in this study; the AIM Coaching Package itself; and the theoretical framework that guided this work. Next, we present key challenges we faced, solutions to address those challenges, and limitations and implications of those solutions related to both the AIM Coaching Package development process and our evaluation plan of the AIM Coaching intervention. Finally, we discuss implications for future research that specifically investigates or includes coaching.

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Teachers' Knowledge of Early Reading and Instruction: A Survey of Nigerian Teachers

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In African nations, students both with and without disabilities struggle with reading proficiently. These high levels of illiteracy contribute significantly to the disease burden of poor communities and countries, which reinforces health and economic inequalities. Most post-colonial and post-military regions in African countries, including Nigeria, grapple with unfavorable social and political situations that have resulted in limited educational opportunities, and these problems are further exacerbated by poverty (Ucha, 2010). It is needless to say that students who have reading problems in the Nigerian setting will continue to do so unless teachers themselves are equipped with the knowledge of how to tackle reading problems. This study supported an increased understanding of the current state of teacher knowledge, and potential gaps, as it relates to early literacy instruction among teachers in FCT, Abuja. Thus, I sought to address four research questions: a) How do primary grade teachers (Kindergarten to 3rd grade) in FCT Abuja, Nigeria perform on a survey tapping their knowledge about reading? b) Are there differences on reported knowledge between teachers in the public and private sector in FCT Abuja, Nigeria? c) What are the perceptions and beliefs about early reading reported by primary grade teachers in FCT Abuja, Nigeria? d) Does teacher certification, years of teaching experience, coursework, or professional development training impact teachers' performance on different sections of the knowledge survey? The data used in this study were collected through a secure Qualtrics survey between January and May 2022. Following thorough screening and cleaning of the survey data, the final sample included 391 primary grade teachers (58.82% female) from both the public (53.96%) and private sectors (46.04%) in grades K-3. Overall, knowledge of primary grade teachers in FCT Abuja, Nigeria regarding reading instruction was low, with scores ranging between 4-24 on the 40-item teacher knowledge survey (TKS). Across three sections of the TKS, participants obtained mean scores of 3.73 (SD = 1.85) on 14 items related to pedagogy, 7.29 (SD = 2.65) on 21 items tapping foundational reading skills, and 0.93 (SD = 1.00) on 5 items tapping meaning making/comprehension. Private school teachers performed higher on the TKS (M = 13.30, SD = 4.25), compared to those in public schools (M = 10.80, SD = 3.08). When measuring teachers' perceptions and beliefs about early reading instruction, there was a high level of endorsement of all statements, both those that were supported by evidence and those that were not. Most teachers in this sample reported that English was the language in which they first learned to read (85.42%) and their secondary school instruction was in English (95.91%). Finally, regression analyses were used to examine the relative influence of teachers' professional characteristics on TKS score. Teaching certification, years of experience, and formal coursework were not statistically significant predictors of knowledge, while participation in professional development significantly predicted teachers' TKS scores. Findings from this study have implications for understanding the teaching workforce in Nigeria and how this may support initiatives that attempt to improve reading instruction, and the overall educational landscape.

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Examining the Literacy Outcomes of Morphological Instruction on Adolescents: A Meta-Analysis

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Research suggests that as students reach adolescence, most rely on larger chunks of text (syllables or morphemes) to derive meaning (Bhattacharya & Ehri, 2004; Ehri, 2005). Additionally, studies have found that direct instruction in morphology, or the study of affixes and root words, has a positive impact on word reading (Carlise & Stone, 2005; Singson et al., 2000), spelling (Deacon & Bryant, 2006), vocabulary (Bowers & Kirby, 2010; Nagy et al., 2006), and reading comprehension (Levesque et al., 2018; Nagy et al., 2006). To show the multidimensionality of morphology and its role in developing our lexicon, Levesque et al. (2020) developed The Morphological Pathways Model based on Perfetti and Stafura's (2014) Reading Systems Framework. The Morphological Pathways Model (Levesque et al., 2020) asserts that morphological awareness influences morphological decoding and morphological analysis and has a direct impact on text comprehension.
The purpose of this meta-analysis is to build on the existing knowledge base regarding morphological instruction by providing a systematic review of studies of morphological interventions in English for students in grades 4-12 through the lens of The Morphological Pathways Model (Levesque et al., 2020). In particular the study asked: 1. What is the overall impact of morphological instruction on adolescents? 2. Does morphological instruction improve different areas of literacy achievement, such as morphological decoding, morphological analysis, morphological awareness, and reading comprehension for adolescents? 3. Is the effect of morphological instruction different for students who are at risk for reading difficulties or who are identified as English Language Learners?

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Bridging the Research-to-Practice Gap: A Descriptive Case Study

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The research to practice gap has been well documented in special education. Carnine (1997) reasoned that the gap exists due to a lack of trustworthiness, usability, and accessibility of the research being conducted. While quality standards for research practices were established, there is still a need to assist practitioners with identifying and implementing research-based strategies for daily classroom use. Fuchs and Fuchs (2001) developed a research and development framework consisting of three stages: (1) Stage One involves working with school personnel to identify the needs and concerns about their current school programming; (2) Stage Two is the implementation of the chosen innovation or practice; and (3) Stage Three involves dissemination of the implementation process to other researchers and school personnel.

The current proposal is a descriptive case study of one special education school's application of the R&D framework for school programming (Fuchs & Fuchs, 2001). A Step Up Academy (ASUA) is a private, nonprofit school that serves approximately 50 students with Autism in grades K-12. Students are referred to the program due their need for clinical services (e.g., behavior support, speech and language, occupational therapy) outside of their school districts. In the past, ASUA has provided individualized programming using the principles of Applied Behavior Analysis (ABA). As the program expanded, we aspired to help bridge the research to practice gap in order to meet the needs of our growing student population.

Stage One of the R&D framework included a school culture assessment indicating a need for increased staff self-efficacy in addressing and managing behaviors in school. The results of the assessment and collaboration between the R&D and School Services department suggested that ASUA may benefit from implementing a School-Wide Positive Behavior and Intervention Support (SWPBIS) program. SWPBIS was chosen for ASUA because of its shown success in general and special education settings not only for improved student outcomes but also for increasing staff self-efficacy and supporting a positive school culture. The process was modeled after other alternative school SWPBIS programming (George et al., 2013; Miller et al., 2005). After developing the desired programming, the SWPBIS committee, consisting of supervisors, related services, and instructional staff, trained the school staff on the procedures during a professional development day. Stage Two of the R&D framework consisted of putting the SWPBIS procedures into place throughout the school. The staff were supported in the implementation through weekly team meetings, fidelity checks, and, when deemed necessary, individual coaching. Stage Three included dissemination of results to the staff and preparation for consultation to outside professionals.

Our research questions were as follows: (1) What is the effect of SWPBIS on student behavior at ASUA as measured by student IEP goal progress?; (2) what is the effect of SWPBIS on staff self-efficacy in managing student behavior in school?; and (3) what effect does SWPBIS have on ASUA's school culture? We hypothesize that frequency of positive student behavior will increase, and staff self-efficacy and school culture will improve. Research and practice implications will be discussed.

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The Effect of Computer-Assisted Instruction for Students with Reading Difficulties: A Meta-analysis

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Reading ability is essential for school success. Computer-assisted instruction (CAI) has become a promising practice to help students who have difficulties in reading with features of multimedia, individualized settings, and immediate feedback (Hall et al. 2000; A. Kim et al., 2006). Prior meta-analysis reveals equivocal findings of the effects of CAI for students with reading difficulties (RD) or learning disabilities (LD). According to Wood et al. (2018), the average effect size of text-to-speech and other read-aloud tools on reading comprehension was 0.36 for K12 students with reading disabilities. Cheung and Slavin (2013) found a smaller impact of CAI on elementary struggling readers' reading achievement with an overall weighted mean effect size of 0.14. The effect size of small group integrated programs was the largest at 0.32 and the effect size of comprehensive models (i.e., CAI combined with noncomputer activities) was the smallest at 0.04. In Kim and colleagues (2017), four out of seven group design studies reported moderate to large effect sizes on the reading comprehension of LD students. Therefore, a more comprehensive understanding of the impacts of CAI programs is needed. Researchers and developers can then create more effective computer programs to meet the needs of students with RD or LD. This will also help schools and teachers select appropriate interventions. My research questions are: 1. What are the average short- and long-term effects of CAI on reading performance for students with reading difficulties? 2. What are the effects of multiple reading and technology components of CAI intervention? 3. Which characteristics of students, instruction intensity, and methodological features are associated with differential effects on students' reading achievement? A comprehensive search was conducted that included an electronic database search, forward and backward ancestral search of included studies, and table of content search of major journals. The database of PsychINFO, ERIC, Web of Science, Education Source, and Academic Search Complete were used. The search strings of reading, difficulties/disabilities, and CAI were combined for literature searching. Studies were selected based on the following criteria: 1. published as a journal article, book chapter, conference paper, or report 2. reported in English and Chinese 3. The research design was an experimental or quasi-experimental one. 4. Participants were in preschool through 12 grade who were identified by the authors as having reading difficulties including dyslexia, reading difficulties, learning disabilities, or low achievement on reading assessments. Studies with participants of mixed abilities were included if the subgroups of reading difficulties were studied. 5. included at least one quantitative outcome measure of reading at the word, sentence, paragraph, or passage level. A full-text review yielded 49 articles that met all the criteria. Alongside the simple view of the reading model (Gough & Tunmer, 1986) and the cognitive theory of multimedia learning (Mayer, 2005), data were collected on (1) participants (e.g., age, risk type), (2) methodology (e.g., research design, attrition, implementation fidelity), (3) intervention features (e.g., technology and reading components, dosage), (4) results reported in the primary studies. A network meta-analysis will be conducted. Findings will be discussed later.

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Why is geometry so hard? An examination of geometry problem solving strategies and error patterns in high schoolers with math difficulties

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Geometry is an important yet understudied mathematics subject (Bergstrom & Zhang, 2016). U.S. students performed worst in geometry among four mathematics domains tested in international competitions such as TIMSS (2011, Chen, et al., 2021). However, most of the current research on geometry problem solving for students with math difficulties (MD) has focused on the elementary level and relatively simple subjects, such as area, perimeter, and basic spatial imaginary skills (Bergstrom & Zhang, et al., 2016). As students approach high school, geometry standards become more complex and in-depth and chain-like deductive reasoning is usually needed in solving high school geometry problems (CCSS, 2011). This study aimed to examine specific difficulties and error patterns in geometry proof in high school students with mathematics learning difficulties. Eighteen high school students with mathematics difficulties with geometry, including 10 officially receiving special education service, participated in this study. All participants were referred by their math teachers as students struggling in learning mathematics. Students with MD met one or more of the following three criteria: (a) having received a grade of C or below in a high school geometry subject; (b) being eligible for special education services, with an IEP goal in mathematics; and/or (c) having failed the state standardized test in mathematics. All participants were asked to take a geometry test of 22 geometry problems selected from high school geometry curriculum, covering a range of high school geometry topics with three levels of difficulties. Students completed the test individually and independently. No prompts or feedback was provided. In addition to providing a solution, students were asked to provide an explanation of how they arrived at their solution and to leave scratch notes or marks on the diagram. We graded students' responses and developed a coding scheme to categorize students' strategies and error patterns in solving geometry problems, based on students' written solutions and explanations, as well as notes on the scratch paper and diagrams. Preliminary results suggested that students with MD demonstrated differential accuracy to the three types of problems. We identified two barriers (i.e., poor geometry vocabulary, frustrations with the dual-mode information input) that blocked students' access to problems; two hurdles that interferes with their cognitive processing (i.e., failure in retrieving learned geometry theorems from long term memory; failure in manipulating sophisticated given information held in working memory). We also found that some students had difficulties with articulating their reasoning in written mathematical format, although their notes on the diagram suggested that they took correct steps to solve the problem. Additionally, we identified three common mistakes in deductive reasoning that is required in geometry problem solving, including (a) confusion between solving an unknown through deductive reasoning and making an estimate/measure based on a diagram; (b) confusions between given information and making assumptions about a diagram; and (c) making deductive reasoning without adequate given information. These barriers/misconceptions were more frequently found in problems with higher difficulty levels. Discussions were provided with regard to how to help students with math learning difficulties to avoid the above misconceptions and address the barriers in problem solving by providing appropriate accommodations.

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The Effects of Reading Comprehension Intervention with Engagement Strategies on Reading Comprehension for Students in Grades 4 through 9

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The national reading comprehension assessment results have shown that a significant number of adolescents have difficulties in reading comprehension. Accordingly, the Institute of Education Sciences released a guidance document for providing interventions for students in Grade 4 through 9 (Vaughn et al., 2022), however, does not address the issue of the role of motivation in reading outcomes for students with reading difficulties. In addition, prior reviews have demonstrated a bidirectional relationship between reading achievement and reading motivation and its predictability of later reading ability (Morgan & Fuchs, 2007; Toste et al., 2020). Poor reading motivation and engagement can have a negative effect on the reading comprehension of struggling readers. These findings indicate the need for intervention addressing and integrated intervention of reading comprehension and engagement for students with reading difficulties. This study aimed to synthesize the effects of these interventions and identify components of effective reading comprehension intervention and type of engagement strategies. Ten peer-reviewed articles met inclusion criteria through the electronic and hand search process. The main results for three research purposes are as follows. First, reading comprehension interventions that combine engagement strategies showed positive effects on reading comprehension across studies. Furthermore, the results of studies that conducted follow-up assessments (k = 4) implied promising long-term effects of combining reading intervention and engagement strategies. Second, six studies implemented multiple strategy reading comprehension interventions. The frequent common components among the interventions were foundational reading skill instruction (k = 3), activating background knowledge (k = 3), vocabulary instruction (k = 3), and summarizing strategy instruction (k = 3). Four studies targeted specific reading comprehension skill including identifying main idea (k = 2), summarization (k = 1), and inferencing (k = 1). Third, six studies used internal engagement strategy, three studies used external engagement strategy, and one study applied both internal and external engagement strategies. For students' internal engagement, attributional training (k = 3) and peer collaboration (k = 2) were the most frequently used strategies. Other internal engagement strategies included students' interest-based topics, students' choice of text, strategy-value feedback, and a differentiated instructional delivery system. For students' external engagement, the token economy reward system (k = 4) and positive reinforcement (k = 2) were the most frequently used strategies.

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Are Visual Representations Helpful? A Comparison of Performance on Growing Patterning Problem Solving between Numerical, Table and Figural Representations in Students with Mathematics Difficulties

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Pattern is understood as regularity in a sequence of ordering units (Björklund, & Pramling, 2014). Patterning is an important skill for students to development mathematical reasoning abilities (Wijns et al., 2019). Patterns may have units that repeat (e.g., ABAB..), are symmetrically ordered (e.g., ABBA), or grow (ascend or descend, e.g., 1, 3, 5, 7..) (Pasnak, 2018). Growing patterns increase or decrease in a systematic way (Hutchinson, & Pournara, 2011) and can be represented in different formats, including numerical strings, tables, or figures (Becker & Rivera, 2006). Prior work on patterning primarily focused on repeated patterning in preschool aged children without learning difficulties or disabilities (Hutchinson & Pournara, 2011). A recent study (Mielicki et al., 2021) examined the influence of presentation formats on patterning problems solving in middle school students without mathematics difficulties, and reported that presenting patterns as figures can benefit performance, although these benefits may depend on both pattern type and patterning task. This study further examined the influence of presentation formats in SMDs' patterning problem solving.
The present study have three goals: (a) to examine the performance and strategies used by SMDs in solving growing patterning problems, (b) to compare the performance and strategy uses of SMDs on growing patterning problem solving under three presentation format conditions, and (c) to examine whether the effect of presentation format exists in transfer word problems for which none of the presentation formats was provided.
Design: A within-subject design was used. 27 middle school SMDs completed three growing patterning problem tests, which were paralleled in difficulty level and item content. The order of taking three tests was counterbalanced. At the end of each test, students also need complete two transfer word problems.
Analysis and Results. We graded participants' accuracy and coded students' strategies. Repeated ANOVAs were performed on accuracy among different types of problems. Preliminary results suggested the figure presentation favored the non-proportion problems ($y = ax + b$) than the numerical and table presentations, whereas SMDs performed better with numerical and table representations in proportional problems ($y = ax$). Meanwhile, on the near-extension task, SMDs did better with the numerical presentation in both the proportional and non-proportion problems. Corresponding to the accuracy data, functional strategies were more frequently used than recursive strategies for the far-extension task in proportional problems, whereas recursive strategies were more frequently used for near-extension tasks in both proportional and non-proportional problems across all three presentation formats. Results implied that figure presentations benefited SMDs when they had to use functional strategies to solve far transfer tasks in non-proportional problems. The presentation format did not have any impact on SMDs' performance on any of the transfer story problems as SMDs scored comparably poorly on these tasks across three format conditions.
Discussions: In contrary to the intuition that SMDs will perform better when figure representations are provided, this study revealed that SMDs only benefited from figure presentations on specific types of problems. Implications were discussed as to the specific conditions under which visual presentations benefited SMDs in solving abstract mathematics problems.

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Status of Literacy Coaching in Middle Schools: A Survey Study

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National studies reveal that significant numbers of adolescents with disabilities do not adequately understand complex texts, impeding their school success, access to postsecondary learning, and job opportunities within our increasingly competitive work environment (Faggella-Luby et al., 2012; Morsy et al., 2010). It is increasingly important for content-area teachers to integrate evidence-based adolescent literacy practices since 60% of SWD spend most of their day in the general education setting (Newman et al., 2011). However, evidence suggests that literacy practices are difficult for many teachers to implement successfully (Swanson et al., 2016; Wexler et al., 2017) and require not only high-quality initial PD but also ongoing instructional coaching.

The secondary setting presents difficulties in providing instructional coaching. Coaches on secondary campuses face a sizeable teacher constituency. In the United States, the average middle school exceeds 500 students (Parsad et al., 2001) and employs 70+ teachers. Compounding this problem is the often-dual role coaches face on middle school campuses serving as both administrators and coaches. This means that relatively little time is spent in direct contact with teachers engaged in ongoing PD activities that support implementation of evidence-based literacy practices (Hershfeldt et al., 2012).

With so few reports of the middle school coaching experience, we wanted to learn more about the "state of literacy coaching" in middle schools. The purpose of this poster is to report findings from a multi-survey study that examined middle school literacy coaching via the perceptions of middle school teachers and coaches. We distributed one survey to teachers and another survey to instructional coaches. Both surveys were distributed in spring 2021 and asked respondents to reflect on their 2019-2020 school year coaching experiences before COVID-19 school shutdowns. Altogether, 141 respondents were included in the final sample for the teacher survey, while 64 respondents were included in our final sample for the coach survey. The low response rates are in line with suppressed response rates reported by others during the COVID-19 pandemic (Rothbaum, 2020).

More than half of respondents (58%) reported that someone in their school was assigned to provide literacy coaching. However, respondents with coaches most frequently reported receiving no support from their coach within a typical month (44%). Teachers frequently reported that their coaches had a good amount of knowledge or expert knowledge of literacy practices (74%) as well as regarding teaching students with disabilities (64%). However, teachers most likely reported the need for materials that are appropriate for their students (n = 62), followed by literacy support for students with disabilities (n = 58).

Meanwhile, 44% of instructional coaches did not report providing teachers with instructionalmcoaching on any literacy-related topic. In fact, coaches most frequently reported providing coaching on classroom management (n = 51). Additionally, respondents most frequently reported wanting to attend a workshop on incorporating literacy practices into various content areas (n =36). Altogether, these findings of this study reveal that both teachers and coaches need support focused on content-area literacy instruction that meets the needs of middle school students with and without disabilities.