THE IMPACT OF A MULTILEVEL COACHING INTERVENTION ON PRESERVICE TEACHERS' FIDELITY OF IMPLEMENTATION OF A READING INTERVENTION

by

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ABSTRACT

CORINNE RACHELLE JONES KINGSBERY. The Impact of a Multilevel Coaching Intervention on Preservice Teachers' Fidelity of Implementation of a Reading Intervention (Under the direction of DR. KRISTEN BEACH)

Teacher preparation programs (TPPs) can equip preservice teachers (PSTs) with skills to implement evidence-based interventions in reading with fidelity by engaging PSTs in carefully designed clinical experience opportunities. Providing PSTs with extensive feedback through coaching is one method to strengthen support for PSTs' implementation of evidence-based interventions, improve PSTs' fidelity of implementation, and increase the likelihood of positively impacting students' reading outcomes. This study contributed to gaps in the literature on preparing elementary education PSTs to implement evidence-based practices (EBPs) in reading with fidelity and the impact of sustained and responsive feedback during an authentic reading tutoring clinical experience. To individualize coaching support and facilitate a responsive approach to coaching centered on PSTs' levels of fidelity, first, this study examined the impact of a multilevel coaching intervention on PSTs' fidelity of implementation of an evidence-based reading intervention during a tutoring clinical experience. Second, this study examined PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention.

Results of this single-case, multiple baseline across participants study indicated a functional relation between the multilevel coaching intervention and PSTs' fidelity of implementation, inclusive of both structural and process dimensions of fidelity. Furthermore, PSTs found the multilevel coaching intervention to be socially valid, indicating the intervention was feasible, effective, and impactful on their future teaching experiences. The findings of this study provide relevant implications regarding teacher preparation and coaching support. Major

implications include (a) providing PSTs as novice learners with authentic clinical experiences, inclusive of coaching support, when implementing EBPs; (b) viewing fidelity as a multidimensional construct that can inform coaching support and teacher practices; and (c) enhancing TPPs with experiences that impact PSTs' beliefs and perceptions about teaching reading and their own ability to do so. A few suggestions for future research include (a) investigating the efficiency of various coaching models at supporting PSTs to implement EBPs with fidelity, (b) examining the role of instructional pacing and other factors that may impact the extent to which EBPs are implemented with fidelity, (c) determining the effects of multiple dimensions of fidelity (i.e., structure and process) and the interaction on student outcomes, and (d) extending research findings on coaching supports that impact PSTs' knowledge and the subsequent impact on student outcomes in reading.

DEDICATION

This dissertation is dedicated to my boys, Philip and Grant. Everything that I do, I do because of and for you. You both make my life full, and I love each of you dearly.

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CHAPTER 1: INTRODUCTION

Statement of the Problem

National reading scores reflect persistently alarming outcomes for students with and without disabilities. In 2022, national reading scores for 4th graders declined from 2019 and 2017 with just 33% of 4th graders most recently performing at or above the National Assessment of Educational Progress (NAEP) proficient achievement level in reading (Irwin et al., 2022; McFarland et al., 2017; McFarland et al., 2019). In addition to the poor reading outcomes for elementary-aged students, there is a discrepancy between the reading performance of students with and without disabilities. Recent research has demonstrated there is a 1.17 standard deviation gap between the reading performance of students with disabilities and their peers without disabilities indicating that students with disabilities are performing three years behind their peers in reading (Gilmour et al., 2019). Moreover, only 11% of students with disabilities performed at or above the NAEP proficient achievement level in reading in 2022 (Irwin et al., 2022).

Additionally, the number of students who receive special education services nationwide is increasing. From the 2009–2010 to 2019–2020 academic year, the number of students aged 3–21 who received special education services under the Individuals with Disabilities Education Act (IDEA; 2004) increased from 6.5 million to 7.3 million, which is approximately an increase from 13% to 14% of students enrolled in public schools (Irwin et al., 2021). Among all students who receive special education services, most students with disabilities qualify for services under the category of specific learning disability (SLD), which accounts for 33% of the student population served under the IDEA (Irwin et al., 2021). Approximately 85% of students with SLD have a primary area of need in reading (Depaoli et al., 2015; McFarland et al., 2019).

Evidence-Based Practices

To address the current state of national reading achievement, federal law either mandates or reinforces the use of scientifically- and evidence-based instructional practices (Every Student Succeeds Act [ESSA], 2015; IDEA, 2004). Scientifically- and evidence-based instructional practices have been identified as practices that are proven to positively impact student outcomes (Cook et al., 2019; Cook & Odom, 2013). Due to research supporting evidence-based instructional practices on improving student outcomes, teachers are expected and required to implement high-quality, explicit, evidence-based instruction in reading to positively impact student reading outcomes (Blachman et al., 1999; D'Angiulli et al., 2004; Joshi et al., 2009; Torgesen et al., 2001; Vaughn & Wanzek, 2014).

Evidence-based instructional practices across all educational settings is critical as the IDEA (2004) mandates that students with disabilities receive their educational services in the Least Restrictive Environment (LRE). Students with SLD are the largest group of students identified with a disability that receive services inside the general education classroom with about 75% of students spending 80% of more of their school day in general education classes (Irwin et al., 2021). This is a significant increase from prior decades when only about 22% of students with SLD received educational services in general education classes (McLeskey et al., 2004). Given that the number of students identified with SLD served in general education classrooms has increased across time and reading outcomes for elementary-aged students as a group are disconcerting, both special and general education teachers require the knowledge and skills to meet the diverse reading needs of all students in their classrooms.

Specific to implementation of evidence-based practices (EBPs) in general education, Leko and colleagues (2015) described how general education teacher preparation programs

(TPPs) should ensure preservice teachers (PSTs) have the knowledge and skills to implement EBPs within a Multi-Tiered Systems of Support (MTSS) framework for preventing academic and behavioral difficulties. Sailor and colleagues (2021) described MTSS as a framework that consists of a high-quality and research-based core curriculum in general education with tiered, differentiated instruction, including implementation of EBPs supported by high-quality research, for students who require additional support. These EBPs have been established to be effective at improving student outcomes and are aligned with students' needs. Tiered intervention support commonly includes three tiers of assessment and instruction. Tier 1 consists of universal instruction and the core curriculum provided to all students. Tier 2 includes supplemental support when students require additional support than is provided in Tier 1 (Baker et al., 2010; Vaughn et al., 2007). Tier 3 is the most intensive level of support that is required for some students to receive an equitable learning experience and includes the provision of individualized instruction for students who require additional support than is provided in Tier 2 (Haager et al., 2007; Vaughn et al., 2003).

The underpinning of MTSS is that achievement for all students is a collective mission that focuses on excellence and equitable learning experiences (Sailor et al., 2021). General education teachers hold much responsibility within this framework as they are responsible for core instruction and responding to students' needs through Tier 2 instruction when student progress indicates a need for supplemental support. Therefore, it is critical that elementary education teachers have the knowledge and skills to implement evidence-based reading instruction to address students' needs within this system of tiered support to positively impact national reading outcomes for elementary-aged students (Leko et al., 2015; McFarland et al., 2017; McFarland et al., 2019).

Previous literature has indicated the key to the effectiveness of an MTSS approach and positive student outcomes might be teacher preparation (Barrio et al., 2015; Compton et al., 2012; Denton, 2012; Gerber, 2005; Gersten et al., 2009; Vaughn et al., 2009). Unfortunately, general education teachers oftentimes are not adequately prepared to work with students with diverse learning needs during their preparation programs (Hurlbut & Tunks, 2016). Researchers have identified gaps in the literature on preparing general education PSTs to implement tiered interventions through an MTSS approach, and more research to enhance teacher preparation in this area is needed (Hazelkorn et al., 2010). For example, Barrio and colleagues (2015) identified a large gap in the literature after reviewing how general education TPPs integrate Response to Intervention (RtI). RtI is one example of a tiered academic intervention support for students implemented via MTSS. The authors concluded that teacher educators can improve the quality of elementary education teachers' preparation to address diverse student needs by including experiences implementing EBPs during their TPPs. However, there has been much debate about what constitutes high-quality, evidence-based reading instruction (Castles et al., 2018). This longstanding debate includes which approaches or practices reflect how students learn to read and in what ways educators can implement these practices to maximize student success in reading (Castles et al., 2018).

Science of Reading

Recently, the Science of Reading has been a topic of interest and refers to the accumulation of evolving scientific knowledge surrounding the best practices for reading instruction (Petscher et al., 2020). The Science of Reading aims to support all educational stakeholders in identifying best practices in reading and ensuring students master literacy skills leading to improved outcomes (DeWalt & Hink, 2009; Rayner et al., 2001). The evidence behind

the Science of Reading provides answers regarding the literacy instruction that students require, which includes how students should be taught reading subskills (i.e., phonemic awareness, phonics, fluency, vocabulary, and comprehension). For example, the Science of Reading has indicated that explicit instruction is an evidence-based instructional practice that is associated with positive effects on students' reading outcomes, especially those with diverse learning needs or from culturally diverse backgrounds (Fletcher et al., 2019; Foorman et al., 2016; Vaughn & Fletcher, 2021). Explicit instruction includes teachers modeling new skills, engaging students in guided and scaffolded practice of new skills with feedback, and providing independent practice of newly learned skills with feedback and embedded review (Archer & Hughes, 2010; Rupley et al., 2009).

Aligned with the Science of Reading, research has indicated that explicit instruction should be used to teach students various subskills of reading including subskills related to word decoding and language comprehension (Petscher et al., 2020). The Simple View of Reading, which is supported by years of compelling research, highlights the ultimate goal of reading as students' ability to make meaning from text, or comprehend, by way of developing their word decoding and language comprehension skills (Gough & Tunmer, 1986). The Simple View of Reading has been widely used to explain the Science of Reading to teachers and those involved in reading education (e.g., Baker et al., 2017) and provides a framework for conceptualizing students' reading development over time (Petscher et al., 2020). This model explains that for students to comprehend text, they need both decoding and language comprehension skills as both areas have been shown to predict reading comprehension skills for students with diverse learning needs (Kershaw & Schatschneider, 2012; Sabatini et al., 2010; Vellutino et al., 2007). If students experience weaknesses in subskills of either strand of this model, word decoding or language

comprehension, their ability to become skilled readers who successfully make meaning of the text will likely be impacted (Vellutino et al., 2007). To prevent and remediate difficulties in these subskills of reading development, teachers can implement EBPs aligned with the Science of Reading and centered on developing word decoding and language comprehension skills (Foorman et al., 2015; Lonigan et al., 2018).

Fidelity of Implementation

When implementing EBPs informed by the Science of Reading, it is often critical that teachers implement these practices with fidelity (Capin et al., 2021; Durlak & DuPre, 2008; Quinn & Kim, 2017; Vaughn et al., 2015). Fidelity of implementation has various definitions although it is generally defined as implementation of the critical components of an intervention as intended or designed; however, fidelity is broadly considered to be multidimensional (Capin et al., 2021; Harn et al., 2013). The multiple dimensions of fidelity have been divided into two broad categories including structural dimensions and process dimensions (Harn et al., 2013).

Structural dimensions of fidelity are objective and indicate whether important pieces of the intervention were delivered. Structural dimensions include measuring (a) program adherence (i.e., central components of the intervention), (b) time allocation (e.g., number of minutes), and (c) intervention completion (e.g, expected number of lessons completed, expected material covered; Durlak & DuPre, 2008; Gersten et al., 2005). Most often, structural dimensions can be measured via direct observation or self-report from the interventionist. During direct observations, using a checklist has been noted as the most common way to monitor fidelity (McKenna et al., 2014).

Process dimensions of fidelity include examining quality of intervention delivery, also referred to as instructional quality, and teacher-student interactions (Justice et al., 2008;

O'Donnell, 2008). Process dimensions of fidelity are more difficult to measure due to the qualitative nature of this dimension, and reliability can be difficult to establish as observers attempt to rate the quality of instructional delivery. This rating may include how well the lesson flowed, teacher responsiveness, and use of instructional language and materials (Durlak, 2010; Kaderavek & Justice, 2010).

Researchers conceptualized and established fidelity to determine if developed interventions were implemented as they were designed within a research study (Harn et al., 2013). This structural dimension of fidelity, program adherence, is commonly measured in research and schools (Capin et al., 2021; DiGennaro & Martens, 2007; Durlak & DuPre, 2008). Measuring fidelity is important as it allows researchers and schools to determine if the intervention was delivered by design. If fidelity is measured and student performance levels are low, researchers and school teams can make decisions about follow-up support for teachers or adaptations to the intervention depending on teachers' levels of fidelity (McKenna et al., 2014).

Although controversy exists on whether fidelity of implementation is associated with student outcomes, studies generally report that fidelity positively predicts student outcomes (Al Otaiba & Fuchs, 2006; Carroll et al., 2007; Durlak & DuPre, 2008; Kaderavek & Justice, 2010; Stein et al., 2008; Vaughn et al., 2015). In a review of the influence of fidelity of implementation on program outcomes, Durlak and DuPre (2008) identified 483 studies summarized in five meta-analyses and 59 additional studies that investigated the impact of implementation on program outcomes. The authors concluded that effective implementation was associated with better outcomes. Furthermore, Vaughn et al. (2015) found that teacher fidelity of implementation to instructional practices in reading mediated the effects of a reading intervention on students' reading outcomes.

In an extension of Vaughn et al. (2015), Capin et al. (2021) examined whether treatment adherence and instructional quality predicted students' reading outcomes after participating in a teacher-implemented reading intervention and if an interaction was present between treatment adherence and instructional quality. The authors found that although treatment adherence was not a statistically significant predictor of reading comprehension performance for students who received the intervention, there was a statistically significant interaction between treatment adherence and instructional quality. To elaborate, when instructional quality was low, treatment adherence had a stronger impact on student outcomes. This finding provides support that treatment adherence can interact with instructional quality specifically for less skilled or experienced teachers as highly skilled and experienced teachers may be more likely to effectively adapt a protocol to meet the individualized needs of students. Few studies have investigated the relation between treatment adherence and instructional quality (Vaughn et al., 2015; Capin et al., 2021). However, these findings that novice teachers may need to implement EBPs with higher levels of fidelity provide empirical support for measuring PSTs' fidelity of implementation when implementing reading interventions as their fidelity may be particularly important due to their status as novice teachers.

In addition to the importance of higher fidelity for less experienced and skilled teachers, such as PSTs, higher fidelity of implementation may be more critical for specific groups of students. Previous studies have found the impact of fidelity of implementation is moderated by students' initial performance levels (Boardman et al., 2016; Hamre et al., 2010; Neugebauer et al., 2017; Odom et al., 2010), such that students with lower initial levels of performance required higher levels of fidelity to make strong gains. In the aforementioned review, Durlak and DuPre (2008) examined factors influencing implementation and discussed implications regarding

subgroups of students. For example, one study included in the review, Felner et al. (2001), found that for students with social-emotional, behavioral, and academic difficulties, intermediate levels of implementation showed little or no benefit to students whereas high levels of implementation demonstrated substantial improvement. Within the context of language and literacy intervention, Odom and colleagues (2010) found a differential association between quality of implementation and low vocabulary pretest scores, indicating the effects of quality of implementation were stronger for students who demonstrated initially low standardized vocabularies. Thus, students identified as performing below expectations in reading at initial timepoints may require teachers who implement reading interventions with higher levels of fidelity.

Standards for Teacher Preparation

To produce highly skilled teachers of reading who possess the knowledge and skills needed to support students' needs and who can provide effective, evidence-based reading instruction with high levels of fidelity, the International Literacy Association (ILA; 2018) and Council for Exceptional Children (CEC; 2020) developed teacher preparation standards to define the expertise that teachers require. Within the Standards for the Preparation of Literacy Professionals (ILA, 2018) and Initial Special Education Preparation Standards (CEC, 2020), PSTs are expected to demonstrate knowledge of students' needs and implement instructional practices to support student learning. To elaborate, PSTs should be prepared to identify and implement evidence-based literacy instruction, such as that identified through Science of Reading initiatives, and evaluate and respond to student progress (Hikida et al., 2019). Furthermore, the National Comprehensive Center for Teaching Quality (TQ Center; 2007) stated that it should be of high priority for TPPs to integrate and emphasize evidence-based

instructional strategies as these strategies have been proven to be effective at improving student outcomes (Joshi et al., 2009).

Alignment of Current Practices and Standards

The National Reading Panel (NRP; 2000) also published a report describing that effective reading instruction can be distinguished as being explicit and systematic. Explicit instruction from a Science of Reading perspective is learner focused and includes presenting manageable tasks to students through modeling, feedback, faded supports, and practice opportunities (Vaughn & Fletcher, 2021). Reading instruction that is systematic is designed with an overall structure that is carefully planned and sequenced (Vaughn & Fletcher, 2021). These guiding principles of literacy instruction are reflected in CEC's Initial Preparation Standards that align with CEC's High Leverage Practices (HLPs) and describe how special education teachers provide explicit and intensive instruction to students with disabilities (McLeskey et al., 2017). Explicit instruction of foundational reading skills has been identified as an EBP and foundational component of executing the Science of Reading (Vaughn & Fletcher, 2021) as it has been associated with beneficial reading outcomes for students. Previous research has consistently demonstrated that explicit instruction in reading provided diverse groups of students with opportunities to become skilled readers (Blachman et al., 1999; Fletcher et al., 2019; Foorman et al., 2016; Torgesen et al., 2001). In addition to research and the teacher preparation standards that inform TPPs, federal law requires that teachers implement evidence-based reading interventions. Specifically, the ESSA (2015) reinforces the use of evidence-based interventions, and the IDEA (2004) mandates that teachers use programs and practices rooted in scientifically-based research to the greatest extent possible.

Despite that teacher preparation standards include the implementation of evidence-based reading instruction and federal law mandates use of these instructional practices, evidence suggests that reading programs used by elementary teachers are not established in scientifically-based research (Burns & Ysseldyke, 2009; Cook et al., 2013; Kretlow & Helf, 2013). The results of a national survey of kindergarten, first-, and second-grade teachers (n = 534) indicated that teachers often use curricula that do not have studies supporting their use and have not been evaluated for impact on student learning (Kretlow & Helf, 2013). Furthermore, few teachers in the national survey reported that they used resources from their undergraduate and graduate preparation programs. The authors offered several implications to change teacher practice, which include providing teachers with follow-up support when implementing newly learned content and strategies and training PSTs to value and evaluate evidence during their TPPs. The authors highlighted that providing follow-up support is critical to improve teacher fidelity of implementation of EBPs.

The lack of teacher implementation of EBPs in schools could be a result of TPPs that do not adequately prepare PSTs to implement EBPs with fidelity (Maheady et al., 2013). PSTs may not receive instruction and opportunities to engage in implementing EBPs with feedback during their preparation programs (Begeny & Martens, 2006; Brownell et al., 2020; Cornelius & Nagro, 2014; Hudson et al., 2021; Schles & Robertson, 2019; Sindelar et al., 2010). Also, PSTs often are not taught how to generalize skills learned in their programs to their future teaching contexts because they might have limited opportunities to apply knowledge and skills learned in authentic contexts (Markelz et al., 2017; Scheeler et al., 2009). Ensuring that PSTs have early opportunities to engage in implementing EBPs with fidelity during their initial teacher

preparation is critical given evidence showing minimal use of EBPs by inservice teachers in the classroom (Kretlow & Helf, 2013).

Teacher Preparation Programs

High-quality TPPs are positioned to impact teachers' use of EBPs and students' reading achievement by preparing PSTs with the knowledge and skills needed to implement explicit and systematic instruction of foundational reading skills (Al Otaiba et al., 2010; Moats, 2009). TPPs can also prepare teachers with an understanding of the Science of Reading including knowledge of reading skills, reading development across time, and best practices for instruction of reading skills (DeWalt & Hink, 2009; Hudson et al., 2021; Petscher er al., 2020; Rayner et al., 2001).

Previous research has indicated that TPPs can be effective at increasing teachers' knowledge of the Science of Reading and foundational reading skills, which includes PSTs' understanding of explicit instruction (Hudson et al., 2021). However, PSTs may have difficulty transferring content knowledge learned into practice (Gormely & Ruhl, 2007; Hudson et al., 2021), because TPPs do not frequently offer opportunities to apply learned knowledge and skills with frequent, ongoing training under expert guidance (Hindman et al., 2020; Hudson et al., 2021). Moreover, research has indicated that PSTs often do not possess the knowledge and skills to implement EBPs within MTSS (Brownell et al., 2010; Leko et al., 2015). To increase and improve teachers' use of EBPs in the field, TPPs can evaluate the emphasis placed on using an evidence-based approach when PSTs are learning how to teach reading (Al Otaiba et al., 2010). TPPs may also focus efforts on supporting PST implementation of EBPs to help teachers transfer learned knowledge to decisions about instructional planning and assessment (Englert et al., 2020).

Developing effective teachers of reading with the knowledge and skills to implement EBPs begins with examining outcomes of high-quality TPPs (Hikida et al., 2019; Hudson et al., 2021; ILA & NCTE, 2017; Kennedy et al., 2015; McCutchen et al., 2002; Risko & Reid, 2019; Risko et al., 2008; Spear-Swerling, 2009). Identified outcomes of high-quality TPPs include the (a) impact on teachers' knowledge and instructional quality, (b) impact on teachers' beliefs, (c) impact on generalization and maintenance, and (d) impact on student outcomes. Specific to generalization of teaching techniques learned during TPPs, key factors that promote generalization include (a) immediate feedback to increase skill acquisition, (b) training to mastery criterion to promote maintenance, (c) programming for generalization, and (d) providing feedback to PSTs in authentic classroom contexts (Scheeler, 2008). Teacher educators can consider how these outcomes can inform PSTs' preparation experiences with focused attention on the need for support and practice opportunities where PSTs can implement what they are learning in university classrooms in the field, perhaps via clinical experiences.

Clinical Experiences

Extensive clinical experiences in which PSTs have opportunities to work with diverse student learners in various settings are widely recommended as a feature of high-quality TPPs (Putman & Walsh, 2021; Tortorelli et al., 2021; TQ Center, 2007). Clinical experiences should be integrated early within TPPs and include supervised practice with sustained support (Birman et al., 2000; Garet et al., 2001; Putman & Walsh, 2021; TQ Center, 2007). These characteristics of high-quality clinical experiences are a most critical component of initial TPPs.

Clinical experiences occur through a continuum of placements including tutoring, early clinical experiences, and student teaching. First, tutoring experiences typically consist of one-on-one instruction that supplements classroom teaching (Elbaum et al., 2000) in which PSTs

connect their coursework with application of knowledge and skills (Haverback & Parault, 2008). Early clinical experiences can differ from tutoring in that PSTs may work alongside a mentor teacher in a classroom. In early clinical experiences, PSTs often receive limited support from university supervisors and mentor teachers (Prater & Sileo, 2004). However, researchers have identified the most important factor for gaining knowledge in how to teach reading as the support of and role served by the mentor teacher (Leko & Brownell, 2011). Last, student teaching is the final clinical requirement of TPPs where PSTs engage in frequent teaching with more freedom over instructional practices.

Providing PSTs with opportunities to engage in and progress through various high-quality clinical experiences with opportunities for feedback has been identified as a feature of high-quality TPPs (Brownell et al., 2020; Cornelius & Nagro, 2014; Hudson et al., 2021; Schles & Robertson, 2019; Sindelar et al., 2010) and supports generalization of skills from preparation programs to classroom contexts (Scheeler, 2008). Inclusion of clinical experiences during TPPs is explicitly stated in CEC's Initial Special Education Preparation Standards (2020), and the Standards for the Preparation of Literacy Professionals (ILA, 2018) encourages opportunities for elementary education teachers to facilitate literacy-rich environments when implementing reading instruction. During these clinical experiences, PSTs typically have opportunities to develop lessons, support student behavior, engage with materials, and deliver instruction. When PSTs have opportunities to implement these skills and apply their knowledge in authentic contexts, they practice implementing knowledge learned during coursework and effective pedagogies to enact the content learned (Darling-Hammond & Oakes, 2019). Incorporating clinical experiences with opportunities to practice newly learned skills has been identified as a critical component of TPPs to support PSTs in applying content and skills learned during

coursework (Brownell at al., 2020; Brownell et al., 2005; Guyton &McIntyre, 1990; Sindelar et al., 2010). Moreover, research has indicated that PSTs who graduate from programs that incorporate carefully sequenced and designed clinical experiences are more likely to contribute to student learning, demonstrate improved perceptions of their preparedness to teach, and be perceived as more effective teachers by supervisors (Boyd et al., 2009; Darling-Hammond & Bransford, 2005; Nougaret et al., 2005). Studies have shown that high-quality clinical experiences during TPPs can also influence PSTs' beliefs about their ability to meet diverse students' needs and their pedagogical knowledge (Hikida et al., 2019; Knackstedt et al., 2018; Risko et al., 2008; Totorelli et al., 2021).

The context in which clinical experiences occur undergirds the positive research findings on improved PST outcomes. The situated learning perspective delineates that remembering, learning, and understanding most often occur within relevant context (Bell et al., 2013; Brown et al., 1989; Lave & Wenger, 1991; McLellan, 1996). Lave and Wenger (1991) highlighted that learning is situated within everyday practice, which includes understanding to whom, when, and where instruction occurs. The situated learning perspective is relevant theory supporting that effective clinical experiences provide PSTs with opportunities to remember, learn, and understand content and skills learned in authentic contexts. Specific to the context of teaching foundational reading skills, clinical experiences situated within authentic contexts (e.g., working with real students) have improved PSTs' literacy knowledge including PSTs' knowledge of reading development, instructional practices to teach specific reading skills, and delivery of reading instruction informed by student assessment data (Tortorelli et al., 2021). To maximize these benefits of improved PST knowledge resulting from participation in clinical experiences

positioned in relevant contexts, high-quality feedback and support should be provided (Tortorelli et al., 2021).

Follow-up Support During Clinical Experiences. To adequately support PSTs during clinical experiences applying knowledge and implementing skills learned, teacher educators can carefully sequence and closely monitor clinical experiences (Grossman & McDonald, 2008; Leko et al., 2015), perhaps by providing specific feedback in their roles as experts or qualified professionals. Feedback is imperative for PSTs' development of teaching skills. PSTs develop effective performance as a teacher over time when they receive performance feedback while engaged in deliberate practice (Leko et al., 2015). Likewise, research has indicated that novice teachers' instructional techniques and student learning have improved when feedback on implementing evidence-based reading interventions has been focused on fidelity of implementation (Quinn & Kim, 2017).

Performance Feedback. One way to provide follow-up support to PSTs and improve their fidelity of implementation is through performance feedback from expert professionals when PSTs are implementing evidence-based instructional strategies (Cornelius & Nagro, 2014; Schles & Robertson, 2019). Performance feedback has been identified as an EBP when feedback is focused on increasing fidelity of implementation of instructional practices (Cornelius & Nagro, 2014; Fallon et al., 2015). When providing feedback on fidelity of implementation, it is essential that expert professionals provide teachers with ongoing support; without ongoing support that substantially improves teachers' ability to implement a practice as it was intended, fidelity levels are likely to remain low (DiGennaro et al., 2007).

Providing PSTs with effective feedback and support during their clinical experiences can impact their success at improving student outcomes. For example, Boyd and colleagues (2009)

found that oversight during student teaching experiences was positively associated with student achievement gains in the first year as teachers. Furthermore, TPPs that include training along with expert guidance have demonstrated the largest impact on improving teacher knowledge (Hudson et al., 2021). Therefore, TPPs that include opportunities for training and scaffolded support during clinical experiences can improve teachers' knowledge and may subsequently impact student reading outcomes (Ehri & Flugman, 2018; Hudson et al., 2021; McCutchen et al., 2002, 2009).

Although research demonstrates positive outcomes for both students and PSTs when PSTs receive performance feedback, the provision of scaffolded and adequate follow-up support during clinical experiences is oftentimes absent in teacher preparation (Scheeler et al., 2009), and clinical experiences that are closely monitored with opportunities for feedback for PSTs are not the norm in general or special education TPPs (Grossman et al., 2009; Grossman & McDonald, 2008). PSTs often have minimal opportunities for practice and feedback during their preparation programs (Leko et al., 2015). Additionally, PSTs may rely on cooperating teachers for the majority of feedback during limited student teaching experience (Grossman & McDonald, 2008) compared to support and feedback delivered through carefully sequenced and designed school and university partnerships (Darling-Hammond, 2014). To improve the quality of clinical experience opportunities in TPPs, Brownell and colleagues (2020) identified performance feedback as an essential component of coaching and a pedagogical strategy to enhance teacher education and PSTs' implementation of EBPs.

Coaching

Coaching has been identified as an alternative form of professional development that facilitates opportunities for performance feedback. Kretlow & Bartholomew (2010) identified

coaching as when an expert provides individualized, follow-up support to a teacher who has previously participated in initial training. Experts include those with the knowledge and skills to provide feedback to preservice or inservice teachers on a newly learned skill or practice. Coaches as expert professionals can provide ongoing, effective feedback to PSTs, and oftentimes this feedback is focused on their fidelity of implementation of EBPs (Kretlow & Bartholomew, 2010; Kraft et al., 2018).

In a comprehensive literature review, Kretlow and Bartholomew (2010) identified critical elements for coaching to be effective at improving PSTs' fidelity of implementation of EBPs. These critical components include (a) high-quality training that simulates instruction with feedback, (b) multiple opportunities to practice the newly learned skills with real students, and (c) individualized feedback with observations and modeling. Furthermore, the authors explained that coaching is a promising practice to promote generalization of high fidelity of implementation of EBPs from clinical experiences to classroom contexts. In addition, the authors proposed that coaching was not a time or cost-intensive support as there were substantial improvements in instructional quality after few coaching sessions, and previous research has indicated that improving teachers' fidelity can take years of intensive support if effective, ongoing feedback is not provided initially (Buzhardt et al., 2007).

Adult Learning Theory

To shape coaching interactions and experiences, the core principles of adult learning theory can be applied as PSTs are adult learners. Adult learning theory was introduced by Malcolm Knowles in the 1970s (Knowles, 1980). Knowles used the popular term "andragogy" to refer to the assumptions or principles about how adult learners learn (Knowles, 1984). When providing coaching support to adult learners, a critical element of the coaching relationship is

facilitating unique adult learning experiences by applying six assumptions or principles of adult learners. These six assumptions are established based on the theory of andragogy that asserts that adult learners should be taught differently than children because their learning processes are unique (Knowles et al., 2005). These assumptions can be applied to inform coaching interactions of PSTs in their transition from childhood to adulthood:

(1) Self-concept: Adult learners' self-concept transitions from a dependent personality toward self-directed learning.

(2) Experience: Adult learners use their previous experiences as resources for learning.

(3) Readiness to learn: Adult learners' readiness to learn becomes more oriented to the developmental task and their social role. Adult learners' readiness to learn depends on the relevancy of a task.

(4) Orientation to learn: Adult learners transition from postponed application of knowledge to immediate application of knowledge.

(5) Motivation to learn: Adult learners feel pressure from external events but experience internal motivation to learn through a desire to achieve goals.

(6) The need to know: Adult learners need to find the task valuable to invest time in learning.

For coaching to be a significant and meaningful support for adult learners, such as PSTs, it should align with these assumptions of adult learners. For example, coaches can consider the range of backgrounds and experiences adults learners have and use this context to inform the support provided within PSTs' current learning experiences. Additionally, adult learners are ready to immediately apply practical knowledge and skills learned; therefore, they should have opportunities to demonstrate their new knowledge and skills in close approximation to when they

have been provided with content or feedback. These assumptions of adult learners can be applied during various types of coaching support and to inform coaching interactions between coaches and PSTs.

Supervisory and Side-by-Side Coaching

There are two dominant forms of coaching identified in the literature: supervisory coaching and side-by-side coaching (Kretlow & Bartholomew, 2010). Supervisory coaching, the less intensive form of coaching, is one method of follow-up support in which an expert provides feedback to PSTs after completing an observation of their implementation of a newly learned skill or practice. Research has indicated that supervisory coaching after initial training can improve preservice and inservice teachers' skills and fidelity when implementing a reading intervention (Brownell et al., 2017; Jager et al., 2002; Lignuaris-Kraft & Marchand-Martella, 1993; Menzies et al., 2008; Morgan et al., 1994; Powell et al., 2010; Zakierski & Siegel, 2010).

Side-by-side coaching is a more intensive form of coaching in which an expert provides in-vivo coaching related to accuracy of specific behaviors during teachers' implementation of newly learned practices. Research has indicated that side-by-side coaching also improved teachers' instruction and fidelity of implementation during reading (Gettinger & Stoiber, 2016; Quick et al., 2009, Sailors & Price, 2010; Tschannen-Moran & McMaster, 2009; Varghese et al., 2021). There is limited research on the effects of side-by-side coaching on PST fidelity of implementation during reading instruction; however, studies have examined the impact of immediate performance feedback via technology during reading instruction and have shown positive effects on increasing teachers' instructional behaviors (Scheeler & Lee, 2002; Scheeler et al., 2012). Side-by-side coaching also has improved PSTs' fidelity of implementation of EBPs in contexts outside of reading. For example, Maheady and colleagues (2004) found that PSTs

were able to implement class-wide peer tutoring during spelling instruction with high levels of fidelity after training and minimal in-class assistance with feedback (Maheady et al., 2004).

Multilevel Coaching

Supervisory and side-by-side coaching are both coaching models that include delivering performance feedback to learners and are effective at increasing teachers' fidelity of implementation and improving implementation of newly learned practices (Brownell et al., 2017; Gettinger & Stoiber, 2016; Jager et al., 2002; Lignuaris-Kraft & Marchand-Martella, 1993; McMaster, 2009; Menzies et al., 2008; Morgan et al., 1994; Powell et al., 2010; Quick et al., 2009, Sailors & Price, 2010; Tschannen-Moran & McMaster, 2009; Varghese et al., 2021; Zakierski & Siegel, 2010). Therefore, coaching can serve an important role in facilitating learners' progress toward sustained implementation of EBPs. However, teachers have varying instructional needs and background experiences, and all teachers may not require the same intensity of coaching support (Bursuck et al., 2004; Goodnight et al., 2020). Coaches can consider how scaffolded, individualized coaching can support PSTs in improving PST implementation of EBPs with fidelity.

Advancing PSTs' learning with scaffolded guidance and mediation is reflective of supporting adult learners who connect to prior experiences and knowledge and Vygotsky's theory of providing support within PSTs' zone of proximal development. The zone of proximal development has been defined as the difference between actual development independent of guidance and mediation and potential development achieved with guidance from and collaboration with those with the knowledge and capability to provide assistance (Vygotsky, 1978). The zone of proximal development can be applied within TPPs to inform the level of guidance and feedback provided to PSTs based on their actual and potential levels of

development (Warford, 2011). Actual levels of development are PSTs' current performance and what they can do without assistance or mediation. The potential level of development is PSTs' future performance and what PSTs could do if provided with appropriate scaffolded support. Within TPPs, teacher educators can continually adjust the level of scaffolded support in response to PSTs' performance, which engenders independent, future application and problem solving (Englert et al., 2020; Warford, 2011). Providing PSTs who are novice learners with guided educational experiences also encourages and advances their individual learning (Berk & Winsler, 1995).

Multilevel Coaching Framework. To address teachers' differential needs and experiences and provide individualized guidance, multilevel coaching is a responsive, tiered framework in which observations of teachers inform movement among levels of coaching support (Wood et al., 2016). The levels of support increase in intensity across tiers and often include (a) high-quality training or professional development, (b) follow-up supervisory coaching, and (c) side-by-side coaching for teachers who require more intensive support (Wood et al., 2016).

Multilevel coaching as a multi-tiered support system modeled after a MTSS framework has been suggested as a behavioral approach to coaching to facilitate the transfer of knowledge to practice (Freeman et al., 2017). This approach is derived from behavioral theory, which is based on three foundational concepts: (a) behavior is learned, (b) behavior is caused by the environmental events and is predictable, and (c) behavior can be modified by altering environmental conditions (Skinner, 1953). These three foundational concepts are critical components of MTSS coaching as they identify actionable coaching steps (e.g., understanding and arranging environmental conditions) that can facilitate accurate and sustained use of EBPs.

Freeman and colleagues (2017) list critical coaching functions based on behavioral theory, which include promoting and monitoring fidelity of implementation as well as delivering prompts and reinforcement. Empirical evidence supports multilevel coaching to facilitate implementation of evidence-based interventions during reading (Bursuck et al., 2004; Goodnight et al., 2020), and there is some research on multilevel coaching during reading to support inservice teachers' use of instructional practices (Bursuck et al., 2004; Goodnight et al., 2020; Hsieh et al., 2009; Schnorr, 2013). However, few studies have reported on the effects of multilevel or MTSS coaching on inservice teachers' fidelity (Stormont & Reinke, 2014), and none have examined the effects on PSTs' fidelity when implementing evidence-based reading interventions. Future research is needed to examine the impact of tiered coaching support on PSTs' fidelity of implementation of newly learned practices. In the present dissertation, PSTs participated in an early, coursework-aligned, embedded reading tutoring clinical experience with coaching support focused on PSTs' fidelity of implementation.

Study Purpose and Research Questions

TPPs serve a pivotal role in preparing PSTs to be effective teachers of reading (Brownell et al., 2020; Hikida et al., 2019; Hudson et al. 2021; Kennedy et al., 2015; McCutchen et al., 2002; Risko & Reid, 2019; Risko et al., 2008; Spear-Swerling, 2009). Providing PSTs with authentic clinical experiences guided by feedback from expert professionals can build PST knowledge and skills to implement EBPs informed by the Science of Reading with fidelity (Brownell et al., 2005, 2020; Darling-Hammond, 2014; Hudson et al., 2021; Kretlow & Bartholomew, 2010; Tortorelli et al., 2021). Given that PSTs may implement EBPs with various levels of fidelity, a multilevel approach to coaching could be a responsive way to support PSTs and provide meaningful feedback based on their respective needs and experiences (Bursuck et

al., 2004; Dawkins et al., 2009a, 2009b; Goodnight et al., 2020; Knowles, 1980; Schnorr, 2013; Vygotsky, 1978; Wood et al., 2016). Therefore, the purpose of this study was to examine the effects of multilevel coaching on PSTs' fidelity of implementation (i.e., adherence and instructional quality) of an evidence-based reading intervention. Additionally, this study examined PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention. The research questions were:

1. What are the effects of multilevel coaching support on PSTs' fidelity of implementation of an evidence-based reading intervention?
2. What are PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention?

Significance of the Study

This study contributes to the limited evidence base on ways in which TPPs can prepare PSTs to implement EBPs to teach reading during clinical experiences and the impact of sustained and responsive feedback delivered through multilevel coaching on PSTs' fidelity of implementation (Boyd et al., 2009; Brownell et al., 2020; Bursuck et al., 2004; Durlak & DuPre, 2008; Kretlow & Bartholomew, 2010; Sindelar et al., 2010; Goodnight et al., 2020). This study also contributes to gaps in the literature on preparing elementary education PSTs to implement Tier 2, evidence-based reading interventions with fidelity (Hazelkorn et al., 2010). In this study, I implemented a multilevel coaching intervention (i.e., training, supervisory coaching, and side-by-side coaching) to provide feedback to PSTs on their fidelity of implementation of an EBP in reading. To extend previous literature, this study was the first known study to use multilevel coaching to support PSTs' implementation of an evidence-based reading intervention with

students identified as in need of additional reading support. This study also contributes to knowledge about the impact of coaching support on PSTs' fidelity of implementation of an EBP.

Delimitations/Limitations

There are several limitations to consider in this study. First, in this study, I did not include measures of student outcomes nor teachers' knowledge and beliefs. Studies have previously reported on the effects of improved novice teacher fidelity of implementation on student outcomes and teachers' knowledge and beliefs (Capin et al., 2021; Quinn & Kim, 2017; Vaughn et al., 2015), but only fidelity of implementation was measured in this study. This limits the findings to the effect of multilevel coaching on PSTs' fidelity of implementation.

Next, this study used a single-case design experimental methodology to examine the impact of multilevel coaching on six PSTs' fidelity of implementation. Single-case design studies allow for researchers to analyze the effects of an independent variable on individual responses. With this design, a functional relation between the independent variable and the dependent variable is established if prediction, verification, and replication are evident in the results. Even though results are replicated across participants, the generalizability of the results is limited due to the small number of participants who were included in the study.

Third, the EBP that PSTs implemented to provide students identified as in need of additional reading support was a Tier 2 intervention focused on developing students' early foundational reading skills (i.e., phonemic awareness and phonics). The effects of multilevel coaching on PSTs' fidelity of implementation is limited to EBPs in early foundational reading skills and the generalizability of the effects to EBPs in other content areas or contexts is limited from the results of this study.

The consideration of these limitations is important; however, this study establishes a foundation for the use of multilevel coaching with PSTs that researchers and teacher educators could implement and replicate with EBPs in other content areas and with PSTs from other disciplines (e.g., special education). Replication of this study would improve the generalizability of the findings and could lead to improved teacher and student outcomes.

Definitions of Terms

Coaching

Coaching is when an expert provides individualized, follow-up support to teachers after teachers have received initial training. Examples of experts include university faculty, supervisors, cooperating teachers, and skilled peers (Kretlow & Bartholomew, 2010).

Evidence-Based Practices (EBPs)

Evidence-based practices are activities, strategies, and interventions that have been shown by scientific research to reliably cause improved student outcomes (Cook et al., 2019; Cook & Odom, 2013).

Explicit Instruction

Explicit instruction is a systematic way of teaching that emphasizes small steps, checking for student understanding, and active participation in which all students are able to be successful. (Archer & Hughes, 2010; Rosenshine, 1987). Explicit instruction includes teacher modeling of new skills, guided and scaffolded practice with feedback, and independent practice with feedback and embedded review (Rupley et al., 2009).

Fidelity of Implementation

Fidelity of implementation is the extent to which an intervention or treatment was implemented as intended (Harn et al., 2013). Fidelity of implementation is also multidimensional and includes structural and process dimensions. Structural dimensions of fidelity are objective and include (a) program adherence, (b) time allocation, and (c) intervention completion (Durlak & DuPre, 2008; Gersten et al., 2005). Process dimensions of fidelity are more difficult to measure and include examining quality of intervention delivery and teacher-student interactions (Justice et al., 2008; O'Donnell, 2008).

Specific Learning Disability (SLD)

A specific learning disability is a "disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations" (IDEA, 2004).

Literacy

Literacy is the ability to read and write well (National Center on Improving Literacy, 2022).

Multilevel Coaching

Multilevel coaching is a process of coaching that includes high-quality training with follow-up support. Data-Based Decision-Making is used to inform movement among levels of support based on teacher responsiveness. Multilevel coaching is often combined with teachers' implementation of evidence-based practices to improve student outcomes (Wood et al., 2016).

Multi-Tiered System of Supports (MTSS)

Multi-Tiered System of Supports is a proactive and preventative framework that integrates and aligns instruction and data. The goal of MTSS is to collectively improve student outcomes by supporting students' social, emotional, and behavioral needs and maximizing student achievement. The four essential components to MTSS are (a) screening, (b) progress monitoring, (c) multilevel prevention system, and (d) data-based decisions. A multilevel prevention system is comprised of a continuum of supports (Tiers 1, 2, and 3) that are evidence-based and address students' academic, social, emotional, and behavioral needs (Center on Multi-Tiered System of Supports, 2022).

Performance Feedback

Performance feedback involves a brief meeting or interaction between an expert and teacher in which implementation of a practice is discussed or reviewed. The expert describes what is going well, areas of improvement, and strategies for improving implementation (Fallon et al., 2015).

Response to Intervention (RtI)

Response to Intervention is one example of a MTSS approach that integrates assessment and instruction to maximize student achievement. RtI is a model of early intervention services that includes (a) screening of academic problems, (b) progress monitoring of students' performance, and (c) increasingly intensive intervention based on students' response to the intervention (Vaughn & Fuchs, 2003).

Science of Reading

The Science of Reading is an accumulation of knowledge obtained through scientific research about reading, the development of reading, and the best practices for teaching reading. The Science of Reading allows educational stakeholders to make informed decisions to effectively promote literacy skills (Petscher et al., 2020).

Scientifically-Based Research

Scientifically-based research includes basic, applied, and evaluation research in which scientific principles inform the rationale, design, and interpretation of results (American Educational Research Association [AERA], 2008).

Side-by-Side Coaching

Side-by-side coaching often involves initial observations with feedback followed with model demonstrations by the coach and additional follow-up observations and consultative meetings (Kretlow & Bartholomew, 2010).

Simple View of Reading

The Simple View of Reading is a model that explains that for students to comprehend text, they need both decoding and language comprehension skills (Gough & Tunmer, 1986).

Supervisory Coaching

Supervisory coaching involves initial training followed by multiple observations of teacher implementation by a coach with consultative feedback meetings (Kretlow & Bartholomew, 2010).

CHAPTER 2: LITERATURE REVIEW

The persistent lack of improvement in students' reading achievement is a continuous national concern (Irwin et al., 2022; McFarland et al., 2017, 2019). Achievement data indicate the majority of students nationwide have been and continue to perform below a proficient level in reading (Irwin et al., 2022; McFarland et al., 2017, 2019). Reading outcomes for students with disabilities are worse as there is a pronounced disparity between the reading achievement of students identified with and without disabilities, and this gap persists over time (Cutting & Levine, 2010; Gilmour et al., 2019; McFarland et al., 2019; Morgan et al., 2011). Furthermore, the number of students who received special education services under IDEA (2004) increased from 13% to 14% of total public school enrollment from the 2009-2010 to 2019-2020 school year (Irwin et al., 2021). Among students receiving special education services, 33% of students are identified with SLD and 85% of students with SLD have a primary area of need in reading (Depaoli et al., 2015; McFarland et al., 2019).

To address the state of reading achievement, federal law mandates and reinforces that teachers implement scientifically- or evidence-based research practices within general and special education curriculum (ESSA, 2015; IDEA, 2004). EBPs are those that have been proven to be effective at improving student outcomes (Cook et al., 2019; Cook & Odom, 2013). Research has indicated that high-quality, evidence-based, explicit instruction of foundational literacy skills is key to support the diverse learning needs of students (Blachman et al., 1999; Castles et al., 2018; D'Angiulli et al., 2004; Gersten et al., 2020; Joshi et al., 2009; Torgeson et al., 2001). Therefore, provision of high-quality, evidence-based instruction in foundational literacy skills will substantially improve national reading outcomes (Castles et al., 2018; Joshi et al., 2009; Spear-Swerling, 2019; Vaughn et al., 2014).

When implementing EBPs in reading, it is important that novice teachers implement the practices with fidelity, or implement the practice as intended (Capin et al., 2022; Durlak & DuPre, 2008; Quinn & Kim, 2017; Vaughn et al., 2015). Generally, studies have reported that fidelity positively predicts student outcomes (Al Otaiba & Fuchs, 2006; Carroll et al., 2007; Durlak & DuPre, 2008; Kaderavek & Justice, 2010; Stein et al., 2008; Vaughn et al., 2015). High fidelity of implementation of EBPs may be even more critical for preservice or novice teachers as they are less skilled and experienced at making adaptations to curriculum protocols (Capin et al., 2022; Quinn & Kim, 2017). When experienced teachers with higher instructional quality make adaptations to interventions, fidelity scores can look worse; however, teachers with higher instructional quality have a strong understanding of instructional procedures and typically make adaptations that are more aligned to meet students' needs (Quinn & Kim, 2017).

For teachers to provide effective, evidence-based reading instruction that meets students' reading needs, teachers require an understanding of the Science of Reading including knowledge of reading skills, reading development, and best practices for teaching foundational reading skills (DeWalt & Hink, 2009; Hudson et al., 2021; Petscher et al., 2020; Rayner et al., 2001). Indeed, poor reading outcomes have often been attributed to teachers who may not have the necessary knowledge and skills to provide evidence-based reading instruction (Lyon & Wiese, 2009; Moats, 2009; Podhajski et al., 2009). Research has indicated that some teachers lack the content knowledge about the key components of reading (i.e., phonemic awareness, phonics, fluency, vocabulary, and comprehension), how the key components relate to reading development (Lyon & Wieser, 2009), and how to explicitly teach foundational reading skills (Brady & Moats, 1997; Moats & Foorman, 2003; Pittman et al., 2020; Spear-Swerling & Cheesman, 2012; Washburn et al., 2016). Additionally, observations of inservice teachers' classrooms have shown low levels of

academic engagement, little explicit instruction, and misalignment of instructional practices with student needs (Cunningham et al., 2009; Foorman et al., 2006; Kretlow & Bartholomew, 2010). Effective instruction is widely considered to incorporate EBPs; however, many teachers do not adequately implement these practices during reading instruction (Klingner et al., 2010; Maheady et al., 2013).

Although there are many potential reasons for knowledge gaps among educators in how to explicitly teach foundational reading skills, initial teacher preparation has been publicly critiqued for a lack of training and experience in delivering EBP in reading (Hanford, 2019; Hindman et al., 2020; Will, 2019). TPPs are often described as having gaps and inconsistencies in their preparation of PSTs to meet the diverse needs of their students in reading (Brownell et al., 2010). In addition, novice teachers have reported concerns with the lack of instruction provided during their TPPs on how to teach foundational reading skills (Meeks et al., 2020). Furthermore, novice teachers have demonstrated they feel unprepared for the realities faced in classrooms as beginning teachers (du Plessis et al., 2020), and principals have confirmed their ill-preparedness (du Plessis et al., 2020; Levine, 2006). Thus, strengthening instruction on EBPs in TPPs is one way to improve teachers' knowledge and skills related to EBPs (Binks-Cantrell et al., 2012; Greenberg et al., 2015; ILA, 2020; Joshi et al., 2009; Moats, 2014, 2020).

To better prepare teachers of reading during their TPPs, researchers have suggested components of high-quality TPPs include instruction on EBPs and the use of explicit instruction for students with or at-risk for disabilities in addition to opportunities to practice knowledge and skills learned during clinical experiences with extensive feedback and scaffolded support (Brownell et al., 2020; Cornelius & Nagro, 2014; Hudson et al., 2021; Schles & Robertson, 2019; Sindelar et al., 2010). Coaching has been identified as one method to strengthen follow-up

support and feedback for preservice and inservice teachers after learning and being trained on a new teaching strategy or practice to be used during reading instruction (Gettinger & Stoiber, 2016; Jager et al., 2002; Kraft et al., 2018; Kretlow et al., 2009; Lignuaris-Kraft & Marchand-Martella, 1993; Morgan et al., 1994; Schnorr, 2013). However, teachers may implement interventions with varying levels of accuracy, and they may not require the same levels of support (Goodnight et al., 2020; Hsieh et al., 2009); therefore, multilevel coaching is a framework of coaching that is responsive to teachers' strengths and needs when providing them with feedback on their implementation of EBPs (Wood et al., 2016). Research has indicated that multilevel coaching can support inservice teachers' implementation of EBPs, but there are currently no known studies of multilevel coaching to support PSTs' implementation of EBPs in reading. This dissertation study addresses this gap in the literature through implementation of a multilevel coaching intervention to determine the effect on PSTs' fidelity of implementation of an EBP in reading.

Figure 1 provides a visual depiction of the review of literature in this chapter. As highlighted within Figure 1, this review is organized into characteristics and outcomes of high-quality TPPs. To provide context, it may be particularly important for PSTs as novice learners to learn how to implement EBPs with high fidelity during high-quality TPPs. To improve PST and student outcomes, high-quality TPPs can integrate content on the knowledge and skills needed to implement EBPs with well-supported clinical experiences applying EBPs in reading.

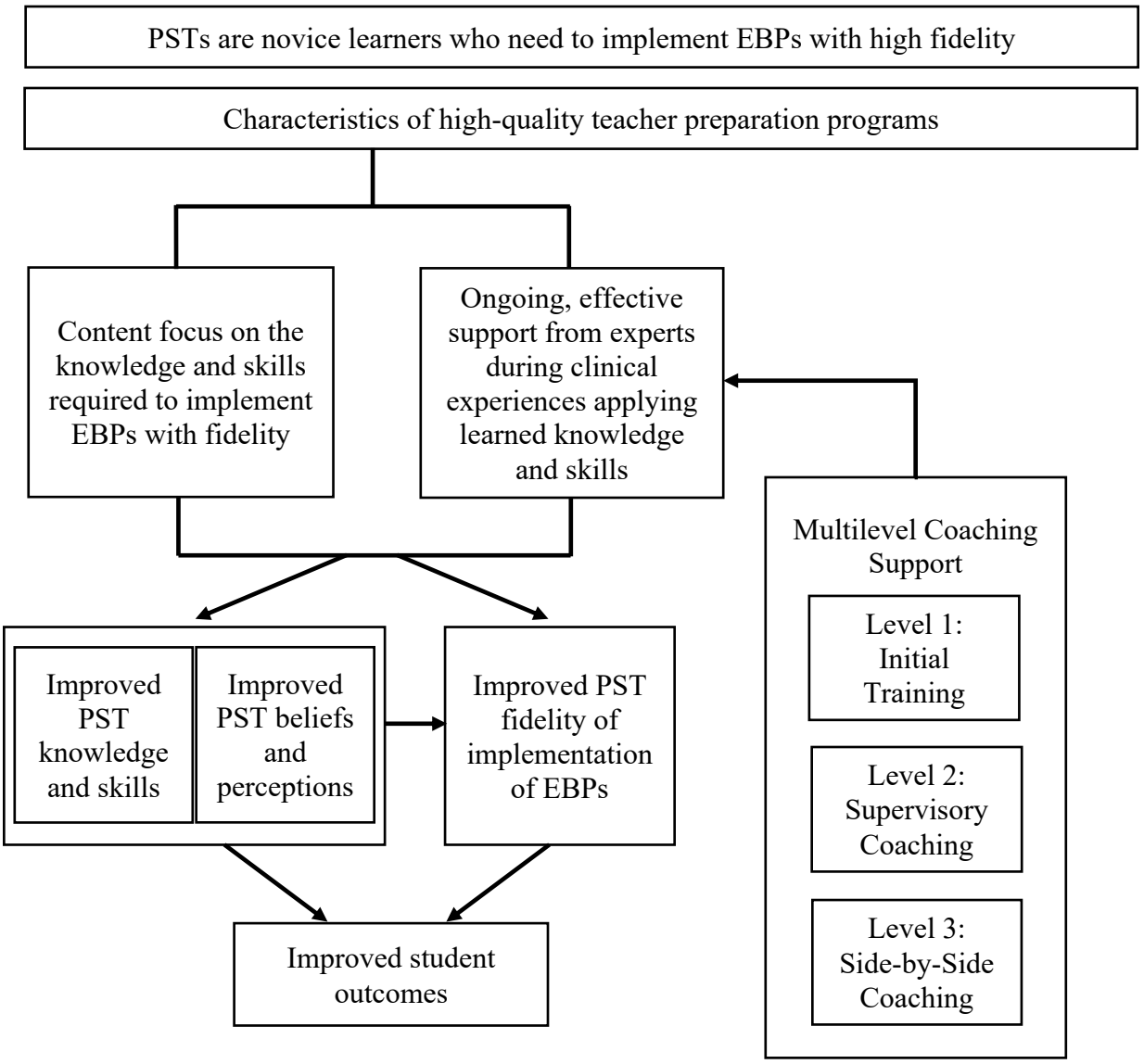


Figure 1. Logic Model.

Teacher Preparation Programs

For students to be skilled readers, they require highly skilled teachers who implement effective instruction (Boyd et al., 2009; NRP, 2000; Risko & Reid, 2019). TPPs scan serve a large role in developing highly skilled teachers of reading who are able to meet the needs of a diverse student population (Brownell et al., 2020; Brownell et al., 2005; Hudson et al., 2021; Risko & Reid, 2019; Sindelar et al., 2010; Valli & Rennert-Ariev, 2000). Professional organizations such as the ILA and National Council on Teacher Quality (NCTQ) also have highlighted that teachers of reading who had access to high-quality TPPs are most likely to have the greatest impact in their classrooms (Putman & Walsh, 2021; Rickenbrode, 2018). Risko and Reid (2019) echo this recommendation and conclude that all students are entitled to teachers who are products of TPPs centered on practices that demonstrate effectiveness and sustainability of teacher learning.

Components of High-Quality Teacher Preparation Programs

To establish and recommend effective components of high-quality TPPs, researchers have reviewed and analyzed practices incorporated into TPPs that are effective at producing and sustaining teachers' knowledge. For example, Brownell et al. (2005) identified effective characteristics of TPPs preparing general education teachers and applied these characteristics to inform a conceptual framework used to analyze characteristics of special education TPPs. The characteristics identified from general education TPPs were (a) coherent program vision evident across coursework and field experiences; (b) deliberate incorporation of theory, disciplinary knowledge, pedagogical knowledge for specific subjects with practice linking coursework to classroom experience; (c) extensive, developmental clinical experiences integrated with coursework that are carefully supervised; (d) standards for quality teaching established among

faculty and used to monitor and support student progress; (e) active pedagogy to help students connect theory and practice; (f) focus on the needs of students with diverse learning needs; and (g) collaboration among PSTs, inservice teachers, and faculty from various disciplines that builds professional community. Commonalities between general and special education TPPs included well-planned and supervised clinical experiences, an emphasis on the importance of collaboration, and program evaluation.

Evidence-Based Practices. A critical component of high-quality TPPs is preparing PSTs to implement EBPs with students who require supplemental or intensive intervention (Barrio et al., 2015; Hazelkorn et al., 2010). EBPs are known to be effective at improving student outcomes (Cook et al., 2019; Cook & Odom, 2013) and federal law mandates and reinforces teachers' use of these practices (ESSA, 2015; IDEA, 2004). Practices have been identified as evidence-based through research conducted under specific conditions and settings and with particular groups of students (Odom, 2009). Research has also indicated that students who require reading support benefit from interventions provided within their general education classrooms, and this support could decrease the chances of students being identified as eligible for special education (Gersten et al., 2009). Unfortunately, general and special education teachers do not always implement EBPs in their classroom and when they do implement EBPs, they do not always implement them with fidelity (Kretlow & Helf, 2013; Maheady et al., 2013).

The lack of teacher implementation of EBPs could be a result of ineffective TPPs (Hindman et al., 2020; Maheady et al., 2013). During TPPs, PSTs might receive little instruction on and few opportunities implementing EBPs (Begeny & Martens, 2006; Scheeler et al., 2016). Oftentimes, PSTs receive coursework about EBPs, but they are not taught how to implement or generalize skills learned to their future teaching contexts (Scheeler et al., 2009). Preparing PSTs

to use EBPs is essential as teachers are likely to continue to use the same practices and techniques used during their first year as teachers throughout their teaching careers (Griffin & Kilgore, 1995; Rock et al., 2014; Scheeler et al., 2016). However, research has documented that PSTs may receive insufficient preparation to implement EBPs due to lack of exposure to EBPs and inadequate opportunities to implement EBPs which is necessary for maintenance and generalization of skills learned (Begeny & Martens, 2006; Burns & Ysseldyke, 2009; Hemmeter et al., 2008; Scheeler et al., 2016).

TPPs face several challenges related to preparing PSTs and increasing their use of EBPs. These challenges include (a) limited opportunities for PSTs to practice implementing EBPs in field experiences, (b) lack of reinforcement for implementing EBPs, (c) competing demands for novice teachers, (d) lack of instruction on how to maintain and generalize EBPs, (e) absence of an EBP culture in public schools, and (f) lack of expertise due to time constraints and applicability of preparation experiences to future classroom experience (Scheeler et al., 2016). To address the challenges faced by TPPs, Scheeler and colleagues (2016) recommended two ways in which TPPs can better prepare PSTs to implement, generalize, and maintain use of EBPs with fidelity in classrooms. These two recommendations are to improve teacher educator knowledge and skills related to EBPs and use effective and efficient instructional tools and practices to facilitate PSTs' learning through instruction and delivery of feedback. The authors recognized that knowledge unaccompanied by high-quality clinical experiences does not guarantee teacher implementation of instruction with fidelity. By incorporating clinical experiences, PSTs are exposed to more purposeful and explicit connections among their coursework, experiences, and classroom contexts. In a call to action, the authors concluded that PSTs cannot implement what they do not know how to do; therefore, there may be no issue more

important to teacher preparation than equipping PSTs with the knowledge and skills to implement EBPs with fidelity through coursework and clinical experiences.

Reading Teacher Preparation. Researchers also have reviewed and analyzed TPPs specific to preparing teachers of reading. Recently, the ILA and National Council of Teachers of English (NCTE; 2017) developed a research advisory that identified four critical quality indicators of TPPs that have evidence supporting the effectiveness of incorporating these indicators into coursework and field experiences. The four quality indicators included (a) content and pedagogy knowledge development, (b) opportunities for authentic practice, (c) engagement in critical reflection and learning communities, and (d) ongoing assessments.

The advisory panel elaborated to explain key features of each quality indicator that are associated with classroom instruction and outcomes. First, knowledge development included depth and breadth of content and pedagogy knowledge, coherent coursework aligned with field experiences, and culturally responsive instruction. Next, applying knowledge in authentic contexts included sustained engagement and explicit guidance, focused and varied field experiences (e.g., tutoring, small group instruction, whole-class instruction), and engagement with culturally diverse students and families. Third, continuous teacher development included engaging in carefully planned mentorship opportunities, analysis of social justice issues, and engagement in learning communities. Last, ongoing assessments in TPPs included assessments related to program admission, formative and summative progress monitoring, benchmark accomplishments, and assessment of teacher success within and beyond the TPP. These four quality indicators encompass defining features of evidence-based TPPs and are supported by substantial evidence associating these practices with advanced teacher learning and classroom performance.

Two of the task force members who coauthored the previously summarized research advisory elaborated on the four quality indicators by providing guiding questions to consider when designing and evaluating TPPs (Risko & Reid, 2019). These guiding questions are based on the characteristics of TPPs that are known to be effective at impacting teacher and student learning. The recommended guiding questions are related to (a) evidence of appropriate teacher retention rates, (b) sufficient and prolonged mentoring, (c) access to relevant content knowledge, (d) sufficient preparation to teach diverse students, and (e) meaningful and coherent integration of coursework with field experiences. The authors urged TPPs to integrate the identified practices and considerations into program design, to ensure high-quality programming.

Outcomes of High-Quality Teacher Preparation Programs

High-quality, well-constructed TPPs are those that incorporate the effective components or quality indicators of TPPs to produce highly skilled teachers (Risko & Reid, 2019). Highly skilled general and special education teachers are defined as those with the knowledge, skills, and dispositions to engage in various instructional procedures to support student learning (Brownell et al., 2011; Sindelar et al., 2010).

There are several outcomes of high-quality TPPs highlighted in the literature that are evidence of effective PSTs who successfully transition to their role as novice teachers in the field. These outcomes of TPPs include improved (a) knowledge and instructional quality, (b) beliefs or perceptions, (c) generalization and maintenance of effective instructional procedures, and (d) student outcomes. In addition to the role that TPPs play in developing effective teachers, there is evidence of interdependence among improved outcomes for teachers and students (Hikida et al., 2019; Hudson et al., 2021; ILA & NCTE, 2017; Kennedy et al., 2015; McCutchen et al., 2002; Risko & Reid, 2019; Risko et al., 2008; Spear-Swerling, 2009). For example,

providing supports for teachers can deepen teachers' knowledge of foundational reading skills, and teachers can subsequently use this knowledge to create change in the quality of classroom practices (McCutchen et al., 2002). This change in teacher knowledge and practice can improve student learning (McCutchen et al., 2002). Therefore, when TPPs incorporate recommended practices, programs are more likely to impact and sustain teacher learning and behaviors (ILA & NCTE, 2017; Risko & Reid, 2019). As a result, highly skilled general and special education teachers are more likely to positively impact student outcomes including students' reading achievement (Boyd et al., 2009; Hudson et al., 2021; Risko & Reid, 2019).

Impact on Teacher Knowledge and Instructional Quality. The ultimate goal of TPPs is to develop highly effective teachers who are likely to impact student outcomes. To do so, TPPs can prepare effective teachers with the content and pedagogical knowledge required to teach reading and promote equitable educational experiences for students (ILA, 2019; Moats, 2009). Teachers are expected to draw upon this knowledge to inform their decision-making and instructional practices (Risko & Reid, 2019).

To guide how to teach reading, teachers require knowledge of the Science of Reading which includes knowledge of reading, reading development, and evidence-based instructional practices (Petscher et al., 2020). Hudson et al. (2021) reviewed 20 empirical studies on how teacher preparation and training programs prepare elementary teachers with knowledge of the Science of Reading and the impact on teachers' knowledge and student outcomes in reading. The review focused specifically on how teachers are prepared to teach foundational literacy skills including phonological awareness, phonics, and morphological awareness. The authors found that all studies had small to large positive effects on teachers' knowledge in at least one of the foundational literacy skills. They concluded these effects are indicative of how extensive training

and scaffolded support through TPPs can improve teachers' knowledge of foundational literacy skills. Moreover, preliminary evidence suggested a relation between improved teacher knowledge and improved student word-level outcomes, with large effects on immediate posttests. Additionally, the authors identified characteristics of programs that improved teacher knowledge. The most impactful characteristic included providing teachers with opportunities to apply their knowledge and skills during targeted, ongoing training with expert guidance.

In another review of studies from 2000–2018 that focused on TPP and teacher preparedness, Hikida et al. (2019) identified 38 articles with 13 focused on teaching reading to students with disabilities. Five focus areas were derived from the findings of this review including (a) definitions of reading processes in the literature, (b) PST beliefs about teaching reading, (c) PST knowledge gaps about reading process, (d) improved PST knowledge of reading processes, and (e) application of knowledge of reading processes through practice. The authors elaborated on the findings from their review that led to each of the identified focus areas on how and what PSTs are taught about teaching reading processes. Importantly, participating in tutoring experiences offered promising insights for PSTs because they seemed to develop their knowledge of reading process through their application of knowledge. However, one study found that PSTs implemented effective reading instruction to varying degrees, and as hypothesized, PSTs who were further along in their TPP implemented reading instruction to a higher degree (Dawkins et al., 2009a, 2009b). In addition to improved knowledge, PSTs had improved perceptions about their own preparedness to teach reading when they participated in reading methods courses centered on meeting the reading needs of students and when they were prepared by TPPs focused on field or tutoring experiences compared to lecture models.

In addition to the role that TPPs serve in increasing teacher knowledge, high-quality TPPs also can impact teachers' instructional quality or teaching behaviors (Moats, 2009). A deep understanding of content knowledge is important due to promising relations between teachers' content knowledge and application of knowledge (ILA & NCTE, 2017; Kennedy et al., 2015; McCutchen et al., 2002; Risko & Reid, 2019; Risko et al., 2008; Spear-Swerling, 2009). For example, in a review of 82 studies on the effectiveness of teacher preparation for reading teachers, Risko et al. (2008) examined how TPPs influence PSTs' knowledge, practices, and beliefs. The authors engaged in an inductive paradigmatic analysis process to examine characteristics within studies and form networks among identified concepts. The results indicated that when teachers are involved in professional development with active participation or "learning by doing," TPPs produce teachers with improved knowledge, beliefs, and practices than TPPs that solely emphasize knowledge and beliefs. Additionally, the authors identified components of TPPs that benefit PSTs' application of pedagogical knowledge. These components included explicit instructions and examples, demonstrations of practices, and opportunities for engaging in field or practicum experiences with guided practice of applying teaching strategies with students.

More recently, Brownell and colleagues (2020) analyzed 49 studies on teacher preparation research from 2010 to 2019 and suggested that teacher education research has made advancements in what is known about effective pedagogical approaches to increase teacher knowledge, skills, and beliefs. These findings were organized into five categories related to research gaps identified by Sindelar and colleagues (2010). Two effective approaches the authors identified were coaching and multi-component professional development models that prepare teachers with knowledge and support them to implement EBPs. Contrasting findings from other

studies that teacher knowledge influences instructional practices, Brownell at al. (2020) concluded that it is unclear as to how changes in knowledge and beliefs influence instructional practices (Kennedy et al., 2015; McCutchen et al., 2002; Risko et al., 2008; Spear-Swerling, 2009).

Similarly, in a study on the impact of coaching on teachers' instructional practices, Neuman and Cunningham (2009) found statistically significant improvements in teachers' literacy instructional practices. However, there were no significant differences in teacher knowledge between groups of teachers who did and did not receive coaching. These contradictory findings indicate that more research is needed to determine the relation between teachers' knowledge and instructional practices and subsequent student outcomes. Other researchers have suggested one reason for a disconnect between translating knowledge and skills learned into practice is that provided support is not always focused on implementation (Englert et al., 2020; Gormley & Ruhl, 2007). Therefore, follow-up support, or coaching, during implementation of knowledge and skills learned might support teachers in more effectively translating their knowledge to practice.

Impact on Teacher Beliefs and Perceptions. TPPs also can impact PSTs' beliefs related to reading instruction and their confidence as future teachers. Two ways that TPPs can impact PSTs' beliefs are through specially designed coursework and field experiences (Hikida et al., 2019; Knackstedt et al., 2018). In a survey study of 577 secondary special education teachers, Knackstedt and colleagues (2018) found that teachers reported feeling satisfied with their TPP and prepared to meet the needs of their students if they had taken a course specifically designed to meet the diverse needs of students in reading. Teachers also reported feeling more prepared

when taught via field or tutoring experience models compared to lecture models during their TPPs.

Experiences applying knowledge and skills learned oftentimes include some form of feedback. Papineau (2017) explored the relationship between literacy coaching and teachers' perceived knowledge and confidence levels for teaching reading to students with disabilities. One hundred sixteen special education teachers, 65 whom received literacy coaching, participated in a survey about their perceived literacy knowledge and confidence. Participants who received literacy coaching perceived themselves as more knowledgeable and confident in effective literacy practices than those how did not receive literacy coaching. The author recommends that schools employ literacy coaching to build teachers' knowledge and confidence to teach reading, especially for less-experienced teachers who demonstrated lower levels of perceived knowledge and confidence.

To support teacher educators to better understand how to influence PSTs' beliefs and the impact on PSTs' future practice, Thomas (2013) outlined eight recommendations: (a) engage in self-reflection as teacher educators, (b) engage PSTs in self-reflection, (c) facilitate cognitive dissonance, (d) provide well-scaffolded field experiences, (e) support PSTs' development of professional skills, (f) establish a professional learning community for PSTs to use as a support as novice teachers, (g) promote membership to professional organizations, and (h) prepare PSTs to collect and analyze data. To highlight one recommendation common among research on TPPs, providing field experiences provides PSTs with authentic and situated practice with implementation of EBPs which contributes to their understanding of theory and practice and can impact their beliefs (Hikida et al., 2019; Knackstedt et al., 2018). The authors emphasized that TPPs should offer classes aligned with these recommendations to PSTs in other disciplines (e.g.,

special education TPPs offering classes to general education PSTs) to influence the beliefs of teachers working with students with identified needs (Harvey et al., 2010; Maloch et al., 2003; Thomas, 2013).

Impact on Generalization and Maintenance. There is a dearth of literature on how TPPs prepare PSTs to generalize and maintain teaching practices learned during their preparation programs to the classroom context (Scheeler, 2008). Due to this lack of evidence, Scheeler (2008) synthesized broader research on generalization and maintenance to inform recommendations for programming generalization and maintenance into TPPs (Han & Weiss, 2005; Robinson & Swanton, 1980; Rose & Church, 1998). Four factors emerged to inform a sequential model on how to promote generalization and maintenance of teaching practices in TPPs. These factors were (a) delivering immediate feedback to promote acquisition of newly learned skills; (b) training to mastery; (c) programming for generalization (e.g., programming common stimuli, training sufficient exemplars); and (d) providing performance feedback in authentic, classroom contexts. Scheeler (2008) also found that generalization and maintenance of teaching practices declined when PSTs implemented newly learned skills. However, when PSTs received performance feedback, they continued to implement learned teaching practices even after feedback was faded. Therefore, providing performance feedback as a support for PSTs may be critical for generalization and maintenance of teaching skills.

In two experimental studies, Scheeler and colleagues (2009) used multiple baseline across participants designs to investigate the effects of three of the components of the aforementioned model for promoting generalization and maintenance of effective teaching skills. In the first experiment, three PSTs received the first two components of the generalization and maintenance model: immediate feedback and training to mastery criteria. During intervention,

PSTs were observed one or two times per week across 12 weeks during 20–30 min teaching sessions. Research assistants provided feedback to PSTs on their completion of three-term contingency (TTC) trials via bug-in-ear (BIE) technology during the teaching observations. PSTs were trained to implement TTC trials during teaching sessions which consisted of presentation from the teacher, student response, and feedback to the student. When PSTs met criteria for mastery (i.e., 90% completion of TTC trials over three consecutive sessions), feedback was gradually shortened and faded. Maintenance data were collected the following semester during PSTs' student teaching experience. PSTs videorecorded 20–30 min lessons over the course of student teaching to determine if the effects of performance feedback were maintained. The results indicated that although PSTs increased their use of the evidence-based teaching skills during intervention, their maintenance of performance worsened from practicum to student teaching.

In a second experiment by Scheeler et al. (2009), two new PSTs participated in similar training and intervention on implementing TTC trials and received feedback via BIE technology. During intervention, PSTs were observed one to two times per week across 14 weeks of student teaching. A third component, programming common stimuli, was introduced in the maintenance phase, which occurred the following year in the teachers' own classrooms. This additional component included bringing salient elements of the training and intervention into teachers' current classrooms (e.g., arranging the environment to evoke learned behaviors). At the conclusion of intervention phase, PSTs identified stimuli they would bring into their classrooms to prompt them to implement TTC trials. One PST selected materials used during lessons while student teaching (e.g., calendar materials), and the other PST selected the BIE device. Maintenance data were collected over the course of the following year via videorecorded

sessions from teachers. The results of this second experiment suggested PSTs' teaching skills generalized and maintained from student teaching to their own classrooms at levels higher than those observed during the intervention. Although the results of this second experiment are preliminary due to few maintenance data points for one participant, the evidence suggests a model including immediate feedback, training to mastery criteria, and programming common stimuli is promising to sustain PSTs' use of evidence-based teaching skills across time and settings. The final step in the model includes providing performance feedback to teachers in classroom settings to promote generalization and maintenance of learned teaching practices; however, this step of the model was not tested in these experiments.

Impact on Student Achievement. Evidence from multiple studies and reviews suggests that teachers' knowledge of reading processes positively impacts student reading outcomes (Boyd et al., 2009; Hudson et al., 2021; McCutchen et al., 2002; Moats & Foorman, 2003; Podhajski et al., 2009). Evidence also suggests that teachers' instructional quality and implementation of practices likely influences students' reading achievement (Brownell et al., 2017; McCutchen et al., 2002; Spear-Swerling & Brucker, 2004). Therefore, there is potential for TPPs to indirectly impact student outcomes by equipping teachers with knowledge and skills that impact their instructional quality regarding implementation of effective reading instruction. However, these findings are not always replicated, and researchers have called for future research on the impact of teachers' knowledge on student outcomes (Brownell et al., 2020; Hudson et al., 2021). For example, in a review of empirical studies on teacher preparation in the Science of Reading, Hudson and colleagues (2021) advised that future research is needed to develop a more thorough understanding of the influence of teaching knowledge on student reading outcomes. This suggestion for future research mirrors the recommendation from

Brownell et al. (2020) that promising, yet limited, research has articulated how teachers' knowledge serves as a foundation for effective teaching that impacts student outcomes.

Some researchers have specifically investigated the link between teacher preparation and student achievement. In a review of 31 elementary teacher education programs, Boyd et al. (2009) used three separate analyses to investigate the effects of teacher preparation on student achievement. In one analysis, the authors investigated the effect of features of TPPs using data collected from programs on student outcomes. Two features of TPP experiences, namely capstone projects and supervised field experiences, were significantly related to the test performance of first-year teachers' students. Overall, the authors concluded that TPP experiences focused on field-based experiences are consistently related to student achievement. When elements of TPPs, such as field experiences, were connected to what teachers were doing as first year teachers, teachers were more effective at producing greater student gains.

Preparation of General Education Teachers to Implement Response to Intervention

Researchers have examined the critical role that teachers serve in providing effective reading instruction for students with reading difficulties (Rupley et al., 2009; Seidenberg, 2017; Snow et al., 1998) and have articulated the need for all teachers to have knowledge of reading difficulties and disabilities (Washburn et al., 2017). Evidence suggests that EBPs and differentiated instruction based on students' identified needs are the foremost options to provide all students with an equitable and quality education (Connor et al., 2011; Fien et al., 2021). To equitably improve reading development for all students, it is assumed that students receive evidence-based, high-quality instruction within their core classrooms (i.e., Tier 1). When students from historically marginalized backgrounds or communities (e.g. students of Color, English learners, students at-risk or with disabilities) do not receive evidence-based instruction

and early intervention services or differentiated instruction are withheld, their outcomes and opportunities are disproportionately impacted (Fien et al., 2021).

General education teachers play a key role in dismantling inequities and providing effective, evidence-based instruction to all students, including students who read below grade level or are at-risk for reading disability. General education teachers provide their instruction within a Response to Intervention (RtI) model which includes three tiers of instruction and intervention. The general education teachers' instructional role within these tiers is to prevent and remediate reading difficulties for students. Given that RtI is a general education initiative, students who require additional support receive instruction via EBPs in classroom settings. At Tier 1, general education teachers are responsible for delivering high-quality, core classroom instruction, monitoring student progress, and implementing adaptations to instruction. For some students, Tier 1 is ineffective, and they require additional, targeted support. At Tier 2, general education teachers must be able to identify, implement, and evaluate targeted, supplemental reading instruction for students who require additional support beyond Tier 1 (Baker et al., 2010; Vaughn et al., 2007). Tier 2 may also be inefficient at meeting students' needs, and students would then be provided with Tier 3 supports. Compared to Tier 2, Tier 3 often incorporates the expertise of special education teachers and even more intensive, explicit instruction and monitoring for longer durations of time and in smaller groups (Haager et al., 2007; Vaughn et al., 2003).

Across tiers, teachers require extensive knowledge and skills to implement explicit and increasingly intensive intervention and assessment to prevent reading disability and improve students' reading skills (Brownell et al., 2010; Moats, 2009). Teachers require sophisticated preparation to meet these instructional demands across tiers and effectively support students'

needs (Fuchs et al., 2010). However, general education teachers oftentimes are ill-prepared during their preparation programs to work with students with diverse learning needs, including students who are performing below grade level or are at-risk for disabilities (Hurlbut & Tunks, 2016). TPPs must pay greater attention to preparing PSTs for their role in supporting students at risk for disability within an RtI framework (Danielson et al., 2007; Hazelkorn et al., 2011; Leko et al., 2015).

To investigate how general education TPPs prepare PSTs to understand and apply RtI in their classrooms, Barrio and colleagues (2015) conducted a systematic review of the research related to teaching, learning, implementing, and evaluating RtI in TPPs. The authors identified 10 studies from 2003 to 2013 focused on general education TPPs and found a large gap on how PSTs are prepared to understand and integrate RtI into their future classrooms. In addition to identifying the gap in the literature on how general education teachers are prepared to implement RtI, Barrio et al. proposed that teacher educators enhance general education teachers' preparation to work with diverse student needs by incorporating practical experiences including implementation of EBPs during their TPP. This aligns with recommendations from previous research for TPPs to transition from teaching about practice to providing carefully sequenced and monitored clinical experiences through a competency-based approach (Grossman & McDonald, 2008; Leko et al., 2015).

Clinical Experiences

Clinical experiences have been referred to as the holy grail of TPPs (Darling-Hammond, 2014). PSTs who graduate from programs inclusive of well-designed clinical experiences are more likely to contribute to student learning, have higher perceptions of their preparedness to teach, and are perceived as more effective by their supervisors (Boyd et al., 2009; Darling-

Hammond & Bransford, 2005; Nougaret et al., 2005). During clinical experiences, PSTs have the opportunity to apply learned knowledge and skills and move from acquisition to mastery (Scheeler et al., 2016). This applied practice is essential to promote generalization and maintenance of skills learned to future teaching contexts when implementing EBPs (Griffin & Kilgore, 1995; Scheeler et al., 2009). Unfortunately, PSTs often have few opportunities for practice and feedback (Hemmeter et al., 2008; Leko et al., 2015; Scheeler et al., 2016) and may rely on cooperating teachers during student teaching experiences for the majority of feedback (Grossman & McDonald, 2008) as opposed to support through clinical experiences designed by strong school and university partnerships (Darling-Hammond, 2014). To strengthen the clinical experiences offered to PSTs, TPPs can incorporate instructional tools and practices (e.g., well-designed clinical experiences and effective feedback) that facilitate a deep understanding of implementation of EBPs to make explicit connections between their TPP experience and future classrooms (Scheeler et al., 2016).

Reading Tutoring and Reading-Based Clinical Experiences. TPPs that provide PSTs with instruction on EBPs in reading and experience implementing EBPs in reading positively influence PSTs' experiences as they enter their first year of teaching (Hoffman et al., 2005). Furthermore, TPPs also positively impact novice reading teachers' quality of reading instruction and student engagement during reading (Hoffman et al., 2005). These outcomes of well-designed reading-based clinical experiences serve as an impetus for ensuring PSTs have opportunities to participate in applying effective reading instruction in applied experiences.

To leverage effective practices on reading instruction implementation, Hindman and colleagues (2020) described how TPPs can prepare PSTs to employ EBPs as outlined in the Science of Reading through hands-on and extensive practical teaching experiences. The Science

of Reading holds firm that high-quality research provides evidence for strategies and EBPs that are effective for teaching all students to read (Hindman et al., 2020). The authors argued that PSTs should have opportunities to implement reading instruction with feedback connected to field experiences. These field experiences should include observations with coaching on implementing practices with high levels of fidelity of implementation. Hindman et al. (2020) concluded that embedding these components of effective inservice professional development into teacher preparation is one way to strengthen novice reading teacher preparation.

In a review of clinical experiences during TPPs in reading, Sailors and colleagues (2004) examined sites of excellence in reading teacher preparation to determine common features of clinical experiences. The university programs selected for inclusion in the review included three reading specialization programs offered within general education programs and five programs intended to prepare all teachers to provide reading instruction. Common features of the clinical experiences included (a) developing reflective teachers, (b) scaffolding experiences and coursework and scaffolding by expert professionals, (c) offering a variety of contexts to work with students (e.g., whole-class and small groups, ages and literacy developmental levels, diversity of learners), and (d) one-on-one tutoring experiences. During one-on-one tutoring experiences, PSTs received supervision support while working with students who required additional reading support. The supervision of tutoring varied widely, and in some cases, PSTs were closely monitored by university faculty and received immediate feedback. In other cases, supervision support was solely the responsibility of the classroom teacher. The contrast in the types of supervision offered to PSTs posed challenges for university faculty as districts often controlled the identification of cooperating teachers, and their practices may not have

instructionally aligned with the tutoring program. The variation in supervision support highlights the need for high-quality clinical experiences to facilitate equitable experiences for PSTs.

In a study on PSTs' perceptions of a clinical experience, Hilaski et al. (2021) used a qualitative research design to investigate the effects of embedded clinical experiences in which PSTs administered assessments and applied content learned during coursework. The authors investigated the impact of the clinical experiences on PSTs' beliefs and attitudes about elementary students with reading needs and PSTs' understanding of their role as reading teachers related to instruction and assessment. The study included 13 dual early childhood and special education PSTs who were enrolled in coursework in which they were participating in an embedded clinical experience. The data included in the analysis were gathered through semi-structured interviews, coursework requirements (e.g., reflective journal entries), and Socratic seminar discussions. Results revealed shifts in PSTs' beliefs and practices including a shift to a more strategic approach when planning and implementing reading instruction. Additionally, the clinical experience contributed to PSTs' identity as teachers as they were more confident in their abilities and practices related to planning and implementing reading instruction and assessment.

Reading tutoring experiences as part of or in addition to high-quality reading-based clinical experiences can also be impactful and beneficial to PSTs' development. Reading tutoring typically consists of one-on-one instruction that supplements classroom instruction (Elbaum et al., 2000). The purpose is often for PSTs to connect coursework to classroom contexts by applying knowledge and skills learned (Haverback & Parault, 2008). Specific to tutoring experiences, Hoffman et al. (2019) reviewed the literature on literacy tutoring and mentoring as a part of TPPs. The authors identified 62 studies in which PSTs participated in literacy tutoring experiences. The findings of this review included that one-on-one and small group literacy

tutoring experiences had a positive impact on PST growth in learning to teach. This growth in PSTs' learning to teach encompassed (a) improved knowledge of literacy, language, and structure of words; (b) strengthened instructional abilities including implementing a variety of literacy strategies, using assessment data for individualization, and applying behavior management skills; (c) learned relationship-building skills with students, families, and colleagues; and (d) developed long-term learning through connections made between tutoring and future classroom experiences. The authors also explored support provided to PSTs during their tutoring experiences and noted that coaching was often found to be beneficial for the growth of PSTs. The authors suggested that future research explore innovative ways of implementing coaching support for PSTs during their tutoring experiences. Although the findings of this review do not warrant causal relationships, they do highlight the substantial evidence documenting the benefits of literacy tutoring experiences during TPPs.

In an experimental study on PSTs' knowledge and perceptions, Al Otaiba et al. (2010) implemented a mixed method study including a randomized-control trial examining PST knowledge and perceptions of preparedness to teach reading after participating in an early literacy course with tutoring experience. Participants included 28 early childhood PSTs who tutored a kindergarten or first grade student with reading difficulties one day per week for 8 weeks. PSTs were assigned to one of two conditions, Book Buddies or Tutor Assisted Intensive Learning Strategies (TAILS). Both interventions provided identical meaning-focused instruction but varied in code-focused instruction. The PSTs using the Book Buddies program implemented code-focused instruction during shared book reading whereas the PSTs implementing TAILS used explicit and scripted lessons. PSTs were trained separately to implement their respective tutoring programs during two 3-hour sessions. The results indicated that PSTs in both conditions

demonstrated improved and similar knowledge gains; however, PSTs who implemented the TAILS program demonstrated higher self-ratings of preparedness to teach reading and increased depth and breadth of knowledge application. Likewise, students in the TAILS condition showed significantly stronger gains in decoding skills; however, students in both conditions made similar gains in comprehension skills. These findings highlight the importance of scripted and explicit code-focused activities on PSTs' knowledge and preparedness to teach reading.

In a more recent exploratory study on reading tutoring, Englert et al. (2020) examined the knowledge and perceptions of 48 PSTs who were enrolled in a literacy course in which they provided phonics instruction via tutoring to primary-grade students with reading difficulties. The authors examined the effects of coursework and tutoring on PSTs' knowledge, PSTs' perceptions of their preparedness to teach reading, and students' phonics scores. During the clinical experience, PSTs were provided with instructional tools and scaffolds such as a recommended scope and sequence, Elkonin boxes, and instructional scripts to support their implementation of phonics instruction. The results of the study indicated that PSTs' knowledge and self-confidence in teaching reading to students with reading difficulties improved. The researchers also analyzed PSTs' adherence to the teaching routine and script and found that PSTs implemented the intervention protocol with high fidelity. Student outcomes also significantly improved related to phonics knowledge and performance. These results suggest that coursework with embedded clinical experiences can improve PSTs' knowledge and perceptions about teaching reading when PSTs are provided with explicit and transparent instructional tools and scripts for teaching phonics.

The promising findings related to student and PST improved outcomes from participation in reading tutoring and reading-based clinical experiences for general education PSTs are

highlighted in the literature with special education PSTs as well. Several studies have examined the effects of reading-based clinical experiences for special education PSTs. For example, Peltier et al. (2020) examined 12 special education PSTs' knowledge and perceptions about teaching foundational reading skills before and after participating in coursework with an aligned clinical experience tutoring an elementary-aged student with a disability. The results indicated that PSTs demonstrated increased knowledge and improved perceptions of their knowledge related to foundational reading skills. The results were similar to previous research indicative of increased special education PSTs' knowledge of foundational skills within the context of coursework with clinical tutoring experiences (Al Otaiba & Lake, 2007; Al Otaiba et al., 2010; Englert et al., 2020; Hoffman et al., 2019; Spear-Swerling, 2009; Spear-Swerling & Brucker, 2004). In addition to increased knowledge of foundational reading skills, PSTs' posttest knowledge scores predicted over half of the variance in student standard score growth on a norm-referenced measure. These findings also align with previous research highlighting special education PSTs' increased knowledge and subsequent improvement in student reading outcomes when participating in reading-based clinical experiences. For example, Spear-Swerling and Brucker (2004) found that special education PSTs' knowledge was related to student outcomes on phonics, reading, and spelling measures. Likewise, Al Otaiba and Lake (2007) found that special education PSTs' knowledge increased significantly as did students' word identification and word attack skills for all but two students in their study. Collectively, these findings underscore the impact of PST knowledge gained through coursework in teaching reading with aligned clinical experiences on students' reading achievement.

Summary

High-quality TPPs have the potential to impact teacher and student level outcomes including (a) teachers' knowledge and instructional quality (Brownell et al., 2020; Hikida et al., 2019; Hudson et al. 2021; Kennedy et al., 2015; McCutchen et al., 2002; Risko & Reid, 2019; Risko et al., 2008; Spear-Swerling, 2009), (b) teachers' beliefs and perceptions (Hikida et al., 2019; Knackstedt et al., 2018; Risko et al., 2008), (c) generalization and maintenance of teaching practices (Scheeler, 2008; Scheeler et al., 2009), and (d) student achievement (Brownell et al., 2017; Boyd et al., 2009; Hudson et al., 2021; McCutchen et al., 2002; Moats & Foorman, 2003; Podhajski et al., 2009; Spear-Swerling & Brucker, 2004). Researchers have identified components of high-quality TPPs that have a greater likelihood at positively impacting these outcomes. One common component of high-quality TPPs is clinical experiences implementing EBPs with feedback (e.g., Brownell et al., 2020; Brownell et al., 2005; Hudson et al., 2021). This component is critical as research indicates that teachers do not always implement EBPs in their classrooms (Kretlow & Helf, 2013; Maheady et al., 2013), perhaps because they are not prepared to do so (Maheady et al., 2013). One example of effective clinical experiences includes reading tutoring which oftentimes consists of one-on-one instruction with a student who has been identified as in need of supplemental reading instruction (Elbaum et al., 2000). Engaging in reading tutoring as a clinical experience affords PSTs the opportunity to link coursework and classroom contexts by applying knowledge and skills learned (Haverback & Parault, 2008).

Through participation in reading-based clinical experiences implementing EBPs, PSTs have the opportunity to make explicit connections between coursework and teaching contexts. Therefore, clinical experiences that involve teaching reading to students with reading difficulties can support PSTs in becoming highly skilled teachers of reading. Additionally, contextualized

clinical experiences in which PSTs receive feedback when working with students are likely to produce the greatest growth in knowledge, skills, and beliefs for PSTs; therefore, improved student outcomes may be more likely to occur (Boyd et al., 2009; Englert et al., 2020).

Fidelity of Implementation

Almost always, it is crucial for EBPs to be implemented with adequate fidelity for implementation to be considered successful. This is because fidelity of implementation is generally associated with improved outcomes (Al Otaiba & Fuchs, 2006; Benner et al., 2011; Carroll et al., 2007; Durlak & DuPre, 2008; Kaderavek & Justice, 2010; O'Donnell, 2008; Stein et al., 2008; Vaughn et al., 2015). EBPs are practices that have been identified as effective through rigorous research, and teachers must be able to recognize which EBPs are most appropriate for the students they teach. When implementing EBPs most appropriate for their students, it is important that teachers implement EBPs with fidelity, or under similar conditions to which the EBP was deemed effective (Harn et al., 2013). When teachers do not implement practices with fidelity (i.e., fidelity is low), they can receive follow-up support through coaching and feedback if student performance is also low (McKenna et al., 2014). If fidelity is high and student performance is low, teachers can make informed decisions to adapt the intervention to more appropriately meet students' needs (McKenna et al., 2014). In both of these scenarios, it is essential to measure teachers' fidelity to make instructional decisions informed by student data.

Most commonly, fidelity of implementation is defined as the implementation of the intervention as designed or intended (Moncher & Prinz, 1991; Yeaton & Sechrest, 1981). Analyzing and reporting fidelity of implementation is important to the internal validity of a study to increase confidence that outcomes were a result of implementation of the intervention. Measuring fidelity also is important to the external validity of a study to ensure the transfer of

effects from research studies to classroom implementation (Harn et al., 2013). If fidelity of implementation is measured, confidence that the outcomes were a result of implementation of the intervention are greater. Inversely, when fidelity of implementation is not measured, confidence that the outcomes can be attributed to the implementation of the intervention decreases as the outcomes could be a result of an unmeasured, extraneous variable (Capin et al., 2021). In essence, measures of fidelity of implementation allow for determining if the effects of an intervention can be attributed to the prescribed intervention and for understanding how research translates to practice.

Dimensions and Measurement of Fidelity of Implementation

Although fidelity is most commonly synonymous with treatment adherence, or the extent to which an intervention was implemented as designed, researchers agree that fidelity of implementation is a multidimensional construct (Capin et al., 2021; Harn et al., 2013). Researchers have captured the multiple dimensions of fidelity under two broad categories: (a) structural dimensions and (b) process dimensions (Harn et al., 2013). These dimensions vary in the ways in which fidelity is defined and measured.

First, structural dimensions of fidelity are more objective as they provide a surface level overview of whether preestablished components of the intervention were implemented as intended (Harn et al., McKenna et al., 2014). Structural dimensions of fidelity include measuring (a) treatment adherence or delivery of central components, (b) time allocation, and (c) intervention completion (Durlak & DuPre, 2008). All three of these structural dimensions of fidelity can be measured via direct observation or self-report. Two of these dimensions, time allocation and intervention completion, are measured by documentation of the events. For example, time allocation might be documented by the number of minutes of intervention.

Intervention completion might include documenting whether expected material was covered or a specific number of sessions were completed. To measure treatment adherence, researchers most often develop a rubric that includes the active ingredients of the intervention. The rubric is used to measure whether those ingredients were present and possibly the extent to which the ingredients were evident (e.g., how well or how often occurred). McKenna et al. (2014) found the most common way to measure fidelity was with a checklist which is similar to measuring evidence of the active ingredients via a rubric.

Second, researchers process dimensions of fidelity are typically related to examining the quality of intervention delivery and teacher-student interactions (Harn et al., McKenna et al., 2014). Process dimensions of fidelity are more subjective because observers attempt to rate the quality of instruction (e.g., how well an intervention was delivered) or teacher-student interactions. The quality of instructional delivery has been measured in multiple ways including (a) ratings on the flow of the lesson by the interventionist, (b) whether materials were ready for the lesson, (c) teacher responsiveness to student responses, and (d) usage of provided instructional materials and language (Durlak, 2010; Kaderavek & Justice, 2010). Additionally, teacher-student interactions have been measured by (a) student engagement ratings, (b) teachers' accuracy of responses, and (c) behavioral redirections (Durlak & DuPre, 2008; Webster-Stratton et al., 2011).

Although process dimensions of fidelity are regarded as more subjective and difficult to accurately capture, researchers have emphasized the importance of measuring process dimensions of fidelity as these components may be more directly related to student outcomes (Gersten et al., 2005; Mowbray et al., 2003; Power et al., 2005). Moreover, researchers have advocated for a multidimensional approach to measuring fidelity including measuring both

structural and process dimensions (Gersten et al., 2005; Odom et al., 2010; Power et al., 2005), with the goal of determining impact of fidelity on student outcomes (Odom et al., 2010).

Acceptable Levels of Fidelity of Implementation

Similar to the various ways to measure fidelity, there is variability as to what constitutes an acceptable level of fidelity (Kretlow & Bartholomew, 2010). Some research suggests that 80% is commonly referred to as the minimum criteria for mastery of a skill (Fuller & Fienup, 2018); therefore, 80% also can be used as the criteria for mastery for adequate fidelity of implementation (Horner et al., 2004). In a review of the impact of fidelity of implementation on program outcomes, Durlak and DuPre (2008) identified 542 quantitative and qualitative studies that measured fidelity and program outcomes and found strong evidence that higher fidelity of implementation was associated with better outcomes. The level of high fidelity was not defined, so it is unclear as to what level or threshold of fidelity is associated with these positive outcomes. In this review, the authors also identified factors that influenced the implementation process. One factor that impacted implementation was characteristics of innovations or adaptations to programs. This finding contributed to the variance in acceptable levels of fidelity, and researchers have debated the impact of adherence on student outcomes and whether adaptations should be permitted when implementing interventions (Center for Substance Abuse Prevention, 2002; Blakely et al., 2002; van Dijk et al., 2021, 2022). In this review of fidelity, the authors found that more structured interventions were more conducive to high fidelity due to the detailed lesson plans and intervention protocol required. The researchers also suggested that fidelity and adaptations to interventions can co-occur and that some level of adaptations is inevitable (Blakely et al., 2002). However, if the objective is to implement interventions with high or acceptable levels of fidelity, fewer adaptations to interventions will be possible.

Outcomes of Fidelity of Implementation During Reading

Aligned with the results found by Durlak and DuPre (2008), studies generally report that fidelity of implementation is associated with improved outcomes (Al Otaiba & Fuchs, 2006; Benner et al., 2011; Carroll et al., 2007; Kaderavek & Justice, 2010; O'Donnell, 2008; Stein et al., 2008; Vaughn et al., 2015). For example, when teachers implement EBPs with high fidelity, there could be greater gains in student academic achievement (Benner et al., 2011; Durlak & DuPre, 2008; Furtak et al., 2008; Kovaleski et al., 1999). Although studies generally report that fidelity is associated with improved outcomes, mixed results have been reported on this relation (Capin et al., 2018; Swanson et al., 2013; van Dijk et al., 2021). In a systematic review by van Dijk and colleagues (2021) the authors identified 50 studies that measured fidelity of implementation and student outcomes. In the studies included, researchers typically measured fidelity as dosage, adherence, instructional quality, or adherence plus instructional quality. The results indicated there was not empirical support for the relation between fidelity and student outcomes in reading. The authors suggested that future research explore acceptable levels of fidelity and that researchers include clear definitions of fidelity so the relation to student outcomes can be evaluated.

Although the results of the previous study did not provide support for the relation between fidelity and student outcomes in reading, the results did suggest that fidelity of implementation and student reading outcomes were moderated by characteristics of measures and students (van Dijk et al., 2021). Specifically, general education teachers' adherence and quality ratings did not lead to better outcomes for students without disabilities but did lead to better outcomes for students with disabilities (Boardman et al., 2016). This finding aligns with other research that fidelity is moderated by students' initial performance levels (Connor et al.,

2007; Hamre et al., 2010; Neugebauer et al., 2017; Odom et al., 2010) and that intermediate levels of fidelity have shown little to no benefit for students at-risk whereas high levels of fidelity resulted in improved student outcomes.

In addition to student characteristics moderating the relation between fidelity and student outcomes, research has suggested there may be a unique interaction between fidelity, specifically treatment adherence, and instructional quality (Capin et al., 2021; Vaughn et al., 2015). Higher treatment adherence may be more important for teachers with less experience, skills, knowledge, or confidence and less important for teachers who possess these characteristics to a higher degree (Capin et al., 2021). For example, Vaughn and colleagues (2015) used a randomized control trial to investigate the effects of a multicomponent intervention learning social studies content on eighth grade students' acquisition of content and reading comprehension. Nineteen history teachers received professional development, and observations of their treatment adherence were conducted. The results indicated a statistically significant impact of the multicomponent intervention on students' knowledge acquisition, but the findings for reading comprehension were not significant. When analyzing teachers' treatment adherence, the results suggested teachers implemented the intervention within a middle to high range of fidelity. The authors also found that teachers' treatment adherence mediated the effects of the intervention on student outcomes.

To extend the findings of Vaughn et al. (2015), Capin and colleagues (2021) used data from the randomized control trial to investigate whether the interaction between teachers' treatment adherence and instructional quality influenced students' social studies content knowledge and reading comprehension. The findings indicated that instructional quality was a statistically significant, positive predictor of students' reading comprehension and content

knowledge. Contrarily, treatment adherence was not a statistically significant, positive predictor. The results also indicated there was a statistically significant interaction between teachers' instructional quality and treatment adherence; when instructional quality was low, treatment adherence had a stronger impact on student outcomes. Furthermore, students' pretest performance and English learner status influenced the interaction between instructional quality and treatment adherence on student outcomes. Students who were identified with more intensive needs disproportionately benefitted from implementation at higher levels of fidelity. These findings provide empirical support that higher fidelity of implementation may be particularly important for teachers who are less experienced and rated as having lower instructional quality (Capin et al., 2021; Vaughn et al., 2015).

Even though implementing EBPs with high levels of fidelity is important for student outcomes, it is inevitable that some students will require adaptations to interventions. To address the need to make adaptations to interventions, Quinn and Kim (2017) described phases of a scaffolded sequence to program implementation using a structured adaptive approach. The scaffolded sequence included two phases: (a) initial adoption of the intervention and (b) experienced implementation of the intervention. In the first phase of this approach, when schools initially adopt an intervention, the primary goal is for teachers to learn how to implement the intervention faithfully through explicit instruction. This phase provides teachers who have not used the intervention with opportunities to learn the instructional procedures as designed. As teachers develop proficiency and master program implementation, they are ready to move into the second phase for those experienced with the intervention. In this phase, the focus is on teachers working collaboratively to design adaptations that are more aligned with and effective for students' needs. To accomplish phase two, teachers must have a sound understanding of the

instructional procedures and active ingredients of the intervention because teachers who are identified as experts are more likely to accurately design effective adaptations (Quinn & Kim, 2017).

To test this structured adaptive approach to implementation, Quinn and Kim (2017) used a randomized control trial to investigate the effects of the approach with schools implementing an evidence-based reading program. Participating schools supported elementary-aged students and were implementing the reading program, READS. Prior to this study, schools were assigned to a fidelity-focused READS condition or a business-as-usual condition. In the following year, a subset of the schools were assigned to implement the same fidelity-focused READS program or implement a structured adaptive approach to READS. The authors described several results of the fidelity-focused approach and the structured adaptive approach on teacher and student outcomes. First, the authors found evidence that a fidelity-focused approach led to improved teacher learning and changes to practices for inexperienced teachers with the program. Conversely, the structured adaptive approach was more effective for experienced teachers with the program. Next, the authors found positive effects on students' reading comprehension outcomes for those who received the structured adaptive approach only when the students received intervention from experienced teachers. These results suggested that a scaffolded approach to program implementation is a promising way to support teachers' knowledge of instructional techniques and their fidelity of implementation. An understanding of the conditions in which adaptations to EBPs are effective is important to support both teacher and student outcomes.

To support novice teachers in implementing EBPs with high fidelity, Quinn and Kim (2017) described that novice teachers' instructional techniques and student learning was

improved when feedback and support on implementing EBPs in reading was focused on fidelity of implementation. Similarly, Klingner and colleagues (1999) found higher student achievement and higher levels of fidelity when teachers received ongoing support. Therefore, ongoing support for novice teachers in the form of feedback and coaching is one way strengthen fidelity of implementation and improve the subsequent impact on student outcomes.

Summary

Fidelity of implementation is a multidimensional construct inclusive of structural and process dimensions (Harn et al., 2013; McKenna et al., 2014). Structural dimensions of fidelity are more objective and include measuring (a) treatment adherence, (b) time allocation, and (c) intervention completion (Durlak & DuPre, 2008). Process dimensions of fidelity are more subjective to capture and include measuring the quality of intervention delivery and teacher-student interactions (Harn et al., McKenna et al., 2014). Although fidelity is multidimensional, fidelity of implementation is most commonly referred to as treatment adherence (Moncher & Prinz, 1991; Yeaton & Sechrest, 1981). Additionally, a checklist is the most common way to measure fidelity (McKenna et al., 2014), and a mastery criteria of 80% is often used to document fidelity of implementation (Horner et al., 2004). Researchers have suggested that a multidimensional approach to measuring fidelity including measuring both structural and process dimensions may be the most promising approach to interpret outcomes (Gersten et al., 2005; Odom et al., 2010; Power et al., 2005).

Related to outcomes, researchers have generally found positive associations between fidelity and teacher and student outcomes. (Al Otaiba & Fuchs, 2006; Benner et al., 2011; Carroll et al., 2007; Kaderavek & Justice, 2010; O'Donnell, 2008; Stein et al., 2008; Vaughn et al., 2015); however, studies do report mixed results (Capin et al., 2018; Swanson et al., 2013;

van Dijk et al., 2021). In addition, researchers have found evidence that higher fidelity may be more critical for students with learning difficulties (Benner et al., 2011; Boardman et al., 2016; Connor et al., 2007; Hamre et al., 2010; Neugebauer et al., 2017; Odom et al., 2010) and for novice teachers with less experience or poorer instructional quality (Capin et al., 2021; Quinn & Kim, 2017; Vaughn et al., 2015). Providing teachers with support has been identified as one way to improve their fidelity of implementation of EBPs and subsequent outcomes (Klingner et al., 1999; Quinn & Kim, 2017).

Coaching

As previously indicated, TPPs can play an important role in preparing PSTs to implement EBPs with high levels of fidelity (Scheeler et al., 2016). Despite that support from experts has been noted as beneficial for PSTs (Hoffman et al., 2019; Kraft et al., 2018; Kretlow & Bartholomew, 2010; Schles & Robertson, 2017), TPPs may only provide course instruction in EBPs and lack the adequate follow-up support needed during implementation of these practices in clinical experiences or student teaching (Scheeler et al., 2009). Furthermore, researchers have recommended that PSTs receive support within the context of working with real students in classrooms when implementing EBPs (ILA & NCTE, 2017). Without ongoing support that substantially improves teachers' ability to implement a practice as it was intended, teachers' fidelity levels are likely to remain low (DiGennaro et al., 2007). Low fidelity of implementation is linked to lower gains in student achievement (Furtak et al., 2008; Kovaleski et al., 1999); thus, a focus on providing instructional support to improve fidelity of implementation is warranted.

Coaching provides PSTs with contextualized support rooted in their application of knowledge and skills learned and in the practice of teaching that facilitates opportunities for teacher growth in their knowledge and instructional quality (Hikida et al., 2019; Hudson et al.,

2021; Kraft et al., 2018; Scheeler et al., 2009). Kretlow and Bartholomew (2010) described coaching as an expert providing individualized support to a teacher after the teacher has participated in initial training. An expert is someone who has been trained in the practice and has the knowledge and skills required to provide feedback to teachers on their implementation of the newly learned practice. Experts who can serve in a coaching capacity include university faculty, supervisors, instructional coaches, lead teachers, and skilled peers. Coaching has been identified as an effective method to provide teachers with follow-up support after learning and being trained on a new teaching strategy or practice to be used during reading instruction (Gettinger & Stoiber, 2016; Jager et al., 2002; Kraft et al., 2018; Kretlow et al., 2009; Lignuaris-Kraft & Marchand-Martella, 1993; Morgan et al., 1994; Schnorr, 2013).

Importantly, coaching support has been linked to improved fidelity of implementation of EBPs. To illustrate, Kretlow and Bartholomew (2010) conducted a comprehensive literature review in which they identified the impact of coaching on preservice and inservice teachers' fidelity of implementation of EBPs. The authors identified a total of 13 studies with 110 teachers who received coaching support. There were 37 inservice teachers and 73 PSTs with 41 being general education and 69 special education teachers. The review revealed critical components needed for effective coaching, including (a) engaging group training sessions, (b) follow-up observations, and (c) specific and individualized feedback based on observations. Specific to TPPs, the review suggested that PSTs require (a) high-quality training that simulates instruction with feedback, (b) multiple opportunities for practice of the newly learned teaching practice with real students in the generalization setting, and (c) individualized feedback with observations and modeling. In addition, the researchers found that of the studies that collected social validity data,

all teachers positively rated the coaching activities, and many suggested more individual coaching sessions as a future improvement.

TPPs can use coaching to support PSTs' fidelity of implementation of EBPs during clinical experiences with the goal of positively impacting student outcomes (Kretlow & Bartholomew, 2010). Researchers have developed a coaching framework that centers on supporting effective teaching practices to serve as a guide for implementation of critical components of coaching (Snyder et al., 2015). This coaching framework is based on core elements of practice-based coaching which is defined as a cyclical coaching process that supports teachers' implementation of effective teaching practices with the ultimate goal of improving student outcomes (Snyder et al., 2015). In addition to the importance of an iterative coaching process and establishing collaborative partnerships between teachers and coaches, other core elements of coaching were (a) shared goals and action planning, (b) focused observations, and (c) reflections and feedback.

The authors highlighted the purpose of this coaching framework is to center coaching support on teachers' use of effective teaching practices (e.g., specific praise, systematic instructional strategies that target specific skills; Snyder et al., 2015). Effective teaching practices also include EBPs that, when implemented with fidelity, are likely to improve student outcomes (Cook & Odom, 2013, 2019). The first component of the framework centered on effective teaching practices, shared goals and action planning, includes initial and ongoing goal setting based on needs assessment and a guide as to how goals will be accomplished. The second component of the framework, focused observation, involves gathering information about fidelity of implementation of the teaching practices. Within focused observations, coaches might provide verbal, gestural, or visual prompts. Last, the third component is reflection and feedback which

includes performance feedback on elements related to fidelity of implementation with both supportive and constructive feedback. Supportive feedback identifies positive behaviors that illustrate progress, and constructive feedback includes specific steps for strengthening fidelity of implementation. The authors propose that future research investigate the effectiveness of various components of this coaching framework to determine the most salient components of coaching.

The various components involved in coaching contrast with elements of traditional professional development. This has led to identification of coaching support as an alternative to traditional professional development (Kraft et al., 2018). Traditional professional development oftentimes includes one-day workshops without follow-up support. Historically, teachers have participated in professional development trainings that have failed to produce improvements in teachers' instructional practices and student achievement (Garet et al., 2008; Glazerman et al., 2010; Harris & Sass, 2011; Jacob & Lefgren, 2004). Due to the ineffectiveness of traditional professional development on teacher and student outcomes, researchers have investigated the conditions under which training and professional development is effective at producing improved outcomes (Desimone, 2009; Wayne et al., 2008). Coaching that included individualized and sustained support over time was identified as an effective alternative (Desimone, 2009; Kraft et al., 2018; Kretlow & Bartholmew, 2010; Wei et al., 2009).

To evaluate coaching as an alternative form of professional development, Kraft and colleagues (2018) reviewed the literature on the effects of teacher coaching on instruction and student achievement. For this review, coaching was defined as a process that was (a) individualized with one-on-one coaching sessions, (b) intensive with interactions at a minimum of every few weeks, (c) sustained occurring over a longer period of time, (d) context specific occurring within teachers' own classrooms, and (e) focused on practicing specific skills. The

authors identified 60 studies conducted with inservice teachers and found large, positive effects of coaching on teachers' instructional practice and on student achievement. Coaching aligned with specific instructional materials and resources demonstrated greater gains in instructional outcomes, rather than providing teachers with a video library of supports. The authors also concluded there was not a consistent relationship between dosage of coaching (e.g., total hours) and both teacher and student outcomes as the number of hours spent during coaching varied widely: Sixteen studies reported 10 hr or less, 14 studies reported 11–20 hr, six studies reported 21–30 hr, eight studies reported 30 hr or more, and 16 studies did not report hours spent coaching. Results indicated a lack of causal evidence of coaching on teacher instruction and student achievement for content-based coaching programs (i.e., coaching across subject areas) except for in reading and literacy. Additionally, Kraft and colleagues concluded the focus of coaching support should be on the quality of coaching instead of providing a high dosage of coaching support. Two noteworthy elements of coaching support that contribute to high-quality coaching support for preservice and inservice teachers are performance feedback and positive reinforcement.

Performance Feedback

In addition to the positive effects of coaching on preservice and inservice teachers' instructional practices and student outcomes in reading, research has indicated a functional relation between performance feedback delivered within a coaching framework and increased PSTs' fidelity of implementation of EBPs (Schles & Robertson, 2019). Performance feedback has been defined as collecting data based on observations of teachers and using the data gathered to provide objective information to teachers about aspects of their instruction (Sweigart et al., 2015). These salient elements of feedback combined with other components (e.g., facilitating

collaborative partnerships, developing shared goals and plans) support teachers in improving targeted teaching skills or practices through coaching frameworks. In their review, Schles and Robertson (2019) identified five single-case studies in which special education PSTs received performance feedback from coaches on their implementation of EBPs including direct instruction in reading. Across all studies, the coaches who provided feedback to the PSTs had a range of backgrounds and included researchers with PhDs, doctoral students, undergraduate PSTs, and a coach with a master's degree in special education experienced in supervising practicum students and coaching inservice teachers. Coaches provided feedback in a variety of formats including (a) twice weekly emails; (b) visual and verbal feedback before, during, and after sessions; (c) individual coaching sessions based on video observations; (d) live feedback provided via bug-in-ear technology; and (e) debriefs after live observations. Across all intervention studies, the authors found that 19 of 20 PSTs demonstrated improved fidelity of implementation of the EBP. Moreover, there was evidence that student outcomes improved, although these results varied across studies.

Cornelius and Nagro (2014) also evaluated the evidence base for providing PSTs enrolled in various TPPs with performance feedback. Eight studies were included in their review and five met all rigorous standards as quality research. Feedback was delivered across a range of formats (e.g., face-to-face, email, bug-in-ear) and from a variety of coaches (e.g., supervisors, experts, peers). The results were similar to those found in the review by Schles and Robertson (2019): the greatest change in fidelity of implementation of EBPs was as a result of performance feedback. In conclusion, performance feedback was identified as an EBP to increase teachers' fidelity of implementation of instructional practices.

Authentic Environments

As described in the previous literature reviews (Cornelius & Nagro, 2014; Kraft et al., 2018; Kretlow & Bartholomew, 2010; Schles & Robertson, 2019), when experts and teachers are engaged in coaching, the teacher is implementing a newly learned skill or practice while an expert provides individualized feedback based on observations. A key component is that teachers receive coaching support in authentic environments with students, because this type of coaching support reinforces the newly learned teaching behaviors in the natural environment (Scheeler et al., 2009). When newly learned behaviors are positively reinforced, there is an increased probability of the teacher implementing the behaviors in the future.

Individualized Positive Feedback and Reinforcement

Individualized feedback in the form of positive reinforcement of the teaching behaviors can occur in different ways. Positive reinforcement includes providing teachers with feedback contingent upon their implementation of a specific aspect of instruction that increases the future probability that the reinforced aspect of instruction will continue to occur (Cooper et al., 2019). Experts might provide praise after the teacher implements the skill or practice correctly (e.g., "Great job using the instructional tools!"), or experts can model how to implement the skill or practice correctly after teacher error (Kretlow & Bartholomew, 2010). After expert modeling, teachers then have an opportunity to implement the skill correctly based on their observation of expert implementation. When teachers do not receive individualized feedback such as through positive reinforcement, their teaching behaviors are likely to be reinforced in other ways. For example, teachers may inadvertently implement a practice incorrectly, or may believe their alternative approach is feasible. Without individualized, explicit feedback and opportunities to practice instructional routines or procedures, teacher behavior would be unlikely to change.

Experts can provide different forms of coaching support with the goal of providing teachers with individualized feedback related to their implementation of newly learned practices. Two common forms of coaching support are supervisory coaching and side-by-side coaching (Kretlow & Bartholomew, 2010).

Supervisory Coaching During Reading Instruction

Supervisory coaching is one method of follow-up coaching in which an expert provides feedback to a teacher after observing their implementation of a newly learned skill or practice. Kretlow and Bartholomew (2010) defined supervisory coaching as when a coach, or expert, conducts an observation and records the presence or absence of particular teaching behaviors the teacher has previously been trained to implement. Then, the coach provides individualized and descriptive feedback on strengths and areas of improvement to the teacher after the observation. Research has indicated that supervisory coaching along with initial training improved teaching behaviors (e.g., use of systematic error correction and praise) and improved fidelity of implementation of trained skills in the area of early literacy or reading by preservice and inservice teachers (Brownell et al., 2017; Jager et al., 2002; Lignuaris-Kraft & Marchand-Martella, 1993; Morgan et al., 1994; Powell et al., 2010).

Inservice Teachers. Studies have shown that supervisory coaching can be an effective method to improve inservice teacher outcomes including improved instructional behaviors, increased fidelity of implementation of a practice, and increased student achievement in reading (Brownell et al., 2017; Gersten et al., 1995; Jager et al., 2002; Powell et al., 2010). For example, Gersten et al. (1995) explored the use of supervisory coaching via special education teachers serving as coaches for general education teachers to support integration of research-based practices in reading (e.g., repeated reading, reciprocal teaching, activation of background

knowledge) in general education classrooms. The study occurred over 2 years, and almost half of the general education teacher participants had 3 years or less of teaching experience. Special education teachers were trained on coaching procedures, which included classroom observations focused on aspects of students' learning such as clarity of explanations, use of explicit strategies, success on academic tasks, and levels of student involvement. After the observations, special education teachers shared their perceptions of the teaching behaviors and interactions observed among general education teachers and their students along with suggestions for improved practice. Supervisory coaching occurred weekly over 3 to 30 weeks with less frequent meetings over time. Results from qualitative data analyzed (i.e., interviews, audiotaped coaching meetings, field notes) suggested that supervisory coaching improved general education teachers' classroom practices when working with students with disabilities during reading instruction.

Jager and colleagues (2002) implemented a quasi-experimental pretest posttest control group design to examine the effects of teacher training with supervisory coaching on the instructional behaviors of inservice general education teachers. Thirteen teachers participated in the experimental conditions and were trained to use either a direct instruction model (n = 5) or a cognitive apprenticeship model (n = 8) to implement a reading comprehension curriculum. Teachers in the control group (n = 7) used the same reading comprehension curriculum without receiving any training with embedded coaching. The teacher training consisted of five inservice training sessions and three individual coaching sessions. During these sessions, teachers were observed and provided with feedback after each observation related to the main components of the instructional model employed (i.e., direct instruction or cognitive apprenticeship). The essential components of the direct instruction model included (a) daily review; (b) presentation of new content; (c) guided practice; (d) individual practice; and (e) feedback, summarization of

new content, and evaluation. The essential components of the cognitive apprenticeship model included (a) activating prior knowledge, (b) highlighting relevancy of subject matter, (c) modeling, (d) opportunities for cooperative learning, (e) opportunities to practice skills with teacher coaching, and (f) evaluation and reflection of lessons. Teachers received feedback on their implementation of these components, which measured their fidelity of implementation of the main components of each respective model. The results indicated that teachers increased implementation of the main components of each instructional model after participating in training with coaching. Additionally, teachers who participated in the training and coaching sessions had improved instructional quality and attended to students' reading comprehension skills more frequently than teachers in the control group. Although the training and coaching sessions had a positive effect on teacher instructional behaviors, not all components included during the training of each model were implemented by teachers. The authors suggested that additional coaching sessions could support teachers to implement more of the expected instructional behaviors.

To engage teachers in learning about and implementing EBPs, Diamond and Powell (2011) conducted a series of studies to investigate the effects of elements of professional development and coaching support on teacher and student outcomes. In one study (i.e., study three), the authors used an iterative approach to professional development that included supervisory coaching to improve teachers' language and literacy instruction at a community childcare center. Five teachers participated in coaching that included a 2-hour training and follow-up support. The supervisory support included teachers video-recording their implementation of a literacy intervention and a literacy coach providing feedback with specific recommendations for improved implementation. Teachers were then asked to video-record

implementation of the specific recommendations provided by the coach. Teachers submitted a various number of video-recorded sessions (M = 7.0, SD = 1.5, range = 2–9) over 10–12 weeks. The authors employed semi-structured interviews to analyze teachers' perceptions of the coaching intervention. Overall, the results indicated that teachers had positive reactions about the experience and perceived the professional development support, inclusive of supervisory coaching, as valuable. Several suggestions for improvement included shortening feedback to short paragraphs or bullet points and limiting embedded links to video exemplars.

In a follow-up study (i.e., study 5), Diamond and Powell (2011) considered the teachers' suggestions and adapted the coaching support. The revised coaching support included on-site coaching visits with observations and consultation in addition to video-recording intervention sessions. In this follow-up study, 34 Head Start teachers were assigned to intervention (n = 18) or control (n = 16) groups. Teachers in the intervention group received a 1-day training on EBPs in vocabulary and phonological awareness instruction. Then teachers participated in supervisory coaching support for 16 weeks across a total of 12 coaching sessions inclusive of on-site (n = 4) and video-recorded sessions (n = 8). During the supervisory coaching sessions, teachers received individualized feedback on strategies for teaching vocabulary and phonological awareness skills. The authors found that teachers in the intervention group provided more vocabulary instruction (M = 7.12 words defined) than teachers in the control group (M = 3.7 words defined). There were also increased child utterances (M = 163 vs. M = 119), teacher utterances (M = 185 vs. M = 137), and teacher questions (M = 66 vs. M = 54) in intervention teachers' classrooms compared to control teachers' classrooms during large group sessions at the end of the semester. Overall, the authors synthesized results of these studies and found the iterative coaching process, including

training and supervisory coaching, promoted teachers' use of EBPs during vocabulary and phonological awareness instruction.

Researchers have investigated the impact of supervisory coaching on student achievement in addition to the impact on teachers' instructional practices. Powell et al. (2010) investigated the effects of an early literacy professional development with expert coaching on the teaching behaviors of Head Start teachers and the literacy achievement of their students. The authors used two randomized control trial comparisons across 2 years with separate cohorts of teachers and students to investigate the effects of early literacy professional development with supervisory coaching. Eighty-eight teachers and 759 children participated in the study, and three early childhood specialists served as literacy coaches. All teachers participated in a one-semester professional development intended to improve their use of EBPs in literacy that would lead to improved student literacy achievement. The intervention included training, a 2-day workshop, and supervisory coaching sessions. Coaches, who were university employees, observed implementation of an evidence-based instructional practice during reading instruction across 15 weeks and provided biweekly supervisory coaching support. The supervisory coaching support consisted of written feedback on strengths and recommendations based on observations. The results indicated the intervention had positive effects on the general classroom environment (e.g., six factors such as organization and management) and classroom supports for early literacy and language development. The authors also found positive outcomes for students' letter knowledge, blending, writing, and concepts of print knowledge.

Similarly, Brownell and colleagues (2017) examined special education teachers' reading instruction and student reading outcomes via an experimental randomized block design and compared the effects of two professional development models. Special education teachers in the

intervention group participated in a Literacy Learning Cohort (LLC), which consisted of a 2-day content-focused professional development with follow-up meetings, supervisory coaching, and self-analysis of video-recorded sessions. Conversely, teachers in the control group only participated in the 2-day professional development. Forty-two special education teachers participated in the study; 22 received the enhanced professional development intervention and 20 received the 2-day professional development. All teachers taught reading to students with SLD in the upper elementary grades. Seven coaches, all with extensive experience in teaching, coaching, and reading intervention research, provided individualized support to teachers in the intervention condition four times based on video-recorded observations. Coaches met with teachers to debrief and provide recommendations for further development of implementation of reading strategies after observations. The results demonstrated that extended and content-focused professional development with coaching support improved special education teachers' instructional practices and quality of instruction in reading. Furthermore, the LLC model had a significant, moderate to large effect on students' word attack and decoding skills, which is reflective of the increased use of evidence-based word study strategies by teachers in the LLC group. This finding suggests that changes in teachers' behaviors influenced students' reading achievement.

As teachers' behaviors change due to effective coaching support, teachers may require decreased support across time. In a study examining how coaching responsibilities are impacted by changes in teachers' behaviors, Collet (2012) used a mixed-method case study to investigate how coaches provided decreased scaffolded support over time after engaging in coaching interactions with teachers. In this gradual release of responsibility model, coaching behaviors included (a) modeling, (b) making recommendations, (c) asking probing questions, (d) affirming teachers' decisions, and (e) providing praise. The goal of the gradual release of responsibility

was to decrease teacher dependence on a coach and increase interdependence and collaboration between the coach and teacher. Three coaches who were professors or doctoral students provided coaching support to 46 preservice and inservice teachers tutoring students in a reading clinic. Qualitative data gathered included notes about observations, interviews, and examination of artifacts, and quantitative data included the frequency of each type of coaching behavior implemented across each coaching session. Results from the qualitative and quantitative data analysis indicated that coaching support transitioned from modeling, making recommendations, and asking probing questions to affirming teachers' decisions and providing praise over time. The author described that teachers became more competent and confidence as coaching support decreased. For example, coaches' comments on lesson plans and reflections were lengthy at the start of tutoring but became shorter over time.

To summarize, supervisory coaching for inservice general and special education teachers can improve their implementation of research-based instructional behaviors during reading which has been suggested to increase students' reading achievement (Brownell et al., 2017; Gersten et al., 1995; Jager et al., 2002; Powell et al., 2010). Therefore, training combined with supervisory coaching for inservice teachers can be considered an effective alternative method to traditional professional development in reading.

Preservice Teachers. Many inservice teachers are not implementing EBPs in their classrooms, and if they do, they often do not implement EBPs with fidelity (Maheady et al., 2013) which can negatively impact student outcomes (Furtak et al., 2008; Kovaleski et al., 1999). As PSTs transition to their role as classroom teachers, they are likely to continue to use practices they implemented in their first year of teaching throughout their teaching careers (Griffin & Kilgore, 1995; Rock et al., 2014; Scheeler et al., 2016). To prepare PSTs to

implement EBPs with fidelity in future teaching contexts, TPPs can provide coaching support (e.g., supervisory coaching) to PSTs to when implementing EBPs during reading so they are better prepared with the knowledge and skills to identify and implement EBPs as classroom teachers (Capizzi et al., 2010; Lignugaris-Kraft & Marchand-Martella, 1993; Mallette et al., 1999; Meisner, 2020; Morgan et al.,1994; Peeples et al., 2019).

Researchers have studied the effects of supervisory coaching with peers as expert coaches on PSTs' fidelity of implementation and teaching behaviors during reading instruction. For example, Lignugaris-Kraft and Marchand-Martella (1993) examined the effects of supervisory coaching from more advanced peers on beginning PSTs' presentation and error correction skills during a Direct Instruction practicum. Eight special education student teachers served as peer coaches to 19 junior special education undergraduate students across three academic quarters. The special education teachers selected as peer coaches were identified by their supervisors as possessing excellent teacher-directed instructional skills and received a high letter grade in their Direct Instruction practicum. The undergraduate students used several Direct Instruction programs including those targeting reading skills during their practicums. During implementation of the program, peer coaches conducted eight observations and following the observations, provided verbal and written feedback on the presence and absence of targeted teaching behaviors. Results indicated significant improvement of PSTs' presentation and error correction skills using Direct Instruction throughout the practicum after receiving peer coaching support.

Similarly, Morgan et al. (1994) used a multiple baseline across PSTs design to investigate the effects of peer coaching on instructional behaviors in reading of five low-performing special education PSTs. The PSTs were participating in a Direct Instruction practicum, and the peer

coaches were three undergraduate students identified as having superior performance during their own Direct Instruction practicum. During intervention, supervisory coaching occurred twice per week during 30- to 45-min sessions in which the coach and PST watched videorecorded teaching sessions, independently scored teaching behaviors, compared scores, and discussed target teaching behaviors for improvement. The coach and PST engaged in these procedures across 9–12 sessions during intervention. The results indicated the presence of a functional relation between supervisory coaching and PSTs' effective instructional behaviors during reading sessions, as well as improved rates of general and specific praise statements offered from PSTs to students.

In another study with peer coaches as experts, Mallette et al. (1999) implemented a multiple baseline across participants design to investigate the effects of in-person conferencing with peer coaches. Six PSTs enrolled in a general education TPP participated in the study and worked in dyads with one student per dyad. All three students who received intervention from the PST dyads were identified with SLD. During intervention, the PSTs implemented four components of the Peer Assisted Learning Strategy (PALS) reading intervention and engaged in reciprocal coaching (i.e., alternate observations of teaching with immediate feedback following the session) to deliver performance feedback. Reading tutoring occurred in 60 min sessions twice per week for 8 weeks. The results indicated that all students in the study demonstrated improvement in their reading comprehension, and this finding was attributed to PSTs' increased accuracy of fidelity of implementation as a result of peer supervisory coaching.

In previously summarized studies for PSTs, peer coaches served as experts to provide feedback via supervisory coaching, and in some of these studies, technology was leveraged to support the coaching feedback. Researchers have also investigated the use of technology (e.g.,

video-recorded sessions) when experts who were not peers served as coaches. Peeples and colleagues (2019) used a randomized control trial to investigate the effects of multimedia instruction and performance feedback from coaches on PSTs' implementation of EBPs for vocabulary and knowledge of application. Two hundred PSTs participated across five universities, and students were assigned to traditional lecture instruction, assigned reading, or multimedia instruction plus performance feedback. University instructors provided instruction and feedback to participants based on one video-recorded lesson. The results indicated that PSTs who received multimedia instruction plus performance feedback implemented more of the research-based practices for vocabulary instruction more frequently and for longer durations of time. A limitation of this study is that PSTs were not able to work with real students when implementing EBPs in reading.

Capizzi and colleagues (2010) also analyzed video-recorded lessons in a multiple baseline across participants design to investigate the effects of video-recorded analysis and expert consultative feedback on special education PSTs' implementation of effective lesson components, rate of praise statements, and rate of opportunities to respond. Three PSTs participated in the study delivering instruction in a 10 hr weekly clinical experience. The coach for all participants was a doctoral student in a special education program. PSTs video-recorded their instructional sessions during the same instructional period each day (i.e., reading group, math group) and received feedback via supervisory coaching at an in-person consultative meeting with the coach for two to three sessions. The results demonstrated that PSTs' instruction improved following expert coaching with the greatest improvements in effective lesson components and specific praise. Two of the PSTs also demonstrated improvement in delivering

opportunities to respond. The PSTs highly rated the intervention which suggests they found the supervisory coaching sessions helpful.

To specifically address PSTs' perceptions of supervisory coaching, Meisner (2020) used a qualitative case study design to examine secondary PSTs' perceptions of instructional coaching during their semester of student teaching. Four PSTs, including one who taught English Language Arts, participated in a coaching sequence that included collaboration and feedback via video conferencing, emails, and in-person meetings to discuss lesson modifications and other classroom related concerns (e.g., classroom management). PSTs also participated in group and individual interviews three times throughout the study. Individual interviews occurred before and after PSTs' semester of student teaching, and the group interview occurred once after the semester of student teaching. The results suggested that PSTs valued being assigned a coach that was easily accessible, enjoyed receiving instructional advice and feedback on a lesson, and were accepting of personal support without being evaluated.

Summary of Supervisory Coaching. The aforementioned research on supervisory coaching to support PSTs' instructional behaviors or practices and fidelity of implementation of EBPs demonstrates this approach to coaching can be an effective method to employ during TPPs to equip PSTs with improved instructional skills (Capizzi et al., 2010; Lignugaris-Kraft & Marchand-Martella, 1993; Meisner, 2020; Morgan et al.,1994; Peeples et al., 2019). Research also has indicated that student outcomes have improved when PSTs demonstrated improved instructional behaviors after receiving supervisory coaching when implementing EBPs in reading (Mallette et al., 1999). These observed effects are similar to those supported by research on supervisory coaching during reading instruction with inservice teachers. Additionally, peers as expert coaches and video-recorded sessions as a means to provide feedback to PSTs was a

common support that contributed to improved PST instruction and student outcomes (Capizzi et al., 2010; Lignugaris-Kraft & Marchand-Martella, 1993; Mallette et al., 1999; Morgan et al.,1994; Peeples et al., 2019). PSTs also indicated they had positive perceptions of supervisory coaching when asked about their experiences (Capizzi et al., 2010; Meisner, 2020).

Overall, supervisory coaching following training is a form of professional development that can be used to improve inservice teachers' and PSTs' reading instruction. An important consideration of supervisory coaching is that inservice teachers or PSTs do not have the opportunity to receive feedback in-the-moment, and teachers who do not respond to supervisory coaching may require more supportive or intensive levels of coaching support. More intensive coaching support oftentimes includes opportunities for coaches to model skills or practices which has been noted as highly valued and a critical aspect of coaching support for some teachers (Gettinger & Stoiber, 2016; Quick et al., 2009). This more intensive level of coaching support can result in prolonged maintenance of learned teaching behaviors compared to supervisory coaching (O'Reilly et al., 1992) and may produce faster acquisition of and greater accuracy implementing effective teaching behaviors (O'Reilly et al., 1992, 1994).

Side-by-Side Coaching During Reading Instruction

Side-by-side coaching is a more intensive form of coaching support in which an expert provides in-vivo coaching during teaching sessions (Kretlow & Bartholomew, 2010). This expert feedback in-the-moment is oftentimes related to the accuracy of implementation of specific teaching behaviors (Kretlow & Bartholomew, 2010). During side-by-side coaching, the teacher has an opportunity to immediately see exemplar teaching behaviors via coach modeling and may also have an opportunity to practice the teaching behaviors afterwards with immediate feedback. Coaching elements prevalent in studies with side-by-side coaching include (a) lessons modeled

by an expert and (b) observations with feedback meetings prior to and during intervention with the teachers (Kretlow & Bartholomew, 2010). During feedback meetings, the coach provides the teacher with strengths and recommendations based on observations. An additional component noted by Stichter and colleagues (2006) includes ongoing access to the coach via email assistance during the intervention.

Side-by-side coaching may be a critical component of professional development for teachers when implementing a newly learned strategy and can be an effective support to improve teachers' fidelity of implementation of EBPs during reading instruction (Kretlow & Bartholomew, 2010; Tschannen-Moran & McMaster; 2009). Results of this literature search indicated that side-by-side coaching has been implemented with inservice teachers more often than with PSTs and has documented effects of improved inservice teachers' instructional behaviors and student outcomes (Amendum, 2014; Gettinger & Stoiber, 2016; Quick et al., 2009, Sailors & Price, 2010; Tschannen-Moran & McMaster, 2009; Varghese et al., 2021). Side-by-side coaching also has been used as a coaching support to improve PSTs' instructional behaviors, although it is often referred to as performance feedback instead of a form of coaching (Scheeler & Lee, 2002; Scheeler et al., 2012). Researchers also have examined teachers' self-efficacy (Tschannen-Moran and McMaster, 2009) and teachers' perceptions of side-by-side coaching (Amendum, 2014).

Inservice Teachers. Side-by-side coaching has been implemented as a professional development model with inservice teachers to determine the effects on teachers' behaviors and student outcomes in reading. In a mixed-methods study, Quick and colleagues (2009) examined qualitative (e.g., interview protocols) and quantitative (e.g., teacher professional development logs) data to determine which characteristics of professional development were associated with

teachers' use of instructional practices and predicted students' reading achievement during a districtwide reform. Across nine schools, participants included 100 inservice general education elementary teachers during the first year, and 106 teachers in the second year. During this study, teachers participated in a districtwide reform of professional development which included (a) a focus on content centered on subject-area curriculum and assessment; (b) peer coaches who co-taught, modeled demonstrations, and provided feedback; and (c) an emphasis on collaboration to strengthen knowledge and improve problem solving. The authors found that teachers valued professional development that included (a) collaboration among and between grade levels; (b) opportunities for modeling, practice, and feedback consistent with typical coaching activities; (c) professional development based on needs of the teachers; (d) an environment that was safe and trusting; and (e) connections to broader school goals and other professional learning experiences. The finding that teachers valued coaching that included opportunities to observe modeling of instructional strategies, practice new techniques, and receive immediate feedback is consistent with side-by-side coaching procedures. Results also indicated that professional development inclusive of coaching with an emphasis on content and curriculum was associated with a higher frequency of teachers' use of instructional practices that have been predicted to increase students' reading comprehension skills; however, definitions of coaching procedures (side-by-side coaching, supervisory coaching) across school sites were not clear related to this finding.

To investigate the impact of side-by-side coaching with inservice teachers and the effects on teachers' behaviors during reading instruction, Gettinger and Stoiber (2016) investigated the effects of two professional development models on Head Start teachers' literacy related behaviors and their classroom environment. The authors used a randomized group design to investigate these effects, and both of the professional development models in this study included

side-by-side coaching support. Twenty-two teachers participated and were assigned to either (a) biweekly coaching sessions over a 9-month period with in-vivo model demonstration on how to incorporate EBPs during book reading, or (b) coaching sessions that did not include explicit demonstration and modeling of these key literacy skills. The results indicated that teachers who received the coaching support with model demonstrations engaged in teaching behaviors that focused on foundational literacy skills to a greater extent than those who did not receive the model demonstration coaching indicating the modeling component of side-by-side coaching is important.

In a more recent study also investigating teacher behaviors, specifically fidelity, and the impact on student outcomes, Varghese et al. (2021) examined the effects of elementary teachers' fidelity of implementation of Targeted Reading Instruction (TRI) on the reading and vocabulary outcomes of students identified as at risk for reading disabilities. One hundred kindergarten and first grade teachers participated in a 3-day professional development program and were trained on implementing and differentiating evidence-based reading strategies based on students' targeted needs. In addition to the training, all teachers received weekly webcam coaching support over 6 to 8 weeks. This side-by-side coaching support included observations conducted by a TRI coach with immediate feedback provided both in-the-moment and in 5–10 min debriefs after lessons. The coach also emailed a summary of the feedback to teachers after each coaching session (i.e., supervisory coaching). The focus of the coaching sessions was to support teachers in implementing the reading strategies with fidelity. Coaches provided performance-based feedback including clarifications of misunderstandings and modifications to improve teachers' fidelity. The authors examined if professional development inclusive of coaching support was related to reading and oral vocabulary gains in the spring. They also investigated if teachers'

years of participation in TRI moderated the relationship between intervention fidelity and students' reading and vocabulary outcomes. Results indicated that teachers with higher adherence, or implementation of TRI as intended, was directly associated with letter-word identification and oral vocabulary gains when teachers were implementing TRI for a second year. In addition, a greater exposure to TRI was related to greater gains in word reading and reading comprehension outcomes for students when their teachers were in their second year of TRI implementation. Side-by-side coaching increased teachers' fidelity of implementation of the reading intervention, and students demonstrated increased reading performance as a result.

Other studies have also examined the impact of side-by-side coaching on both teacher- and student-level outcomes reading instruction. Sailors and Price (2010) investigated the impact of two professional development models for elementary and middle school reading teachers that were aimed at improving teachers' instructional reading comprehension practices and students' reading achievement. The objective of this exploratory study was to determine if professional development models with coaching that occurred within the context of the teachers' classrooms was more effective than the traditional professional development model which solely included a workshop. The effectiveness of the professional development models was measured by students' reading comprehension outcomes. The participants included 44 general education teachers and 527 students. All teachers attended a 2-day workshop on intentional comprehension instruction. Teachers in the treatment condition also participated in classroom-based coaching support where two coaches, who were highly qualified instructional reading specialists, modeled demonstration lessons, cotaught lessons with teachers, provided feedback to teachers based on observations, and collaborated with teachers on cognitive reading strategies for their students. The authors employed a pretest posttest comparison group design and found that teachers included in the

workshop with follow-up classroom-based coaching support (i.e., side-by-side coaching) outperformed teachers who participated in the workshop only professional development on measures of teachers' reading instructional behaviors. Students of teachers with the follow-up support also demonstrated greater gains in reading comprehension.

In another study measuring student outcomes, Amendum (2014) also examined inservice teachers' perceptions of coaching (supervisory and side-by-side coaching) as a form of professional development. The authors used a mixed methods study design to examine the effects of a classroom-based early reading intervention and professional development that included a 1.5-day initial training and weekly coaching on the outcomes of a first grade team of teachers and their students. Ten participants made up the first grade team of teachers (six classroom teachers, three reading specialists, and one curriculum coordinator) and 45 students participated in the study with 29 students in the intervention group and 16 students in the comparison group. Students in the intervention group received one-on-one reading intervention for 15–20 min sessions inclusive of three instructional parts: (a) familiar rereading, (b) word study, and (c) teacher-guided reading with writing extensions. The professional development intervention consisted of embedded professional development in early reading development and weekly coaching from a literacy coach. Embedded professional development refers to teachers within a professional learning community (e.g., similar subject area or same school) working together to problem solve over time. The reading intervention consisted of explicit and diagnostic instructional strategies delivered by first grade teachers in one-on-one settings. The structure of the weekly coaching visits was based on teacher preferences for coaching and included observations with feedback (i.e., supervisory coaching), coaching and feedback during implementation of the reading intervention (i.e., side-by-side coaching), or a combination of each

of these procedures. On student reading outcomes, first graders who participated in the reading intervention made greater gains than students in the comparison group across all four reading outcomes (i.e., letter-word identification, word attack, spelling of sounds, and passage comprehension). Findings from the analysis of semi-structured interviews, documents, and pre/post questionnaires indicated that first grade teachers had changed perceptions of literacy teaching and learning across the intervention and held varied perceptions of the effectiveness of the intervention and professional development. Generally, teachers rated the professional development and reading intervention procedures as socially acceptable; however, two teachers noted concerns about dedicating instructional time to working one-on-one with a struggling reader.

Researchers have also investigated teachers' self-efficacy when learning new instructional procedures. Tschannen-Moran and McMaster (2009) conducted a quasi-experimental study examining inservice teachers' self-efficacy and implementation of newly learned teaching strategy after participating in one of four different professional development formats. The four professional development models included (a) a 3-hour workshop; (b) a 3-hour workshop with modeling; (c) a 4-hour and 30-min workshop with modeling and practice; and (d) a 5-hour and 45-min workshop with modeling, practice, and coaching. Ninety-three primary general education and special education resource teachers participated in the professional development. The coaching occurred as a follow-up support in the weeks following the workshop and consisted of small group reviews of a teaching behavior, a 15-min one-on-one coaching session collaborating with the coach, and a 30-min coaching session with the coach in the teachers' classroom (i.e., side-by-side coaching). During the coaching sessions, the coach, who trained teachers on implementing the instructional reading strategy, provided teachers with

individualized and targeted feedback during their implementation of the reading strategy. Some teachers requested an additional follow-up coaching session in which the expert modeled the use of the new strategy in the teachers' classrooms. The results indicated the strongest effects on self-efficacy beliefs for teachers in the intervention condition with follow-up coaching sessions, and teachers who did not receive coaching support experienced a decrease in their self-efficacy during reading instruction.

Research on side-by-side coaching has demonstrated that this form of coaching support contributed to improved teacher and student outcomes. Side-by-side coaching support improved teaching behaviors during reading instruction (Gettinger and Stoiber, 2016; Sailors and Price, 2010), improved student outcomes in reading (Sailors and Price, 2010; Varghese et al., 2021), contributed to higher levels of fidelity associated with gains across student reading outcomes (Varghese et al., 2021), and improved teachers' self-efficacy during reading instruction (Tschannen-Moran and McMaster, 2009). Teachers also expressed positive perceptions of side-by-side coaching support during their reading instruction (Amendum, 2014). Although outcomes vary across studies and span various teacher and student level outcomes, side-by-side coaching can be an effective form of professional development that may impact various teacher and student outcomes. Further research investigating the impact of side-by-side coaching is warranted to clearly establish effects on various teacher and student outcomes.

Preservice Teachers. Research has indicated improved teacher fidelity of implementation, instructional behaviors, and reading outcomes for students when inservice teachers received side-by-side coaching during reading instruction (Amendum, 2014; Gettinger & Stoiber, 2016; Quick et al., 2009, Sailors & Price, 2010; Tschannen-Moran & McMaster, 2009; Varghese et al., 2021). However, there are fewer studies on the impact of side-by-side

coaching with PSTs. Although I was unable to locate studies in which PSTs were described as explicitly receiving side-by-side coaching during reading instruction, there are studies in which PSTs received immediate performance feedback via technology during reading instruction (Scheeler & Lee, 2002; Scheeler et al., 2012). Due to coaching oftentimes being categorized as performance feedback, it can be difficult to discern when side-by-side coaching was used to support PSTs. Based on the definition of side-by-side coaching, examples of performance feedback that include immediate feedback can be categorized as side-by-side coaching support. For example, Scheeler and Lee (2002) used a multiple baseline across participants design to investigate the effects of immediate corrective feedback provided via BIE technology during reading instruction. Three special education PSTs participated in a practicum using direct instruction to teach various reading skills (e.g., decoding) 1 day per week across 14 weeks. The coach, a doctoral student, provided delayed feedback during baseline and immediate, corrective feedback during intervention on PSTs' delivery of a three-term contingency in reading. The three-term contingency included PST presentation (e.g., "Read this word"), response by the student, and PST delivery of the consequence (e.g., "Good job" or corrective feedback). Feedback to PSTs was delivered via BIE technology, and the coach was present in the classroom conducting observations when PSTs delivered reading instruction to students with disabilities. The results indicated that immediate corrective feedback was more effective at increasing PSTs' instructional behaviors (i.e., three term contingency trials) than delayed feedback that occurred 10–15 minutes after the instructional session (i.e., supervisory coaching).

Similarly, Scheeler and colleagues (2012) used a multiple baseline across participants design to investigate the effects of immediate performance feedback (i.e., side-by-side coaching) on PSTs delivery of the three-term contingency during a practicum placement teaching reading

or math. This study differs from Scheeler and Lee (2002) as immediate feedback was provided via webcam and Bluetooth technology, and researchers who provided feedback did so remotely instead of on-site. Five special education PSTs participated by providing reading intervention to students who were identified as at-risk for disabilities by their classroom teachers. Two researchers provided feedback to PSTs on their delivery of a three-term contingency in reading during the practicum placement for all PSTs following the baseline and intervention protocol described in Scheeler et al. (2002). This practicum was also 14 weeks and sessions occurred 3–4 days per week, two times per day, for 15–20 min. The results were similar to the previous study as immediate feedback was more effective than delayed feedback, which occurred 5–15 minutes after instruction was delivered (i.e., supervisory coaching), at increasing PSTs' specific teaching behaviors during reading.

Summary of Side-by-Side Coaching. Although studies using the terminology "side-by-side coaching" are limited with PSTs, immediate feedback provided via technology during reading instruction is a variation of side-by-side coaching support that has increased PSTs' instructional behaviors (Scheeler & Lee, 2002; Scheeler et al., 2012). Outside of reading instruction, side-by-side coaching also has been implemented to improve PSTs' implementation of EBPs such as Class Wide Peer Tutoring (Maheady et al., 2004) and effective teaching behaviors (e.g., beginning instruction promptly, taking ongoing data) during Direct Instruction (Pierce & Miller, 1994). Additionally, side-by-side coaching has improved inservice teachers' instructional behaviors, fidelity of implementation, and student reading outcomes (Gettinger & Stoiber, 2016; Quick et al., 2009, Sailors & Price, 2010; Tschannen-Moran & McMaster, 2009; Varghese et al., 2021). Although studies on the impact of side-by-side coaching on student outcomes is limited, research with inservice teachers has demonstrated positive effects;

therefore, future research is needed to replicate the effects of side-by-side coaching on student outcomes in reading with inservice teachers and establish the effects with PSTs.

Multilevel Coaching During Reading Instruction

Supervisory and side-by-side coaching are models of professional development that are effective at increasing teachers' fidelity of implementation of research-based practices and instructional behaviors in reading, and these improvements during reading instruction may increase students' reading achievement (Kraft et al., 2018; Kretlow & Bartholomew, 2010). However, teachers have varying instructional needs, and not all teachers may require more intensive coaching as a follow-up support to training (Bursuck et al., 2004; Goodnight et al., 2020; Schnorr, 2013). Due to the nature of in-vivo modeling and feedback, side-by-side coaching also is more resource intensive than supervisory coaching. Therefore, a multileveled approach to follow-up support to meet teachers' individual needs can be employed instead of implementing universal support for all (Myers et al., 2011).

According to Wood and colleagues (2016), multilevel coaching is a responsive framework of coaching that often includes (a) initial training or high-quality professional development, (b) follow-up supervisory coaching, and (c) side-by-side coaching for teachers who require additional support. Observations of teachers should include direct measures of teacher performance that evaluate whether teachers have met mastery criteria of targeted teaching behaviors or fidelity of implementation. Data gathered from observations can inform movement among levels of coaching support (Wood et al., 2016). Multilevel coaching can be used to support teachers in improved implementation of EBPs with fidelity in classrooms (Bursuck et al., 2004; Schnorr, 2013). With improved fidelity of implementation of EBPs, research has indicated that student outcomes would likely improve (Al Otaiba & Fuchs, 2006;

Carroll et al., 2007; Durlak & DuPre, 2008; Furtak et al., 2008; Kaderavek & Justice, 2010; Kovaleski et al., 1999; Stein et al., 2008; Vaughn et al., 2015). Researchers have investigated the effects of multilevel coaching during reading instruction for inservice teachers; however, research is limited, and there is a lack of studies on multilevel coaching with PSTs in reading.

Inservice Teachers. Based on this review of studies of multilevel level coaching during reading instruction, multilevel coaching has demonstrated positive outcomes for both teachers and students. First, Bursuck and colleagues (2004) employed a federally funded model demonstration project, Project PRIDE, to examine beginning literacy outcomes and potentially prevent reading failure for elementary students. Project PRIDE was a multi-faceted project with components including (a) systematic phonemic awareness and phonics instruction incorporated into a classroom reading program, (b) multi-tiered teaching (e.g., RtI), (c) data-based decision-making, and (d) ongoing professional development with on-site coaching. Project PRIDE took place over 2 years and in three high-poverty elementary schools with both general education and special education teachers. The ongoing professional development component consisted of after-school workshops and summer institute trainings with observations of models and opportunities to practice instructional strategies. Data were collected on the extent to which trained enhancements (e.g., praise statements, error correction procedures) were implemented effectively across all tiers of teaching (i.e., Tier 1, Tier 2, Tier 3). The on-site coaching comprised of classroom observations with follow-up feedback in the form of supervisory coaching on performance of implementation of instructional strategies. The observation and feedback cycle continued until teachers demonstrated competence for each trained enhancement (e.g., offering three praise statement for every corrective statement). An additional feature of coaching was demonstration teaching in which coaches either modeled effective implementation of an

enhancement prior to a teacher beginning implementation or coaches modeled during teachers' lessons only if the teacher demonstrated difficulty implementing the strategy (i.e., side-by-side coaching). The results indicated that students in Project PRIDE outperformed students at a control school on curriculum-based measures (i.e., Nonsense Word Fluency and Oral Reading Fluency), and students in all three tiers made reading gains. Results from the teacher satisfaction questionnaire indicated high social validity that was likely due to the professional development strategy of direct, systematic training and follow-up coaching support including on-site coaching as teachers rated they were highly satisfied with the various components of Project PRIDE.

In a study on coaching support to increase preschool teachers' use of foundational reading instructional strategies, Hsieh and colleagues (2009) implemented a multiple baseline design across three clusters of teaching strategies. The three clusters of teaching strategies included (a) vocabulary information, comprehension, and narrative structure; (b) phonological awareness and the alphabetic principle; and (c) print concepts and written language. The study design was replicated with five early childhood teachers to investigate the effects of coaching on teachers' ability to apply each teaching strategy. The coaches were two early childhood special education university faculty. Although not described as multilevel coaching, the coaching sequence included three components with implementation of the third component contingent upon teachers not meeting the predetermined criterion for mastery of 80% or greater across three sessions. The three components of the coaching sequence were (a) introduction to the cluster (e.g., overview of outcomes, description of strategy, plan for practicing); (b) practice with observation and feedback; and (c) booster session if needed with a review of outcomes, teaching strategy, and plans for practicing. The intervention sessions occurred semiweekly for an average of 6 weeks; however, some teachers required 8–12 weeks as the number of coaching sessions

was dependent on how long it took teachers to reach mastery criterion for each cluster of teaching strategies. The results indicated the coaching package intervention increased and maintained teachers' use of the three clusters of teaching strategies. Teachers implemented the three clusters of teaching strategies more often during intervention than in baseline and continued to implement the strategies at higher levels than baseline during the maintenance phase. All but one teacher required at least one booster session when implementing one or more of the teaching strategies, although the number of booster sessions varied for each teacher across clusters. Although experimental control was not established for student outcomes due to the lack of a control group, student reading scores were statistically higher post-intervention on picture naming, alliteration, rhyming, and print knowledge. Results from the social validity survey indicated that teachers found the training to be useful and valued the coaching support.

As noted in the previous study, not all teachers required the same amount of coaching support as they met criterion for mastery as different points. A critical component of multilevel coaching is that it is a responsive framework, and teachers receive scaffolded support based on observations of their performance (Wood et al., 2016). In a study specifically evaluating multilevel coaching, Schnorr (2013) used a multiple baseline across teachers design to investigate the effects of multilevel coaching on teachers' use of research-based strategies during beginning reading instruction. Multilevel coaching included three levels of support: (a) 3-hour inservice training, (b) supervisory coaching, and (c) side-by-side coaching. Coaching support was systematically increased across levels of support based on whether teachers met mastery criterion of at least 80% for correctly implemented group instructional units. Group instructional units were defined as a single or series of three-term contingencies that included one of the following formats: (a) model-test, (b) model-lead-test, or (c) test-only. Students must

independently and correctly respond for the group instructional unit to be counted as being implemented correctly. Nine first grade teachers participated in the study, and all teachers received Level 1 support, which included inservice training on research-based strategies (e.g., choral responding, response cards, model-lead-test, and systematic error correction) to be used within a district selected core reading program. Level 2 support (i.e., supervisory coaching) was systematically introduced across teachers for those who had not met mastery criterion; those who had met mastery criterion of at least 80% of correctly implemented group instructional units moved into the maintenance phase. Three of the nine teachers demonstrated the need for Level 2 supervisory coaching and improved their percentage of correctly implemented group instructional units after one supervisory coaching session, which included an observation and feedback meeting. No teachers required Level 3 support of side-by-side coaching. The results suggested that follow-up support for teachers could assume a multilevel approach to meet the diverse needs of teachers and that sometimes the most intensive form of coaching support (i.e., side-by-side) is not needed at all.

In a similar study, Goodnight and colleagues (2020) used a multiple baseline across teachers design to examine the effects of inservice training and multilevel coaching on teachers' use of research-based strategies during reading instruction. Nine elementary general education teachers participated in the study and were trained on using research-based strategies to include model-lead-test, unison responding, and systematic error correction during phonics and phonemic awareness instruction. The multiple baseline design consisted of up to four phases: (a) initial baseline, (b) post inservice training, (c) post side-by-side coaching, and (d) maintenance. During the initial baseline, no training was provided to the teachers. Prior to entering the second baseline phase, all teachers participated in a 3-hour inservice training on research-based

enhancements for beginning reading instruction with demonstrations and opportunities to practice. The third phase, side-by-side coaching, was provided only to teachers who did not meet mastery criterion of at least 80% correctly implemented group instructional units (as defined in Schnorr et al., 2013). Side-by-side coaching consisted of three components: (a) individual preconferences, (b) 30- to 45-min side-by-side coaching sessions, (c) and individual feedback meetings. The coach, a doctoral student in special education, modeled specific phonics or phonemic awareness instructional strategies and systematic error correction procedures during the side-by-side coaching, and the teacher was prompted to practice implementing the skill following the model. The last phase of the study was maintenance. Teachers who met mastery criterion during the second phase entered maintenance and did not receive side-by-side coaching. The results indicated that six teachers only required the half-day inservice training (i.e., phase 2) to improve their correct implementation of research-based strategies to at least 80% whereas three teachers required the more intensive side-by-side coaching support. Although a functional relation was not clear due to high variability of correctly implemented group instructional units during the second baseline phase, all three teachers' data were at higher levels and two teachers' data were more stable during the side-by-side coaching phase compared to the first and second baseline phases. All six teachers who met mastery criterion during the second baseline phase improved and maintained their use of correctly implemented group instructional units. These results align with the rationale for multilevel coaching in that some teachers may require more intensive levels of support to implement trained strategies correctly and some teachers may not (Wood et al., 2016).

Preservice Teachers. PSTs enter the teaching profession with a variety of background experiences and prior knowledge, and not all PSTs may require the same intensity of support

when implementing EBPs in reading (Dawkins et al., 2009a, 2009b). For example, Dawkins and colleagues (2009a) implemented an exploratory study and recruited PSTs to serve as reading tutors to develop the reading skills of students identified as at-risk for disabilities. Six primary grade students participated in the reading tutoring intervention during 32 sessions across 8 weeks for 15 min each session. Eight PSTs participated as reading tutors, and each PST worked with a student one time per week. PSTs that volunteered for the program had a range of experiences including some who were in their first year of their TPP with minimal clinical experiences, and some had already completed their culminating practicum in their fourth year of their TPP. All PSTs received a 2-hr small group training and ongoing, individual training and support from a reading specialist throughout the reading tutoring program. Researchers measured PSTs' fidelity of implementation of the reading intervention procedures and PSTs' understanding of the reading process. The results demonstrated that all PSTs were able to implement the reading intervention procedures with fidelity and had a satisfactory understanding of the reading process after tutoring, although the frequency of feedback and individual support required for each tutor is not reported. Notably, PSTs in their fourth year of their TPP were described as the most effective reading tutors as they engaged students in substantial learning instead of simply progressing through lesson components. This finding suggests that experience and background plays a role in PSTs' knowledge and skills to implement reading intervention as all PSTs in this study participated in the same initial training. Although not multilevel coaching, the various needs and skills of PSTs indicated that PSTs may require varying levels of supports after being trained to implement reading instruction during tutoring with students at-risk for disabilities. Multilevel coaching support offers a potential approach that is responsive to the level of support required by PSTs' individual strengths and needs.

Dawkins and colleagues (2009b) reported specifically on the knowledge and skills gained by PSTs who participated as volunteers in the reading tutoring intervention program described in Dawkins et al. (2009a). Findings on PSTs' implementation of two instructional skills, administering a running record and engaging students in book orientation skills, were reported. Although noted as initially difficult for some PSTs, all PSTs were able to successfully calculate accuracy for students' oral reading fluency. Second, all tutors except two were able to implement book orientation skills with their student beginning at the first tutoring session. The two students who had difficulty teaching book orientation skills required additional modeling from their peers and the reading specialist. After additional modeling, the two tutors were able to successfully teach book orientation skills. These findings provide further evidence that PSTs may require various levels of coaching support during reading tutoring, and additional modeling of skills by an expert may be required for some PSTs to successfully implement skills learned post training.

Relevant theory also supports that multilevel coaching may be an effective framework to support PSTs as adult learners. Adult learning theory (Knowles, 1980) highlights six assumptions of adult learners that should be employed to support adult learning (Knowles et al., 2005): (a) Self-concept transitions from dependent to self-directed from childhood to adulthood; (b) Adult learners use their previous experiences as resources for learning; (c) Readiness to learn becomes more oriented to developmental tasks and social roles; (d) Readiness to learn depends on relevancy of a task; (e) Application of knowledge transitions from postponed to immediate; (f) Motivation to learn is internal, although adult learners feel pressure from external events; and (g) Adult learners identify tasks perceived as valuable to invest time in learning. During coaching interactions with PSTs, coaches can apply these six assumptions to facilitate successful learning experiences for PSTs. For example, coaches should consider PSTs' previous

experiences as resources for learning and respond appropriately to PSTs' readiness to learn based on each PSTs' perceived relevancy of tasks. Each assumption of adult learning theory can be applied to provide scaffolded support based on the individual and unique strengths and needs of PSTs as adult learners.

Other pertinent theory, Vygotsky's zone of proximal development (Vygotsky, 1978), has been applied within TPP to differentiate between PSTs' actual and potential levels of development (Warford, 2011). PSTs' actual level of development is what they are able to independently execute without assistance or mediation, and their potential level of development is what their future performance would be if provided with scaffolded support. Related to coaching, this scaffolded support is what coaches are able to provide PSTs to support their future performance. Coaches can continually adjust levels of support provided to PSTs based on their current performance. Providing PSTs, who are novice learners, with guided educational experiences also encourages and advances their individual learning (Berk & Winsler, 1995). Both theories, Vygotsky's zone of proximal development and Knowles' adult learning theory, can be applied to inform individualized coaching interactions and support for PSTs.

Future Research

Although varying levels of coaching support (i.e., supervisory and side-by-side coaching) and a multilevel framework of coaching have indicated positive effects on inservice teachers' fidelity of implementation of EBPs in reading, improved instructional behaviors, and subsequently increased student achievement in reading, the literature suggests that future research is needed to investigate varying effects of coaching, specifically with PSTs. First, research is needed to determine if a particular method of coaching is more effective than other types of coaching (Powell et al., 2010). Second, future research on professional development

models should be reflective of classroom practices and incorporate various components of support including training with opportunities for practice and follow-up support as warranted (Bursuck et al., 2004). Third, observational learning during coaching support related to specific instructional strategies in reading may be a useful pedagogical model for coaches to employ. TPPs could incorporate observational learning during coaching support for PSTs as inservice teachers have demonstrated improved implementation of literacy skills via this approach (Gettinger & Stoiber, 2015). Finally, based on recent research and relevant theory indicating teachers may implement interventions at varying levels and may require differing levels of ongoing coaching support, there is a need to investigate the level of support that teachers require to make adequate improvements in fidelity of implementation and teaching behaviors (Dawkins et al., 2009a, 2009b; Goodnight et al., 2020; Knowles, 1980; Myers et al., 2011; Schnorr, 2013; Vygotsky, 1978). Additional research is needed to determine the effects of multilevel coaching on PSTs' fidelity of implementation during reading instruction as PSTs are novice learners and may require varying levels of coaching support during reading instruction (Dawkins et al., 2009a, 2009b; Knowles, 1980; Vygotsky, 1978). Overall, the most important consideration of professional development in reading for teachers is that the ultimate goal is to improve student reading achievement. Therefore, professional development models should be responsive to teachers' individual needs and centered on eliciting measurable changes in teachers' behaviors to affect positive change on student reading outcomes (Yoon et al., 2007).

Summary

Research has indicated that coaching supports can improve teachers' instructional teaching behaviors and increase their use and fidelity of implementation of newly learned research-based strategies (Kraft et al., 2018; Kretlow & Bartholomew, 2010; Tschannen-Moran

& McMaster, 2009). In addition, research also has demonstrated that with improved fidelity of implementation of reading strategies and instructional reading behaviors via ongoing follow-up support, reading outcomes for students are likely to improve (Brownell et al., 2017; Bursuck et al., 2004; Quick et al., 2009; Sailors & Price, 2010; Varghese et al., 2021). Coaching support is a form of follow-up support that can be provided using a variety of methods including supervisory coaching and side-by-side coaching. These dominant coaching models differ by the integration of in-vivo feedback for teachers based on observations during side-by-side coaching compared to delayed feedback during supervisory coaching (Kretlow & Bartholomew, 2010). However, research has indicated that not all teachers require side-by-side coaching support to achieve mastery criterion for fidelity of implementation (Bursuck et al., 2004; Goodnight et al., 2020; Schnorr, 2013). When implementing a coaching model to support teachers' implementation of newly learned skills, multilevel coaching is a responsive approach that can support the varying needs of teachers. Relevant theory (Knowles, 1980; Vygotsky, 1978) and results of multilevel coaching support with inservice teachers (Bursuck et al., 2004; Goodnight et al., 2020; Schnorr, 2013) suggest that multilevel coaching may serve as an effective framework for providing scaffolded follow-up support to address PSTs' individual abilities based on their background and experiences (Dawkins et al., 2009a, 2009b) rather than providing universal coaching support (Wood et al., 2016). Due to the lack of current research on multilevel coaching with PSTs, research is needed to determine the effects of multilevel coaching on PSTs' knowledge and skills and on subsequent student outcomes.

CHAPTER 3: METHOD

Study Purpose

The purpose of this study was to examine the effects of multilevel coaching support on PSTs' fidelity of implementation of an evidence-based reading intervention. Additionally, the study examined PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention. The study involved coaching six PSTs on how to implement an evidence-based reading intervention with fidelity. Fidelity was measured via a checklist that measured both structural and process dimensions. I implemented a quantitative, experimental, single-case, multiple-baseline across participants design to investigate the effects of multilevel coaching on PSTs' fidelity of implementation. This chapter provides information on the recruitment and consent process, participants, setting and context, experimental design, multilevel coaching intervention, materials, data collection, threats to validity, and data analysis.

Research Questions

1. What are the effects of multilevel coaching support on PSTs' fidelity of implementation of an evidence-based reading intervention?
2. What are PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention?

Recruitment and Consent Process

Prior to recruitment, I submitted a study protocol to the Institutional Review Board (IRB) to ensure study procedures protected the rights and confidentiality of study participants. After obtaining IRB approval, I recruited PSTs who were enrolled in READ 4161: Assessment, Design, and Implementation of Classroom Reading Instruction during their elementary education TPP. READ 4161 required participation in a clinical experience in which PSTs implemented a

reading intervention with a struggling reader. As the primary researcher, I recruited participants in person during the synchronous training sessions. The study began in January 2023 (See Appendix A for the Consent to Participate in the Research Study). Prior to data collection, I obtained written consent from all participants, and I selected six PSTs to participate in the multilevel coaching intervention. It was assumed that PSTs had low levels of fidelity prior to training because they were novice teachers who had not implemented the specific intervention before. More than six PSTs consented to participate in the study, so participants with the lowest fidelity of implementation percentages on the first two Level 1 probes were selected for inclusion. Each participant was assigned a pseudonym.

Participants

Six PSTs were selected to participate in the study. Inclusion criteria for participants included (a) enrollment in the elementary education TPP and (b) enrollment in READ 4161. The following criteria did not exclude participants from being considered for participation in the study: (a) enrollment as a dual education major, (b) enrollment as a graduate or undergraduate student, or (c) documentation of academic integrity, disposition issues, or poor academic performance. The following criteria excluded participants from being included in the study: (a) prior participation in implementation of the reading intervention, (b) prior classroom teaching experience that impacted their status as novice PSTs, and (c) initial assignment to tutor one student instead of two during the clinical experience.

PST 1: Logan

Logan was an undergraduate senior enrolled in a TPP as an elementary education major. She was 20 years old and identified as a woman. She identified her ethnicity as not Hispanic or Latino and her race as White. Her self-reported GPA was a 3.78.

PST 2: Ollie

Ollie was an undergraduate senior enrolled in a TPP as an elementary education major. She was 24 years old and identified as a woman. She identified her ethnicity as Hispanic or Latino and her race as White. Her self-reported GPA was a 4.0.

PST 3: Rene

Rene was an undergraduate senior enrolled in a TPP as an elementary education major. She was 21 years old and identified as a woman. She identified her ethnicity as Hispanic or Latino and her race as Black or African American. Her self-reported GPA was a 3.4.

PST 4: Greer

Greer was an undergraduate senior enrolled in a TPP as double major in elementary education and applied dance with an add on K–12 dance teaching licensure. She was 20 years old and identified as a woman. She identified her ethnicity as not Hispanic or Latino and her race as White. Her self-reported GPA was a 3.86.

PST 5: Peyton

Peyton was an undergraduate senior enrolled in a TPP as an elementary education major. She was 23 years old and identified as a woman. She identified her ethnicity as not Hispanic or Latino and her race as White. Her self-reported GPA was a 3.7.

PST 6: Dylan

Dylan was an undergraduate senior enrolled in a TPP as an elementary education major. She was 21 years old and identified as a woman. She identified her ethnicity as not Hispanic or Latino and her race as White. Her self-reported GPA was a 4.0.

Setting and Context

Elementary School

The study took place at an elementary school located in the southeastern United States. The school was a Title 1, university laboratory, public charter school and served students in kindergarten through fourth grades at the time of the study. Students enrolled at the elementary school had been identified as students at-risk for academic failure, at-risk for social-emotional or health-related factors, or were previously enrolled in an underperforming school. The school opened virtually during the 2020–2021 school year and during the COVID-19 pandemic with students entering the building for the first time in March 2021. During the first year, 75 students were enrolled across kindergarten (40 students), first grade (20 students), and second grade (15 students). Enrollment by race/ethnicity included 76% Black, 12% Hispanic, 6.67% two or more races, 4% White, and 1.33% Asian. During the 2022–2023 school year, 27 students were enrolled in kindergarten, 30 students in first grade, 38 students in second grade, 21 students in third grade, and 21 students in fourth grade.

Student Participants

Elementary-grade students who received the reading intervention volunteered to participate in an existing after-school reading tutoring program. Caregivers had previously provided consent for program participation. The students were identified by school personnel as having reading difficulties with early decoding skills. Inclusion criteria for students included (a) identification as a struggling reader by school personnel and (b) participation in an existing after school program not related to reading tutoring due to the availability of transportation services.

Reading Tutoring Intervention and Coaching Context

The reading tutoring intervention occurred in a two-on-one setting with two students and one PST. If a student was absent, reading tutoring may have taken place in a one-on-one context with one student and one PST. There were two tutoring sessions per week for a maximum of 17 tutoring sessions. The tutoring sessions occurred on Tuesdays and Thursdays as permitted observing the elementary and university calendars. Each tutoring session was approximately 25–30 min. The PST and students were seated at a table in the library or in the adjacent gym during each reading tutoring session. All applicable reading tutoring materials for the lesson were placed on the table with the Lesson Book in front of the students. The recording device (e.g., laptop, iPad) was positioned on the table with the emphasis of the videorecording on the reading tutoring materials. The PST sat next to or across from the students during each lesson.

All coaching sessions occurred one-on-one via email (i.e., supervisory coaching) or via email and in-person during the tutoring session (i.e., side-by-side coaching). If the reading tutoring session required side-by-side coaching support, the coach was visible to the PST and students and sat at the table where the reading intervention was taking place. This procedure was to ensure the coach was able to provide in-the-moment support as needed.

Primary Researcher and Secondary Observer

The primary researcher was a third-year doctoral student, former Graduate Research Assistant, and current Research Associate in the Department of Special Education and Child Development at the University of North Carolina at Charlotte. The researcher held a bachelor's and master's degree in Special Education (Multi-categorical, K–12). The researcher also studied Applied Behavior Analysis (ABA) during graduate studies and was a Board Certified Behavior Analyst (BCBA). Prior to the doctoral program, the researcher was a special education teacher at

an elementary school for five years. As a special education teacher, the researcher served a school in a different district than the district where this study occurred. The former school district also was located in the southeastern United States. The former school where the researcher was employed as a special education teacher was a Title 1, public elementary school and served students in pre-kindergarten through fifth grades. Enrollment for the 2021–2022 school year by race/ethnicity included 33% Black, 30.82% Hispanic, 29.65% White, 5.53% two or more races, 0.84% Asian, and 0.17% American Indian/Alaska Native. She supported students with disabilities by (a) implementing intensive, evidence- and research-based interventions across various academic and behavioral domains (e.g., reading, writing, math); (b) developing individualized goals based on students' strengths and needs; (c) engaging in progress monitoring and Data-Based Decision-Making (DBDM); and (d) collaborating with and supporting general education teachers to identify and respond to students' strengths and needs.

As the principal investigator, the researcher was the primary data collector and was responsible for (a) recruiting participants for the study; (b) co-leading the training on implementation of the reading intervention; (c) providing coaching support and feedback (i.e., supervisory and side-by-side coaching); (d) monitoring PSTs' fidelity of implementation; and (e) making decisions for multilevel coaching support based on PSTs' fidelity of implementation. The researcher had previously participated in training and coaching PSTs enrolled in READ 4161 who were participating in the reading tutoring program. The researcher served as the coach to all PSTs included in the study; therefore, in the subsequent sections of this chapter, the primary researcher will be referred to as the coach.

The secondary observer was a second-year doctoral student and Graduate Research Assistant in the Department of Special Education and Child Development at the University of

North Carolina at Charlotte. The observer held an MBA from the Wake Forest University School of Business, an M.S.Ed. from the University of Pennsylvania, and a B.S. from the North Carolina Agricultural and Technical State University. Prior to enrollment in the doctoral program, the secondary observer served as a school administrator for eight years and a gifted specialist for eight years, serving school districts in the northeastern and southeastern United States. The secondary observer had previously participated in training and coaching PSTs engaged in the reading tutoring clinical experience in a previous semester of the reading tutoring program. The secondary observer was trained to collect interobserver agreement (IOA) of the dependent variable and procedural fidelity of the multilevel coaching intervention.

Experimental Design

I implemented a quantitative, experimental, multiple baseline across participants design (Ledford & Gast, 2018) to investigate the impact of multilevel coaching on PSTs' fidelity of implementation of an evidence-based reading intervention. Multiple baseline across participants designs require participants to enter intervention in a time-lagged manner to be able to compare baseline to intervention conditions at three or more different points in time across three or more participants without withdrawing the intervention (Ledford & Gast, 2018). Baseline logic can be applied to time-lagged designs such as multiple baseline across participants (Cooper et al., 2019). When baseline levels are stable for the first participant, a prediction is made that if intervention was not applied, levels of responding would continue to be similar. Verification of the predicted levels of responding occurs if there is little or no change in subsequent tiers that are still subject to the baseline conditions. Replication of the effect of the intervention occurs when and only when the intervention is applied in subsequent tiers, and the behavior changes in a similar

manner as observed in the previous tiers. Phases of the design included baseline (i.e., Level 1), two phases of intervention (Level 2 and Level 3), and maintenance.

All PSTs entered Level 1 simultaneously. The Level 1 phase occurred post-asynchronous and synchronous training and prior to supervisory or side-by-side coaching. I collected a minimum of four data points during the Level 1 phase for all PSTs. Throughout this study, the requirement to meet fidelity included observation of at least 80% of expected behaviors across three consecutive sessions or at least 90% of expected behaviors for one session. When a PST met fidelity (i.e., observation of at least 80% of expected behaviors across three consecutive sessions or at least 90% of expected behaviors for one session) and appropriate pacing was observed (i.e. line item measuring pacing on the Fidelity of Implementation Checklist scored as a 1), they would enter the maintenance phase in which all coaching support would have been removed. If fidelity dropped below 80%, they would reenter Level 2, supervisory coaching, until their fidelity was at or above 80% of expected behaviors for one session and pacing was scored as a 1. When PSTs met the requirements for fidelity and pacing was scored as a 1 during Levels 1, 2, or 3, the PSTs would move into the maintenance phase immediately upon obtaining fidelity. The score for the line item measuring pacing on the Fidelity of Implementation Checklist must be present during each session that counted toward obtaining fidelity to meet the requirement for coaching support to be removed. Figure 2 depicts the Multilevel Coaching Framework and Decision Rules implemented in this study.

If PSTs did not meet fidelity during the Level 1 phase (i.e., observation of at least 80% of expected behaviors across three consecutive sessions or at least 90% of expected behaviors for one session), they entered Level 2 (i.e., supervisory coaching) in a time-lagged manner. Due to the prolonged baseline in a multiple baseline across participants study designs, limited

opportunities for data collection due to the number of sessions for reading tutoring, and the multiple phases of intervention in this study, participants entered Level 2 of coaching support as dyads. After collecting a minimum of four data points in the initial baseline phase, the first dyad was paired and entered Level 2. This procedure of entering Level 2 in dyads allowed for the potential for three demonstrations of the effect at three different points in time as PSTs entered Level 2. If possible, PST dyad members entered Level 3 of coaching support (i.e., supervisory coaching plus side-by-side coaching) together, if levels of responding for both PSTs in the dyad were similar. However, entering Level 3 was based on individual PSTs' data. If one PST dyad member met fidelity (i.e., observation of at least 80% of expected behaviors across three consecutive sessions or at least 90% of expected behaviors for one session) and did not require Level 2 or Level 3 support, but the other dyad member required support, the PST requiring support may have entered Level 2 or Level 3 individually instead of as a dyad.

PSTs were paired in dyads based on their initial baseline performance. First, criteria for pairing PSTs was determined by ranking PSTs from PST 1 to PST 6 based on their fidelity percentage of the first two baseline data points. The PST with the lowest fidelity score was ranked as PST 1 and the PST with the highest fidelity score was ranked as PST 6. The list of PSTs was then divided in half, and the top low-performing PST was paired with the top high-performing PST until all PSTs were paired (e.g., PST 1 and PST 4; PST 2 and PST 5; PST 3 and PST 6). When creating dyads, I also considered the level and trend of PST data in Level 1 to inform decisions about PST pairings. After the first dyad of PSTs entered Level 2 and a change in level or trend was observed for at least one PST, the next top low-performing PST and high-performing PST who had not met the requirement for fidelity with the most stable data were paired as a dyad and entered Level 2. If there was no change in level or trend for either PST in

the first dyad and neither PST met fidelity (i.e., observation of at least 80% of expected behaviors across three consecutive sessions or at least 90% of expected behaviors for one session), both PSTs entered Level 3 together. When a change in level or trend was observed for at least one PST in Level 3, the second dyad of PSTs entered Level 2. After the second dyad of PSTs entered Level 2 and a change in level or trend was observed for at least one PST, the final two PSTs entered Level 2 support simultaneously as the third dyad if each PST had not met fidelity.

The first intervention phase, Level 2, was supervisory coaching. If PSTs' data were stable and did not meet fidelity (i.e., observation of at least 80% of expected behaviors across three consecutive sessions or at least 90% of expected behaviors for one session), during this phase, they entered Level 3 coaching support, side-by-side plus supervisory coaching. As with movement from Level 1 to Level 2, PSTs entered Level 3 in a time-lagged manner in dyads as appropriate; however, entering Level 3 was based on PSTs' individual levels of responding. To establish a demonstration of effect, I collected a minimum of three data points during Level 2 and Level 3 for each PST but oftentimes needed more than three data points to establish the effect of the intervention. Time-permitted adaptations were not implemented during this study due to time constraints (i.e., end of the semester and clinical experience).

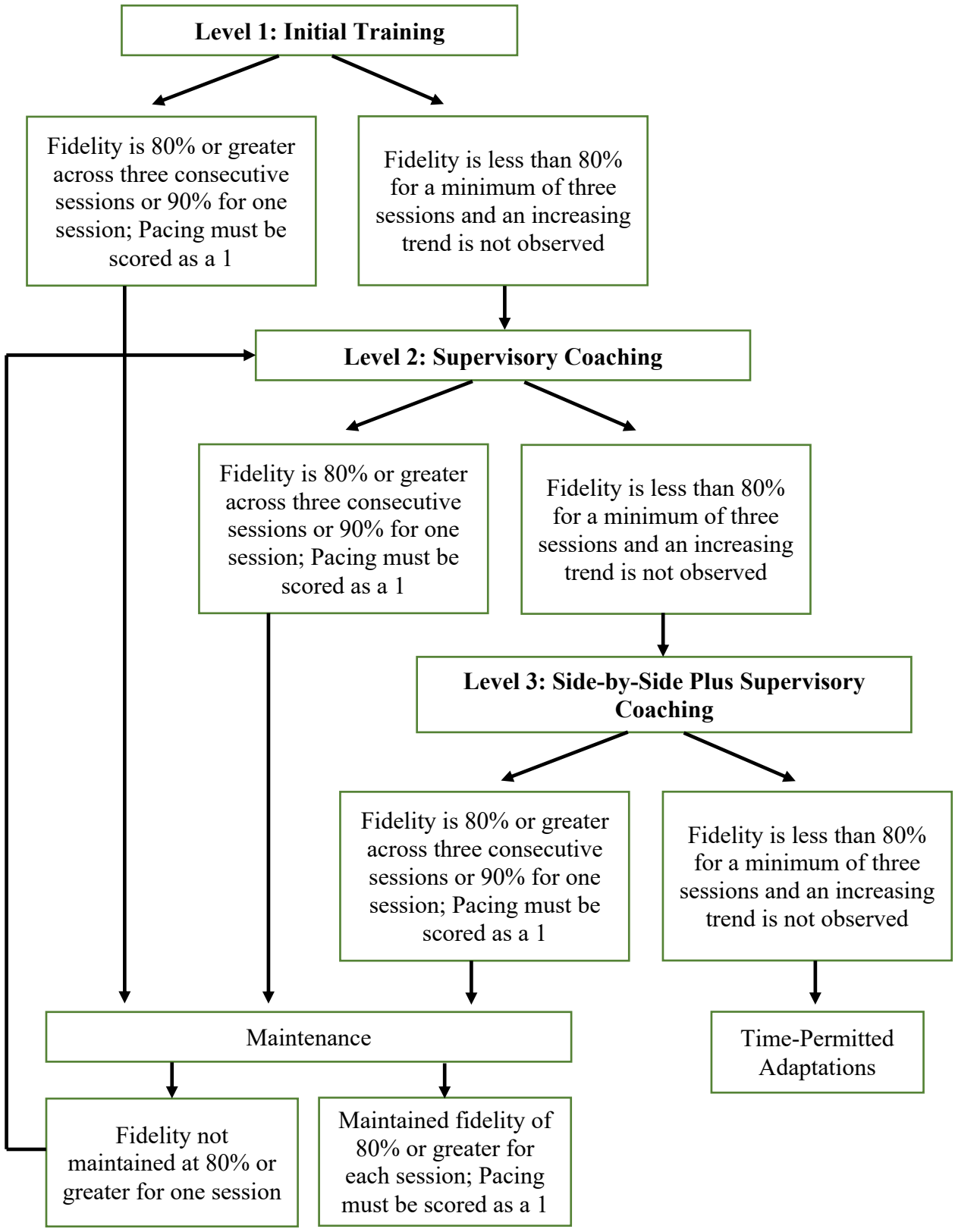


Figure 2. Multilevel Coaching Framework and Decision Rules.

Multilevel Coaching Intervention

The multilevel coaching intervention included three levels of coaching support. Level 1 was synchronous and asynchronous training. Level 2 was supervisory coaching. Level 3 was side-by-side plus supervisory coaching. PSTs participated in asynchronous and synchronous training sessions for four weeks. Further details on the purpose and content of the asynchronous and synchronous training sessions are included in the materials section. After training was completed, PSTs participated in implementing an evidence-based reading intervention with an elementary-aged struggling reader for a maximum of 17 tutoring sessions in a two-on-one or one-on-one setting. Coaching was provided based on PSTs' fidelity of implementation.

Baseline

Level 1: Training. Prior to the first baseline probe, PSTs participated in asynchronous and synchronous training on implementation of an evidence-based reading intervention. After training, data collection began in the baseline phase. PSTs video-recorded all sessions implementing the reading intervention with their students. At the conclusion of each session, PSTs uploaded their video-recording to a password protected Google Drive folder that only the coach and the research team had access to. This protocol was the standard procedure for the existing reading tutoring clinical experience. All videos were uploaded prior to the next tutoring session. The coach collected data on the dependent variable (i.e., PSTs' fidelity of implementation measured by percentage of expected behaviors observed) using the Fidelity of Implementation Checklist (see Appendix B). Data collection occurred after each tutoring session once videos had been uploaded and prior to the next tutoring session. If a video was not uploaded the evening of the tutoring session, I sent the PST a reminder email the following morning to upload the video. Neither supervisory nor side-by-side coaching was provided during the Level 1 phase.

Intervention

Level 2: Supervisory Coaching. PSTs who did not meet fidelity during Level 1 entered Level 2 support, supervisory coaching. During supervisory coaching, PSTs continued to video-record each tutoring session and upload their video-recording to a Google Drive folder. The coach watched the video-recorded session, scored PSTs' fidelity, and emailed feedback to each PST with a minimum of two strengths and one to two areas of growth prior to the next tutoring session following the specific schedule of feedback described below. The strengths were referred to as "glows", and areas of growth were referred to as "grows." Emailed feedback on each area of strength included specific praise on correctly implemented components from the Fidelity of Implementation Checklist, with specific language or examples of behaviors observed during the tutoring session. Emailed feedback on each area of growth also included specific language or examples of behaviors from the Fidelity of Implementation Checklist or training, with a focus on how to improve in the identified areas of growth. Providing feedback is consistent with previous research when performance feedback was provided following an observation, including email feedback following viewing of a video-recorded lesson (e.g., Cornelius & Nagro, 2014; Schles & Robertson, 2019).

Content and Schedule of Email Feedback. As noted, the feedback provided was based on PSTs' fidelity scores. More specifically, feedback on PSTs' strengths was provided in at least two areas in which the PST scored partial or full credit on the Fidelity of Implementation Checklist. Feedback on PSTs' areas of growth was provided in one to two areas in which the PST scored partial or no credit on the Fidelity of Implementation Checklist. To earn partial credit, the PST must have correctly completed a sub-behavior (i.e., strength), *and* incorrectly

completed a sub-behavior (i.e., growth). Thus, expected behaviors that earned partial credit could have been both a strength and area of growth.

PSTs received feedback on their implementation of structural and process dimensions of fidelity (Harn et al., 2013). First, PSTs received feedback related to areas of growth on structural dimensions of fidelity, which included implementation of required expected behaviors specific to components of the reading intervention (e.g., modeling segmenting and blending boxed sounds and words, asking oral-only questions when prompted, reading sentences and books two times). PSTs received email feedback on their implementation of structural dimensions of fidelity after each session during phases in which PSTs received email feedback (e.g., Level 2 and Level 3), and their structural dimensions of fidelity percentage was less than 80% on the Fidelity of Implementation Checklist. If PSTs' fidelity percentage was at or above 80% for structural dimensions of fidelity, PSTs then received feedback related to areas of growth on their implementation of process dimensions of fidelity. Process dimensions of fidelity are oftentimes more complex and, to implement correctly, require sound understanding and implementation of structural dimensions of fidelity. Process dimensions include measuring (a) appropriate pacing; (b) use of the Visual Schedule (c) use of specific praise; (d) preparation of materials; and (d) provision of appropriate and aligned systematic error correction based on student responses during specific components of the reading intervention (e.g., sight words, decodable words). Figure 3 depicts the Framework and Decision Rules for Content of Email Feedback. Based on the decision rules, the content of the email feedback for PSTs' areas of growth followed the sequence outlined for each dimension in the framework due to the importance and prevalence of each structural or process component to a Sound Partners lesson.

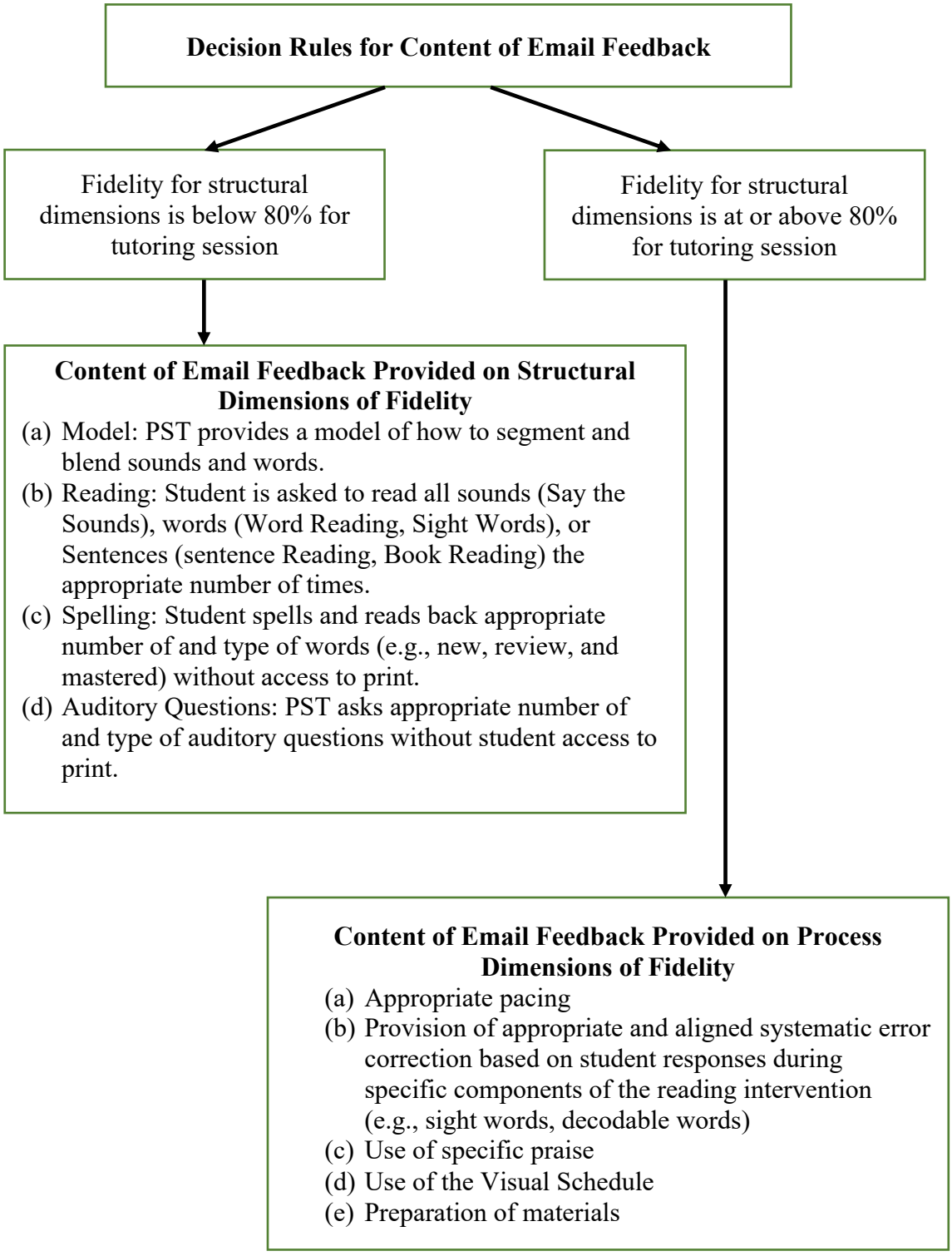


Figure 3. Framework and Decision Rules for Content of Email Feedback.

All feedback emails included explicit language that maximized PSTs' understanding of how they should continue to implement specific behaviors correctly, and how they can implement specific behaviors differently. An example of a feedback email is included in Appendix C. PSTs received feedback emails after each tutoring session, and all emails were sent individually to each PST prior to the next tutoring session. For tutoring sessions that occurred earlier in the week (i.e., Tuesdays), feedback was sent to each PST at 8:00 AM on Thursdays, and for tutoring sessions that occurred later in the week (i.e., Thursdays), feedback was sent to each PST at 8:00 AM on Mondays. This temporal location of feedback provides PSTs with feedback about their performance in close proximity to their next tutoring session, and feedback provided prior to teaching sessions instead of directly after teaching sessions may be more effective at improving teaching skills (Aljadeff-Aberjal et al., 2017).

Level 3: Side-by-Side Plus Supervisory Coaching. PSTs who did not meet fidelity during Level 2 entered Level 3 support which included more intensive coaching support, side-by-side coaching, in addition to supervisory coaching. During Level 3, PSTs received the side-by-side coaching during their tutoring sessions and continued to receive supervisory coaching after each session. For side-by-side coaching, the coach positioned a chair so that they were next to the PST and students during the tutoring session, and all materials were visible to and accessible by the coach. During side-by-side coaching, the coach used the Coaching Log to document observations related to areas of strength and growth. If PSTs did not implement a behavior or implemented the behavior incorrectly during the reading tutoring session, the coach intervened and either prompted the PST to lesson materials (e.g., script in the Lesson Book, Quick Reference Guide) or modeled the behavior. The coach provided prompting and modeling of any incorrectly implemented behaviors on the Fidelity of Implementation Checklist. The

coach and PST engaged in side-by-side coaching for a duration of 4 to 13 min each session. PSTs continued to video-record all tutoring sessions and upload the video to Google Drive at the conclusion of the sessions. The coach continued to watch the video-recorded sessions, score PSTs' fidelity, and email feedback to each PST with two strengths and one to two areas of growth following the same procedures as described in Level 2. The scoring procedures that were used during side-by-side coaching are described in the dependent variable section under scoring rules. If time permitted, an adaptation would have been made to the intervention (e.g., increase in the dosage of side-by-side coaching support) if PSTs' level and trend of data were not an adequate response; however, due to the limited timeframe, no adaptations were implemented.

Maintenance

PSTs would have moved into the maintenance condition when their fidelity of implementation scores were 80% or greater of expected behaviors across three consecutive sessions or 90% or greater of expected behaviors during one session and pacing was scored as a 1 for each session counting toward obtaining fidelity. During the maintenance condition, PSTs would have continued to video-record each reading tutoring session, but PSTs would not receive supervisory nor side-by-side coaching. These procedures are reflective of a return to baseline conditions. Maintenance data would have been collected one time per week for a minimum of three data points for each participant until the conclusion of the study. If data were not able to be collected one time per week for a minimum of three data points due to time constraints, maintenance data would have been collected more often (i.e., two times per week) to obtain at least three data points, time permitting. If PSTs' fidelity scores dropped below 80% of expected behaviors for one session during maintenance, the PST would have reentered Level 2 support. If fidelity is subsequently achieved, the PST would reenter the maintenance condition. To achieve

fidelity to reenter the maintenance condition, PSTs would be required to implement at least 80% of expected behaviors for one session. The criterion of at least 80% of expected behaviors for one session to return to maintenance is due to time constraints and the fact that PSTs would have previously met the requirement for fidelity (i.e., 80% or greater of expected behaviors across three consecutive sessions or 90% or greater of expected behaviors during one session).

Materials

Materials involved related to the multilevel coaching intervention and reading tutoring sessions included (a) curriculum, (b) asynchronous training materials, (c) synchronous training materials, and (d) coaching materials.

Sound Partners Program

Sound Partners is a semi-scripted, evidence- and phonics-based tutoring program that provides struggling readers in kindergarten through third grade with supplemental, explicit instruction in early reading skills (e.g., phonemic awareness and phonics; Vadasy et al., 2004). Sound Partners has been found to have positive effects on students' alphabetics, comprehension, and reading fluency (WWC, 2010). Sound Partners also has a rating of "Strong" by Evidence for ESSA, and students who received Sound Partners tutoring maintained gains on word reading and comprehension measures two years later (Center for Research and Reform in Education at Johns Hopkins University, 2022). Sound Partners lessons follow a predictable format. Scripts and prompts within the lesson book guide tutors for what to say or what to do during instruction; however, the scripts and prompts are not comprehensive of all procedures for what to say or do throughout the lesson.

There are 108 Sound Partners lessons. Early lessons in Sound Partners (1–30) include instruction on the most common sound of letters or letter pairs. These lessons also include

practice segmenting words into phonemes, reading word lists, spelling words from word lists, and reading decodable books. The middle set of Sound Partners lessons (31–60) include more phonics instruction with additional components (e.g., Magic -e-, Word Endings); in this set, phonemic awareness activities are faded. The last set of lessons (61–108) includes more instruction in letter-sound correspondences and introduces reading longer words.

There are six core components of beginning Sound Partners lessons which include (a) Say the Sounds, (b) Segmenting, (c) Word Reading, (d) Sight Words, (e) Sentence Reading, and (f) Book Reading. Some lessons also contain additional components which include explicit instruction in word-reading skills. After completing a set of 10 lessons, PSTs administered a mastery test to determine student progress and inform next steps. Each of these components of the Sound Partners program are described below.

Say the Sounds. Say the Sounds is the first core component of each Sound Partners lesson. The purpose of Say the Sounds is to develop letter-sound correspondences. During Say the Sounds, students are provided with opportunities to practice reading and spelling sounds.

Segmenting. Segmenting is typically the second core component of a Sound Partners lesson, although this component is not included in later lessons. The purpose of Segmenting is to develop students' phonemic awareness, or their ability to hear and manipulate individual phonemes in words. During Segmenting, students segment and blend words using Elkonin boxes.

Word Reading. Word Reading is typically the third core component of a Sound Partners lesson. The purpose of Word Reading is for students to apply their knowledge of letter-sound correspondences to decode words. During Word Reading, students are provided with opportunities to practice reading and spelling words. Some lessons also include oral only

questions which require students to identify the first, middle, or last sound in words without access to print.

Sight Words. Sight Words is typically the fourth core component of a Sound Partners lesson. The purpose of Sight Words is for students to practice reading high-frequency words with automaticity. During Sight Words, students are asked to orally read, spell, and reread a list of sight words. Students also have an opportunity to practice spelling sight words.

Sentence Reading. Sentence Reading is typically the fifth core component of a Sounds Partners lesson. The purpose of Sentence Reading is for students to apply all word-level practice within the context of a sentence. During Sentence Reading, students practice reading sentences twice.

Book Reading. Book Reading is typically the sixth core component of a Sound Partners lesson. The purpose of Book Reading is for students to apply word-level skills in connected text and promote fluency. During Book Reading, students practice reading a decodable text, or Bob book, twice.

Additional Components. Sound Partners lessons follow a developmental scope and sequence, and additional components fade in and out depending on the particular lesson within the sequence. The additional components that appear in Sound Partners lessons more often (i.e., more than four lessons) include (a) Magic -e-, (b) Word Endings, (c) Pair Practice, and (d) Reading Long Words. The mini-components of Sound Partners lessons appear in two to four lessons and include (a) Final m and n Blends, (b) Inside-Sound Spelling, (c) Spelling Similar Sounds, (d) Long u Sounds, (e) Useful Word Chunks, (f) Double Consonants, and (g) Contraction Review. The structure of additional components generally includes one or more of

the following procedures: (a) modeling, (b) asking oral-only questions, (c) reading word lists, and (d) spelling.

Mastery Tests. Mastery tests are used for students' initial placement in Sound Partners and progress monitoring. For initial placement, mastery tests are administered to students to determine lesson placement. Typically, the first mastery test is administered to each student unless data from school personnel indicate a different starting point in a later lesson. Based on student data gathered from the mastery test, the following options were applied: (a) go forward (e.g., 90–100% accuracy); (b) review missed items, then move forward (e.g., 80–89% accuracy), or (c) review the set of lessons (e.g., <79% accuracy). Students began Sound Partners lessons in the lowest set of lessons their score did not meet criterion to go forward. For progress monitoring, mastery tests were administered after the completion of every 10 lessons to assess students' mastery of taught skills, including letter sounds, word reading, and spelling. Based on students' data from mastery tests, the same options from initial placement were applied. The mastery test database included these decisions rules and was included on PSTs' Activity and Assessment Logs.

When implementing the Sound Partners intervention, PSTs had access to Sound Partners and researcher- or faculty-developed materials. The Sound Partners materials included (a) Sound Partners Lesson Book which includes the semi-scripted lessons with core and additional Sound Partners components, (b) Sound Partners Sound Card to use as needed to support error correction procedures, and (c) Bob Books for Book Reading. Sound Partners also has a Tutor Handbook, but due to the asynchronous and synchronous training sessions developed based on the Tutor Handbook, PSTs did not require access to this resource.

To provide feedback to students, Sound Partners highlights and provides guidelines for two key components that effective tutors implement during reading tutoring: error correction and specific praise. Error correction and praise should be immediate, specific, and relevant. For error correction, tutors were trained to implement a scaffolded approach and first draw students' attention to the error that provides students with an opportunity to self-correct. If students were not able to self-correct, tutors may provide more support (e.g., Sound Card) if appropriate for the error made. At this point, if students did not correct the error, the tutor would provide a model of the correct response and students would repeat the correct response. Specific praise should be provided immediately when students are doing a good job to inform them of specifically what they are doing well on. An example of specific praise might sound like, "You got all the sounds in the word 'flash' just right!" The Sound Partners Tutor Handbook emphasizes the importance of applying error correction procedures and delivering specific praise immediately and consistently throughout the lesson (Vadasy et al., 2004). Furthermore, researchers have recommended that inservice teachers deliver specific praise at a rate of six specific praise statements per 15 min observations (Sutherland et al., 2000).

In one-on-one sessions, Sound Partners lessons are designed to be implemented in 30 min tutoring sessions, and tutors were encouraged to complete as much of each lesson as possible within the 30 min timeframe by using a brisk instructional pace. Research also supports implementation of Sound Partners with student dyads. Given that many lessons consist of the six core components and tutoring sessions were about 25–30 min, PSTs participating in this clinical experience were expected to complete at least one component every 5 min, on average.

Other Reading Tutoring Session Materials

PSTs also had access to researcher- or faculty-developed materials to support their implementation of Sound Partners. The researcher- or faculty-developed materials that PSTs had access to during implementation of Sound Partners included the (a) Quick Reference Guide, (b) Visual Schedule, and (c) Activity and Assessment Log. Other materials for implementation included reinforcers (e.g., notes home, pencils, stickers), dry erase markers and erasers, whiteboards, and a laptop for tracking data in their Activity and Assessment Logs and for video-recording tutoring sessions.

Quick Reference Guide. The Quick Reference Guide was a supplemental support to the scripts and procedures included in the Sound Partners lesson book for PSTs to use during the reading tutoring session. The Quick Reference Guide included key procedures along with examples of scripts on how to implement each of the six core components of Sound Partners, along with a reminder to deliver specific praise at least one time during each component. The Quick Reference Guide also included an error correction scaffold for each of the six core components. See Appendix D for the Quick Reference Guide.

Visual Schedule. The Visual Schedule was a visual representation of the tasks students worked to complete each tutoring session. Expectations for each session are listed on the schedule which include (a) completing the task, (b) being body ready, (c) using a read aloud voice, and (d) listening to directions. PSTs worked with their student to identify a goal and select a reinforcer to work toward each session. See Appendix E for the Visual Schedule.

Activity and Assessment Log. Each PST had an Activity and Assessment Log to track student progress through lessons after each tutoring session. The PST recorded the beginning and ending lesson number and components and anecdotal notes about student progress. PSTs also

used the Activity and Assessment Log to administer and score mastery tests. The assessment piece of the log included a mastery test database to record student responses and make data-based decisions as to next steps for instruction. See Appendix F for the Activity and Assessment Log.

Asynchronous Training Materials

The asynchronous training module included lessons and embedded videos for PSTs to engage with on the Rise 360 platform. The Rise 360 platform is an online app used to create interactive and responsive training or courses. The online training module included an overview of information related to reading tutoring and specific procedures to be used during implementation of the reading intervention. The reading intervention that PSTs implemented was Sound Partners (Vadasy et al., 2004). In addition to content presented, there were embedded exemplar videos of the instructional procedures for PSTs to watch. The online training module included 12 lessons: (a) Introduction, (b) Sound Partners Methodology, (c) Behavioral Supports, (d) Say the Sounds, (e) Segmenting, (f) Word Reading, (g) Sight Words, (h) Sentence Reading, (i) Book Reading, (j) Concluding Thoughts, (k) Data Entry and Coaching, and (l) Additional Components.

The purpose of each lesson was to introduce PSTs to aspects of the reading tutoring intervention or prepare PSTs to implement components of Sound Partners. The content presented in each lesson is summarized below.

(1) Introduction: This lesson was an introduction to the online training module and Training Log. PSTs were also introduced to what Sound Partners is, the Sound Partners materials, and the Sound Partners lesson format.

(2) Sound Partners Instructional Methodology: This lesson introduced and overviewed the core instructional methods and practices that are foundational to Sound Partners (i.e., systematic and explicit instruction).

(3) Behavioral Supports: This lesson introduced and overviewed the positive behavioral supports embedded within Sound Partners lessons and other positive behavioral strategies if students need additional support. PSTs learned how to use the Visual Schedule to set expectations, how to implement praise that is specific, and additional strategies available for students who need extra support.

(4) Say the Sounds: This lesson introduced the first core component of a Sound Partners lesson, Say the Sounds. During this lesson, PSTs watched an introductory video to better understand the purpose of Say the Sounds, learned how Say the Sounds is implemented, used data to inform implementation of Say the Sounds (e.g., error correction procedures), watched Say the Sounds being implemented, and practiced implementing Say the Sounds. PSTs were also introduced to the Sound Card and watched a video on the correct pronunciation of sounds.

(5) Segmenting: This lesson introduced the second core component of a Sound Partners lesson, Segmenting. During this lesson, PSTs watched an introductory video to better understand the purpose of Segmenting, learned how Segmenting is implemented, used data to inform implementation of Segmenting (e.g., error correction procedures), watched Segmenting being implemented, and practiced implementing Segmenting.

(6) Word Reading: This lesson introduced the third core component of a Sound Partners lesson, Word Reading. During this lesson, PSTs watched an introductory video to better understand the purpose of Word Reading, learned how Word Reading is implemented,

used data to inform implementation of Word Reading (e.g., error correction procedures), watched Word Reading being implemented, and practiced implementing Word Reading.

(7) Sight Words: This lesson introduced the fourth core component of a Sound Partners lesson, Sight Words. During this lesson, PSTs watched an introductory video to better understand the purpose of Sight Words, learned how Sight Words is implemented, used data to inform implementation of Sight Words (e.g., error correction procedures), watched Sight Word being implemented, and practiced implementing Sight Words.

(8) Sentence Reading: This lesson introduced the fifth core component of a Sound Partners lesson, Sentence Reading. During this lesson, PSTs watched an introductory video to better understand the purpose of Sentence Reading, learned how Sentence Reading is implemented, used data to inform implementation of Sentence Reading (e.g., error correction procedures), watched Sentence Reading being implemented, and practiced implementing Sentence Reading.

(9) Book Reading: This lesson introduced the sixth core component of a Sound Partners lesson, Book Reading. During this lesson, PSTs watched an introductory video to better understand the purpose of Book Reading, learned how Book Reading is implemented, used data to inform implementation of Book Reading (e.g., error correction procedures), watched Book Reading being implemented, and practiced implementing Book Reading.

(10) Concluding Thoughts: This lesson included two videos of implementation of entire Sound Partners lessons.

(11) Data Entry and Coaching: This lesson overviewed details about administering and scoring mastery tests, completing the Activity and Assessment Log, coaching support, and engaging in the video-recording process during reading tutoring sessions.

(12) Additional Components: This lesson provided an overview of general procedures for implementing additional components. Videos of implementation of additional components were included.

The online training module was developed by faculty in the College of Education at UNC Charlotte. The online training module had been used in previous semesters with PSTs who were trained to implement Sound Partners and required a total of 3 to 4 hrs to complete. PSTs were assigned specific lessons to complete throughout the first 4 weeks of coursework in READ 4161. The lessons were assigned in sections by the Introduction through Word Reading (Lessons 1–6) and Sight Words through Data Entry and Coaching (Lessons 7–11). PSTs completed lesson 12 as needed if their students' data indicated a starting point in which additional components were included in the Sound Partners lessons. Each additional component was introduced in different lessons throughout Sound Partners. For example, the additional component Final m and n Blends is introduced in lesson 43 and Magic -e- is introduced in lesson 46 of Sound Partners. During the asynchronous training, PSTs completed a Training Log which included answering brief questions related to content presented and reflecting on their practice of implementation of the components of Sound Partners. The expectation was that PSTs practice implementing each of the core components of Sound Partners with another human for 5–10 min following completion of each asynchronous lesson (i.e., Say the Sounds, Segmenting, Word Reading, Sight Words, Sentence Reading, and Book Reading). The Training Log was divided into 12 sections aligned with the 12 lessons in the online training module. See Appendix G for sample of the asynchronous training module lessons and Appendix H for a sample of the Training Log.

Synchronous Training Materials

The synchronous training occurred over four sessions across 4 weeks and consisted of high-quality professional development features including demonstration and practice (Joyce & Showers, 2002). The synchronous training co-occurred with the asynchronous training. The synchronous training sessions required a total of about 4.5 hours to complete. All synchronous training sessions were held on site at the elementary school. The professor of READ 4161 facilitated the synchronous trainings. The coach who had previously trained and worked with PSTs implementing the reading intervention supported the synchronous training sessions by offering support to PSTs, modeling components of Sound Partners, providing feedback to PSTs, and answering PSTs' questions during the synchronous training sessions.

The purpose of the synchronous training sessions was to prepare PSTs to implement Sound Partners with fidelity and use the data entry and mastery testing procedures to document student progress. The synchronous training sessions included a review of the lessons in the asynchronous training module with additional opportunities for PSTs to engage with Sound Partners materials by practicing implementation of each of the six core components with a peer or in a small group. The training sessions progressed through (a) review of Sound Partners instructional methodology and behavior supports, (b) review of each of the six core components of Sound Partners, (c) practice implementing each of the six core components with practice applying error correction procedures, (d) practice data entry using the Activity and Assessment Log, and (e) practice administering and scoring mastery tests. For each of these components of the synchronous training, the professor of READ 4161 and other project personnel (e.g., the coach, secondary observer) first provided a demonstration of how to implement each procedure. Then, PSTs had an opportunity to practice implementing the procedures with feedback. See

Appendix I for the synchronous training Google Slides that were used to guide the modeling and practice opportunities.

Coaching Materials

The primary researcher served as the coach to all PSTs included in the study. During Level 1, the coach required access to the (a) Sound Partners Lesson Book, (b) Fidelity of Implementation Checklist as described in the dependent variable section (see Appendix B), and (c) PSTs' video-recorded sessions. Although the coach did not provide coaching support during Level 1, the coach watched PSTs' video-recorded sessions and scored fidelity. During Levels 2 and 3, the coach required access to the (a) Sound Partners Lesson Book, (b) Fidelity of Implementation Checklist, (c) PSTs' video-recorded sessions, (d) Systematic Coaching Feedback (see Appendix J), and (e) Coaching Log (see Appendix K). Across all levels, the coach used the Sound Partners Lesson Book and Fidelity of Implementation Checklist while viewing and scoring PSTs' fidelity of implementation via videorecorded sessions. The coach used the same Fidelity of Implementation Checklist across all levels of support (i.e., Levels 1, 2, and 3) and maintenance.

Systematic Coaching Feedback. The Systematic Coaching Feedback document included researcher- and faculty-developed examples of possible scripts for email feedback. The Systematic Coaching Feedback document was aligned with the Fidelity of Implementation Checklist and was used as a resource for editable scripts to support PSTs' fidelity of implementation. For example, if a PST did not ask the student to read back all sounds spelled during the spelling portion of Say the Sounds, the following script is provided in the Systematic Coaching Feedback: "During the spelling portion of Say the Sounds, be sure to always have the student read back anything that they spell. So, after writing the new, review, and mastered sound,

ask the student ‘What sound?’ and have them read back all sounds spelled.” Although all feedback was individualized based on observations for each session, the Systematic Coaching Feedback document provided examples as to what the specific language and examples might sound like in coaching feedback. See Appendix J for a sample of the Systematic Coaching Feedback document.

Coaching Log. The purpose of the Coaching Log was to document the coaching activities that occurred during each level of coaching support and to record observation notes. This log also served as a measure of procedural fidelity of coaching. During Level 2 coaching sessions, the coach used the Coaching Log to (a) document appropriate, Level 2 components of multilevel coaching occurred (e.g., email feedback sent) and (b) record observation notes from the videorecorded sessions on the areas of strength and areas of growth. These observations were used to guide the email feedback provided to PSTs. After each Level 3 coaching session, the coach completed the Coaching Log to (a) document that appropriate, Level 3 components of multilevel coaching occurred (e.g., email feedback sent and side-by-side coaching occurred), (b) record observation notes from the videorecorded sessions on areas of strength and areas of growth; (c) record length of time of the side-by-side coaching session, and (d) record observation notes from the side-by-side coaching session. See Appendix K for a sample of the Coaching Log.

Interobserver Agreement and Procedural Fidelity

To ensure reliability of scoring the dependent variable and procedural fidelity of the multilevel coaching intervention across all experimental conditions, a secondary observer was trained to view the video-recorded sessions, score PSTs’ fidelity of implementation, and measure procedural fidelity. The sections below describe the procedures and training for collecting IOA

of the dependent variable, PSTs' fidelity of implementation, and procedural fidelity of the multilevel coaching intervention.

Interobserver Agreement of the Dependent Variable

IOA collected on the primary dependent variable, PSTs' fidelity of implementation. To ensure IOA of scoring the dependent variable, a secondary observer watched the videorecorded sessions and scored PSTs' fidelity of implementation for a minimum of 20% of all data points (i.e., Level 1, Level 2, and Level 3) for each PST included in the experimental design (WWC, 2022). IOA of the dependent variable was collected across all PSTs and during each phase. IOA was calculated using a point-by-point agreement method by dividing the number of agreements by the number of agreements plus the number of disagreements and multiplying by 100 to calculate the total percent agreement (Ledford & Gast, 2018). Average agreement of 80% or better has been considered an acceptable level of agreement for measuring more nuanced and complex behaviors (Kazdin, 2010; WWC, 2022).

Training for Data Collection of Interobserver Agreement. A secondary observer was trained by the coach on scoring PSTs' fidelity of implementation using the Fidelity of Implementation Checklist. The secondary observer had previous experience watching video-recorded tutoring sessions and scoring PSTs' fidelity of implementation in previous iterations of the reading tutoring clinical experience. Due to the secondary observer's previous experience with scoring PSTs' fidelity using the Fidelity of Implementation Checklist, training consisted of a review of each expected behavior as defined on the Fidelity of Implementation Checklist and independently coding a session to calculate the extent to which the coach and secondary observer agreed. The Fidelity of Implementation Checklist included scoring rules, descriptions of each expected behavior on the checklist, and a "For Reference" tab that had been developed to

provide further clarification and inform scoring fidelity in previous iterations of the reading tutoring clinical experience. During training, the coach reviewed all scoring rules, each expected behavior on the Fidelity of Implementation Checklist, and the "For Reference" tab with additional clarification regarding how to score using the Fidelity of Implementation Checklist. Then, the coach and secondary observer independently scored a training video of a reading tutoring session from a previous iteration of the reading tutoring clinical experience. If agreement between the coach and secondary observer was at least 80% or greater across expected behaviors, using the point-by-point method to calculate agreement, the secondary observer was considered reliable at scoring the dependent variable. If agreement between the coach and secondary observer was less than 80% for each expected behavior, the coach and secondary observer discussed and came to a consensus on how to score using the Fidelity of Implementation Checklist. The consensus on how to score was added to the "For Reference" tab to provide further clarification for the expected behaviors disagreed upon. The coach and secondary observer continued to engage in this iterative process until agreement of 80% across all expected behaviors, within a single tutoring session occurred.

Procedural Fidelity of Multilevel Coaching

To ensure procedural fidelity of the multilevel coaching intervention, a secondary observer measured the adherence and differentiation of the independent variables in baseline and intervention conditions to determine if all experimental conditions were conducted as intended (Ledford & Gast, 2018). Adherence included measuring that the intervention was implemented as planned, and differentiation included measuring that different components were implemented in each condition or phase (Ledford & Wolery, 2013, Sutherland et al., 2013). The secondary

observer collected procedural fidelity for a minimum of 20–33% of sessions for each condition and for each PST included in the experimental design (Ledford & Gast, 2018).

The secondary observer collected procedural fidelity in three ways: (a) using the coach's Coaching Log and (b) by reviewing the Level 2 feedback emails., and (c) reviewing videos for the presence of side-by-side coaching during Level 3. To enable collection of procedural fidelity data, during each of the intervention phases of the experimental design, the coach used the Coaching Log to document coaching procedures. The Coaching Log allowed for documentation of the procedures for supervisory coaching and side-by-side coaching (e.g., the date when the feedback email was sent, time spent during side-by-side coaching, observations from the video-recorded sessions and side-by-side coaching). During baseline and maintenance phases, the coach did not use the Coaching Log to document supervisory or side-by-side coaching as coaching support was not provided during these phases. See the description of the Coaching Log in the materials section and Appendix K for a visual representation of the Coaching Log. In addition, the secondary observer reviewed feedback emails relevant to Level 2 and Level 3 coaching support, which the coach downloaded from her email and uploaded to an email feedback folder in Google Drive. See Appendix C for sample email feedback.

Level 1 Procedural Fidelity Checklist. The secondary observer used three procedural fidelity checklists to ensure the coach implemented each phase of the experimental design as intended. The first procedural fidelity checklist was designed for use during the baseline (i.e., Level 1) and maintenance phases to measure the extent to which supervisory and side-by-side coaching procedures were absent: (a) documentation of supervisory coaching is not present (e.g., no email uploaded with "glows" and "grows") and (b) documentation of side-by-side coaching is not present (e.g., coach did not document time engaged in side-by-side coaching or observations

of tutors in the Coaching Log). See Appendix L for the procedural fidelity checklist used during baseline.

Level 2 Procedural Fidelity Checklist. The second procedural fidelity checklist was designed for use during Level 2 coaching support (i.e., supervisory coaching) to measure the extent to which supervisory coaching procedures were present and side-by-side coaching procedures were absent (See Appendix M). The second procedural fidelity checklist included specific coaching behaviors that should and should not be observed during supervisory coaching. The specific supervisory coaching behaviors were: (a) providing email feedback within the expected timeframe (i.e., prior to the next tutoring session) and (b) addressing all required components in email feedback (i.e., "glows" and "grows"). The presence of "glows" and "grows" in email feedback were measured separately on the procedural fidelity checklist. The second procedural fidelity checklist also measured that documentation of side-by-side coaching was not present (e.g., coach did not document time engaged in side-by-side coaching or observations of tutors in the Coaching Log).

Level 3 Procedural Fidelity Checklist. The third procedural fidelity checklist was designed for use during Level 3 coaching support (i.e., side-by-side plus supervisory coaching) to measure the extent to which supervisory and side-by-side coaching procedures were present (See Appendix N). The third procedural fidelity checklist included specific coaching behaviors that should be observed during supervisory plus side-by-side coaching. In addition to the aforementioned specific supervisory coaching behaviors, the third checklist also included specific side-by-side coaching behaviors: (a) documentation of time engaged in side-by-side coaching; (b) observation notes documented by the coach during side-by-side coaching in the Coaching Log; (c) prompting or modeling related to structural components of Sound Partners;

(e) opportunities to provide a prompt or model were not missed related to structural components; (f) prompting or modeling related to process components of Sound Partners; and (h) opportunities to provide a prompt or model were not missed related to process components. The secondary observer used the Coaching Log and video-recorded sessions to score procedural fidelity of Level 3 coaching. The secondary observer used the time documented in side-by-side coaching on the Coaching Log to determine if side-by-side coaching procedures occurred during the designated time spent in side-by-side coaching.

Training for Data Collection of Procedural Fidelity. The secondary observer was familiar with supervisory and side-by-side coaching procedures including email feedback with "glows and "grows", the Coaching Log, and in-the-moment prompting and modeling during reading tutoring. The coach met with the secondary observer to review all expected behaviors on each procedural fidelity checklist and oriented the secondary observer to resources to support measuring procedural fidelity (e.g., email feedback, Coaching Log). The coach answered any clarifying questions for the secondary observer prior to collecting procedural fidelity data.

Dependent Variable

Fidelity of Implementation Checklist

The primary dependent variable was the percentage of observed expected behaviors on the Fidelity of Implementation Checklist (see Appendix B) adapted from the Tutor Observation Form in the Sound Partners Tutor Handbook (Vadasy et al., 2004). The Fidelity of Implementation Checklist measured structural and process dimensions of fidelity (Harn et al., 2013). Components of the Fidelity of Implementation Checklist related to measuring structural dimensions of fidelity included measuring treatment adherence, which included implementation of required expected behaviors specific to components of the reading intervention (e.g.,

modeling sounds and words in boxes, providing appropriate words to spell, reading the selected book two times). Components of the Fidelity of Implementation Checklist related to measuring process dimensions of fidelity included measuring the quality of instructional delivery and teacher-student interactions. Components measuring quality of instructional delivery and teacher-student interactions on the Fidelity of Implementation Checklist included (a) appropriate pacing; (b) use of the Visual Schedule (c) use of specific praise; (d) preparation of materials; and (e) provision of appropriate and aligned systematic error correction based on student responses during specific components of the reading intervention (e.g., sight words, decodable words).

The Fidelity of Implementation Checklist provided opportunities to score fidelity within six skill areas or constructs for the core Sound Partners components (e.g., Say the Sounds, Word Reading, Sentence Reading). There were also opportunities to score each additional component, as its own skill area or construct and a section to score overall session tasks (e.g., preparation of materials, pacing, Activity and Assessment Log completion, use of Visual Schedule). Each construct contained between three to six observable and expected behaviors for teaching that construct. Sample behaviors are (a) modeling segmenting (sounding out) then blending (reading) boxed word, using a blending routine; (b) having the student read all the words, and if the student sounds out first, has student read whole word before moving on to next word; (c) implementing error correction procedures correctly; and (d) providing specific praise at least once within each component.

Scoring Rules. I graphed PSTs' percentage of fidelity of implementation based on the PSTs' overall fidelity score. The overall fidelity score was obtained by summing the number of observed expected behaviors, dividing the total number of observed expected behaviors by the total applicable expected behaviors and multiplying this ratio by 100 to obtain a fidelity

percentage. However, there were two sub-fidelity scores to guide feedback to PSTs. These scores were related to (a) structural dimensions of fidelity or intervention adherence (e.g., modeling, asking students to read word lists) and (b) process dimensions of fidelity or instructional quality (e.g., specific praise, pacing, error correction procedures, student engagement/behavior support, and materials). Each observable behavior received a score of 0, 0.5, or 1. Behaviors on the Fidelity of Implementation Checklist were scored as a 1 if the behavior was observed or 0 if the behavior was not observed. Some items could be scored as a 0.5 if the behavior included multiple components and was partially observed. For example, one line item of expected behavior was that PSTs (a) track points during/end of lesson, and (b) review daily goal at end of lesson and determined if met. If the PST only met a or b, this expected behavior was scored as 0.5. If the lesson did not include a component, the behaviors were marked as N/A in the score column for each line item of that component (e.g., additional components that are not present in all lessons). The scores were input using a dropdown box in a Google Sheet. The coach and secondary observer selected a score of 1, 0.5, 0, or N/A for each item on the checklist by following the scoring rules. Given that PSTs were working with two students during the reading tutoring session, the expected behaviors were scored based on the occurrence of the behavior with at least one student.

A notes column was included to track nuances of instruction that were not clearly captured by check boxes. If an item was scored as 0 or 0.5, the researcher and secondary observer may have used the notes column to document rationale for the score.

All tutoring sessions were approximately 25–30 min; therefore, to measure appropriate pacing, it was expected that PSTs would complete a minimum of six components of Sound Partners during a 30 min lesson. This expectation allowed for completing one Sound Partners

component per 5 min with appropriate time for beginning and ending tutoring session activities (e.g., preparing materials, reviewing the Visual Schedule, setting a goal with the students). The expectation to complete six components was aligned with existing program expectations. Additionally, the Sound Partners Tutor Handbook describes that Sound Partners tutoring sessions are designed to be 30 min. The authors emphasize the importance of using brisk instructional pacing in several sections of the Tutor Handbook (e.g., General Guidelines, Student Behavior Management, Things to Remember) to maximize instructional time and minimize off-task behavior (Vadasy et al., 2004). If the PST completed more than six components, the scorer continued to track fidelity if the component was not a repeated component. If a PST completed a full lesson and began the next lesson, they were likely to repeat a component (e.g., teach Say the Sounds twice, once for each lesson covered during the session). If that occurred, fidelity was scored until six components were completed even if a component was repeated. Once six components were completed and the next component in the lesson sequence was a repeated component, fidelity was no longer scored for that session. If the PST met the expectation for the expected number of components to be completed, pacing was scored as a 1, and if the PST did not meet the expectations for the expected number of components to be completed, pacing was scored as a 0. As described in Figure 2, pacing must be scored as a 1 in addition to meeting other requirements for fidelity for coaching support to be removed.

As PSTs progressed through the Sound Partners lessons, they implemented additional components and administered mastery tests. Each additional component was scored as one component (e.g., Final m and n Blends, Pair Practice). Administration of mastery tests was scored to document whether the PST administered the mastery test at the appropriate time (i.e., after completion of 10 lessons), but mastery tests did not count as a Sound Partners component.

If a PST administered a mastery test as part of the lesson, the number of components was prorated to reflect the time spent in instruction, as opposed to assessment. For example, if a PST administered a mastery test and the remaining tutoring time was 20 min, the expectation was to complete four Sound Partners components in addition to the mastery test (i.e., 5 min per component). Prorating the number of components to complete was applied to any tutoring session in which the tutor did not have the full tutoring session time (e.g., completing other coursework-related assignments such as administration of reading assessments). If the PST did not complete the prorated number of components during the lesson, pacing was scored as 0 on the Fidelity of Implementation Checklist.

During side-by-side coaching, if the coach modeled the behavior due to the PST not implementing the behavior or implementing the behavior incorrectly, the behavior was scored as 0. The coach only modeled after the PST did not implement or implemented an expected behavior incorrectly. Side-by-side coaching did not impact the fidelity score as these behaviors would have already been scored as 0. However, if the behavior could be repeated within that component (e.g., specific praise, error correction procedures), the fidelity score was updated to partial credit based on the behaviors observed. For example, the coach modeled error correction procedures during Word Reading by asking the student to read the line again. Then, when the student made another error later during Word Reading, the PST implemented the error correction procedures correctly by asking the student to read the line again. This example would receive a score of 0.5. If the behavior cannot be repeated within that component (e.g., modeling boxed sounds or words), the fidelity score for that behavior remained at no credit for the missed or incorrectly implemented behavior observed. If the PST repeated the behavior modeled by the coach immediately after the coach was required to provide side-by-side modeling, the behavior

was scored as a 0. Only additional and separate instances of the expected behaviors without direct modeling from the coach immediately before the behavior were counted as partial credit.

Social Validity Questionnaire

PSTs' perceptions of the social importance of the multilevel coaching intervention were gathered via a social validity questionnaire (see Appendix O). The questionnaire was administered to the PSTs at the conclusion of the study. The social validity questionnaire consisted of 16 questions including 12 Likert rating scale questions ranging from 1 (strongly disagree) to 5 (strongly agree) and four open-ended questions.

The questionnaire measured PSTs' perceptions of the social importance of the intervention including the feasibility, effectiveness, and future impact of the multilevel coaching intervention. Measuring the feasibility, effectiveness, and future impact of the intervention is recommended by Ledford and Gast (2018). Measuring PSTs' perceptions of the feasibility of the intervention included questions about the social acceptability of the procedures (e.g., I enjoyed receiving supervisory coaching during the reading tutoring program.). Measuring PSTs' perceptions of the effectiveness of the intervention included questions about the effects of coaching support on their knowledge and skills to teach reading and on their instructional behaviors (e.g., Having a coach observe video recorded sessions and send email feedback during the reading tutoring program improved my knowledge and skills of teaching reading.). Last, PSTs were asked about the impact of the coaching supports on their future teaching experience (e.g., I will use reading strategies that I learned from my coach in my future teaching experiences.).

Threats to Validity

Effects of potential threats to validity were controlled for to establish adequate internal validity and allow for demonstration of experimental control. First, effects of potential attrition were controlled for by recruiting six PSTs for the study and having PSTs enter Level 2 and Level 3 coaching support in dyads, if possible. Additionally, PSTs were explicitly informed of the extended baseline design and the leveled coaching support during the consent process to minimize attrition threats. PSTs also experienced a non-aversive baseline condition post-training without observations with feedback. Second, maturation effects were unlikely given the nature of the dependent variable, PSTs' fidelity of implementation. PSTs' fidelity is unlikely to improve without intervention because PSTs are novice teachers and those included in the study did not have prior experience implementing Sound Partners. Third, choosing PSTs unfamiliar with implementing Sound Partners also helped to control for potential inconsistent effects because PSTs selected for inclusion were likely to respond to the same intervention (i.e., coaching). Inconsistent effects are likely to occur when behaviors or participants in each tier are not functionally similar, and the magnitude of behavior change varies across tiers. All PSTs included were enrolled in the same course during their TPP and did not have prior experience teaching or implementing the reading intervention. Fourth, potential history effects were controlled for by continuing conditions until data were stable and entering PSTs into the intervention in a time-lagged manner. Entering the PSTs in a time-lagged manner helped to establish experimental control if responding changes when and only when the intervention was introduced. Next, it is a threat to validity that the primary researcher served as the coach and was the same person collecting fidelity of implementation data. The effects of this potential threat were controlled for by collecting IOA of fidelity of implementation. Training the secondary observer to score PSTs'

fidelity using the Fidelity of Implementation Checklist and collecting IOA of PSTs' fidelity also controlled for the effect of potential threats to validity due to instrumentation. Moreover, expected behaviors on the Fidelity of Implementation Checklist were carefully defined, including additional clarification for scoring on the "For Reference" tab of the checklist. Last, PSTs were exposed to the coach, setting, and data collection procedures (e.g., video-recording protocol) prior to the start of the study during the training sessions to minimize threats to validity due to adaptation. Exposure to these study conditions helped to ensure baseline data were indicative of PSTs' true performance.

Data Analysis

The study design was a multiple baseline across participants design. This design evaluated the effectiveness of the multilevel coaching intervention on PSTs' fidelity of implementation of an evidence-based reading intervention when working with struggling readers. The multiple baseline design demonstrated experimental control if the effect of the multilevel coaching intervention was replicated through the time-lagged introduction of intervention across three tiers. This replication of effect could occur when comparing the effect from Level 1 to Levels 2 and 3, as Level 3 was considered a phase change with the addition of side-by-side coaching support to supervisory coaching. There was one 6-tier graph included in the results. The first two tiers on the graph included data from the first PST dyad to enter Level 2. The third and fourth tiers on each graph included data from the second PST dyad to enter Level 2. The fifth and sixth tiers on the graph included data from the third PST dyad to enter Level 2. The coach used visual analysis of the graphed data to determine if a functional relation existed between the independent variable, the multilevel coaching intervention, and the dependent variable, PSTs' fidelity of implementation. Fidelity of implementation was graphed as

the percentage of expected behaviors observed. The coach evaluated the change in level, trend, and immediacy of the effect when each PST entered the Level 2 intervention and also analyzed if PSTs' data in tiers subject to Level 1 conditions remained stable.

The coach also evaluated the change in level, trend, and immediacy of the effect when each dyad of PSTs entered the Level 3 intervention and that data in tiers still subject to Level 1 conditions remained stable. Decisions to enter Level 3 were made based on individual PST data. For example, if the data for one PST in the dyad indicated an increasing trend and data for the other PST in the dyad indicated a stable or decreasing trend, only the PST with data indicating a stable or decreasing trend entered Level 3 at that time. Each comparison from Level 1 to Levels 2 and 3 represented one demonstration of effect. A functional relation would be established if baseline (Level 1) levels remained stable and low and the multilevel coaching intervention condition (Levels 2 and 3) was associated with its own level or trend of behavior, across at least three demonstrations of effect (i.e., at least three PSTs).

CHAPTER 4: RESULTS

In this study, I investigated the effects of multilevel coaching support on elementary education PSTs' fidelity of implementation of an evidence-based reading intervention. The multilevel coaching intervention consisted of three tiers of support: Level 1 was implemented post-training, which included asynchronous and synchronous training activities and practice sessions. Level 2 included supervisory coaching consisting of email feedback based on video-recorded observations of PSTs' implementation of the reading intervention. Level 3 was the final and most intensive level of coaching support provided to PSTs and included supervisory coaching in addition to side-by-side coaching. The side-by-side coaching support required the coach to provide prompting and modeling in-the-moment during PSTs' implementation of the reading intervention with students identified as in need of reading support. In addition to investigating the effects of multilevel coaching support on PSTs' fidelity of implementation, I also examined PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention. Data collection began in January 2023 and ended in May 2023. Six PSTs participated in the study, and all PSTs selected for inclusion in the study required Level 2 or Level 3 coaching support. Two PSTs required Level 2 coaching support, and four PSTs required Level 3 coaching support. Results for PSTs' fidelity of implementation are reported across one 6-tier graph in Figure 4. Results for IOA and procedural fidelity are described first followed by results for both research questions.

Interobserver Agreement

IOA was collected to ensure reliability of scoring the dependent variable, fidelity of implementation. The secondary observer was trained to view and score PSTs' video-recorded sessions. The secondary observer scored a minimum of 20% of all data points for each PST

within each level of the experimental design (i.e., Level 1, Level 2, and Level 3). Specifically, the secondary observer scored 24% of sessions across Level 1, 27% of sessions across Level 2, and 33% of sessions across Level 3. IOA was calculated using a point-by-point agreement method by dividing the total number of agreements by the total number of agreements plus disagreements multiplied by 100 to obtain a total percent agreement (Ledford & Gast, 2018). IOA across Level 1 fidelity of implementation indicated a mean of 77% agreement (range: 67%-87%). IOA across Level 2 fidelity of implementation indicated a mean of 86% agreement (range: 80%-90%). IOA across Level 3 fidelity of implementation indicated a mean of 86% agreement (range: 78%-89%). Low IOA scores across all levels were primarily the result of disagreements when one observer (i.e., primary researcher or secondary observer) scored 0.5 and the other observer scored a 1 or 0. For example, PSTs could receive a score of 1, 0.5, 0, or N/A for error correction procedures during each component implemented. PSTs received a score of 1 when a student made an error and (a) the error was corrected immediately using appropriate error correction procedures and (b) the error correction procedure concluded with the student repeating the word or line of words correctly. If error correction procedures were partially implemented correctly, the PST received a score of a 0.5, and if error correction procedures were not implemented correctly, the PST received a score of 0. When the student did not make an error during the component of the intervention, the error correction line item was scored as N/A. When line-item scores were not an exact match, IOA was scored as a 0 for the line item. Due to the nuanced scoring of fidelity of implementation, lower IOA for some tutoring sessions was expected. When IOA for a tutoring session was low, the primary researcher met with the secondary observer to review the scoring rules. Table 1 provides the range of IOA for fidelity of implementation across Levels 1, 2, and 3 for each PST.

Table 1

Interobserver Agreement for PSTs' Fidelity of Implementation

	Range of IOA		
	Level 1	**Level 2**	**Level 3**
Logan	84.62%	86.37%	89.47%
Ollie	66.67%	80.00%	83.33%
Rene	75.76%	88.00%	78.00%
Greer	86.67%	87.50%–90.00%	N/A
Peyton	78.79%–85.71%	89.47%	88.89%
Dylan	69.23%–72.22%	82.00%–84.38%	N/A

Procedural Fidelity

To determine the degree to which the multilevel coaching intervention was implemented as designed, a secondary observer was trained to measure adherence and differentiation of the Level 1, Level 2, and Level 3 conditions. The secondary observer completed a procedural fidelity checklist for a minimum of 20–33% of sessions for each PST across Level 1, Level 2, and Level 3. Specifically, the secondary scored procedural fidelity for 29% of sessions across Level 1, 33% of sessions across Level 2, and 47% of sessions across Level 3. For Level 1, the secondary observer reviewed the Coaching Log to determine if coaching was absent during Level 1. For Level 2, the secondary observer reviewed the Coaching Log and feedback emails to determine if supervisory coaching procedures were implemented as intended. For Level 3, the secondary observer reviewed the Coaching Log, feedback emails, and tutoring sessions to determine the extent to which supervisory and side-by-side coaching procedures were implemented as intended. Procedural fidelity was calculated by dividing the total number of

observed coaching behaviors by the total number of expected coaching behaviors for each level of the multilevel coaching intervention and multiplying by 100. During Level 1 sessions, the secondary observer determined the absence of two behaviors, supervisory and side- by-side coaching. During Level 2 sessions, the secondary observer determined the absence of side-by-side coaching and the presence of supervisory coaching for six behaviors. During Level 3, the secondary observer determined the presence of supervisory and side-by-side coaching for 11 behaviors. Results indicated a mean of 100% procedural fidelity for Level 1, 100% procedural fidelity for Level 2, and 100% procedural fidelity for Level 3 across all PSTs.

Results for Research Question 1: What are the effects of multilevel coaching support on PSTs' fidelity of implementation of an evidence-based reading intervention?

Figure 4 shows the effects of the multilevel coaching support on PSTs' fidelity of implementation of an evidence-based reading intervention. The 6-tier graph includes data for all six PSTs across all three levels of the multilevel coaching intervention. There were two breaks in the data, one between sessions three and four and one between sessions 13 and 14, for all PSTs due to planned breaks during the semester-long clinical experience. There were a total of 17 possible reading intervention days across the semester. In addition to PSTs' overall fidelity of implementation scores, PSTs' fidelity of implementation scores related to structural and process dimensions of fidelity are reported in Tables 2 and 3, respectively, including the mean and range of fidelity of implementation scores across Level 1, Level 2, and Level 3. Additionally, Figure 5 visually depicts PSTs' mean structural, process, and overall fidelity of implementation scores across Level 1, Level 2, and Level 3.

During Level 1, PSTs implemented the reading intervention post-training without coaching support. There was variability across PSTs' fidelity of implementation during Level 1,

and PSTs with low mean scores across the first four Level 1 probes and those with the most stable data entered Level 2 first. The first PST dyad to enter Level 2 coaching support was Logan and Ollie. Next, Rene and Greer entered Level 2 support concurrently due to a decreasing trend in Rene's Level 1 data and a stable baseline in Greer's Level 1 data. Dylan and Peyton had the most variable data and were the last PST dyad to enter Level 2 once their data were more stable or a decreasing trend was observed. All PSTs required Level 2 coaching support due to not meeting at least 80% or greater of expected behaviors across three consecutive sessions or 90% of expected behaviors for one session and the pacing requirement.

During Level 2, PSTs received supervisory coaching support. Logan and Ollie, the first PST dyad to enter Level 2 support, both required Level 3 coaching support and entered Level 3, side-by-side coaching, as a dyad. The second PST dyad was Rene and Greer. Rene entered Level 3 coaching support individually, and Greer continued to receive Level 2 coaching support through the duration of the study. The third PST dyad was Peyton and Dylan. Peyton also entered Level 3 coaching support individually, and Dylan continued to receive Level 2 coaching support through the duration of the study. Maintenance data were not collected due to the conclusion of the semester-long clinical experience. Results for the impact of the multilevel coaching intervention on each PSTs' fidelity of implementation are described below.

Logan

During Level 1, Logan's fidelity of implementation data were stable and a decreasing trend was observed prior to entering Level 2. Her Level 1 overall fidelity of implementation data ranged from 60.81%–72.06% with a mean of 67.66% of expected behaviors observed. For structural dimensions of fidelity during Level 1, Logan's fidelity scores ranged from 71.05%–100% with a mean of 82.35%. For process dimensions of fidelity during Level 1, Logan's

fidelity scores ranged from 50.00%–65.38% with a mean of 59.91%. During Level 1, Logan implemented the reading intervention for four sessions. She worked with two students during two sessions and with one student during two sessions. Logan met the pacing requirement during both sessions implemented with one student but did not meet the pacing requirement during either session with two students.

During Level 2, Logan's data indicated an increasing trend with an increase in level prior to entering Level 3 support. Logan's Level 2 overall fidelity of implementation data ranged from 67.31%–80.56% with a mean of 74.77% of expected behaviors observed. For structural dimensions of fidelity during Level 2, Logan's fidelity scores ranged from 83.33%–92.86% with a mean of 85.94%. For process dimensions of fidelity during Level 2, Logan's fidelity scores ranged from 53.57%–72.73% with a mean of 64.88%. During Level 2, Logan implemented the reading intervention for five sessions. She worked with two students during three sessions and with one student during two sessions. During Level 2, Logan met the pacing requirement once when working with one student.

During Level 3, there was an increase in level of Logan's fidelity of implementation scores with a slight increasing trend across the first three data points and a decreasing trend prior to the conclusion of the study. Logan's Level 3 overall fidelity of implementation data ranged from 75.68%–89.06% with a mean of 86.34% of expected behaviors observed. For structural dimensions of fidelity during Level 3, Logan's fidelity scores ranged from 81.25%–96.88% with a mean of 90.58%. For process dimensions of fidelity during Level 3, Logan's fidelity scores ranged from 61.76%–82.35% with a mean of 76.57%. During Level 3, Logan implemented the reading intervention for four sessions. She worked with two students during one session and with one student during three sessions. Logan met the pacing requirement during all Level 3 sessions.

Logan met criteria for overall fidelity during Level 3 by obtaining scores of at least 80% across three consecutive sessions and meeting the pacing requirement.

Overall, Logan was present to implement the reading tutoring intervention for 13 sessions tutoring two students during six sessions and one student during seven sessions. Logan's overall fidelity of implementation data indicated an increase in level of fidelity from Level 1 to the multilevel coaching intervention (Levels 2 and 3). Additionally, Logan's mean fidelity of implementation scores related to both structural and process dimensions of fidelity increased from Level 1 to Levels 2 and 3. Fidelity of implementation scores related to process dimensions of fidelity were consistently lower than structural dimensions of fidelity scores across all levels of the multilevel coaching support.

Ollie

During Level 1, Ollie's fidelity of implementation data were stable with little variability and a slight decreasing trend was observed across all Level 1 data. Her Level 1 overall fidelity of implementation data ranged from 63.33%–76.67% with a mean of 70.49% of expected behaviors observed. For structural dimensions of fidelity during Level 1, Ollie's fidelity scores ranged from 75.00%–100% with a mean of 85.63%. For process dimensions of fidelity during Level 1, Ollie's fidelity scores ranged from 55.56%–68.75% with a mean of 60.88%. During Level 1, Ollie implemented the reading intervention for four sessions. She worked with two students during three sessions and with one student during one session. Ollie met the pacing requirement during one session when she worked with one student.

During Level 2, Ollie's data were more variable at a similar level to Level 1. Ollie's Level 2 overall fidelity of implementation data ranged from 61.36%–78.85% with a mean of 71.36% of expected behaviors observed. For structural dimensions of fidelity during Level 2,

Ollie's fidelity scores ranged from 81.25%–100% with a mean of 90.26%. For process dimensions of fidelity during Level 2, Ollie's fidelity scores ranged from 42.32%–70.00% with a mean of 57.45%. During Level 2, Ollie implemented the reading intervention for four sessions, and she worked with two students during each session. Ollie met the pacing requirement once during Level 2 while working with two students and obtained an overall fidelity score 78.85%.

During Level 3, Ollie's data were stable, and there was an immediate increase in level of fidelity of implementation scores. Ollie's Level 3 overall fidelity of implementation data ranged from 87.04%–91.67% with a mean of 89.91% of expected behaviors observed. For structural dimensions of fidelity during Level 3, Ollie's fidelity scores ranged from 96.15%–100% with a mean of 99.04%. For process dimensions of fidelity during Level 3, Ollie's fidelity scores ranged from 78.57%–88.89% with a mean of 83.61%. During Level 3, Ollie implemented the reading intervention for four sessions working with two students during each session. Ollie met the pacing requirement during the last two sessions of Level 3 obtaining 87.04% and 90.00% fidelity. Ollie met criteria for overall fidelity during Level 3 by obtaining a score of at least 90% for one session and meeting the pacing requirement.

Overall, Ollie was present to implement the reading tutoring intervention for 12 sessions tutoring two students during 11 sessions and one student during one session. Ollie's overall fidelity of implementation data indicated an increase in level of fidelity immediately upon entering Level 3 coaching support. Ollie's mean fidelity of implementation scores related to structural dimensions of fidelity increased from Level 1 to Levels 2 and 3 reaching a mean of 99.04% during Level 3. Although her mean fidelity of implementation scores related to process dimensions of fidelity slightly decreased from Level 1 to Level 2, her fidelity related to process dimensions during Level 3 was highest at a mean score of above 80%. Fidelity of

implementation scores related to process dimensions of fidelity were consistently lower than structural dimensions of fidelity scores across all levels of the multilevel coaching support.

Rene

During Level 1, Rene's fidelity of implementation data indicated a decreasing trend and were variable but became more stable prior to entering Level 2. Her Level 1 overall fidelity of implementation data ranged from 60.00%–78.13% with a mean of 66.98% of expected behaviors observed. For structural dimensions of fidelity during Level 1, Rene's fidelity scores ranged from 64.29%–78.57% with a mean of 71.69%. For process dimensions of fidelity during Level 1, Rene's fidelity scores ranged from 56.25%–77.78% with a mean of 63.33%. During Level 1, Rene implemented the reading intervention for five sessions. She worked with two students during three sessions and with one student during two sessions. Rene met the pacing requirement during three sessions, one time when working with two students and twice when working with one student. During the sessions that Rene met the pacing requirement, each fidelity score was lower than 66%.

During Level 2, there was an immediate increase in level of Rene's data, and there was a decreasing trend across all Level 2 data. Rene's Level 2 overall fidelity of implementation data ranged from 72.22%–95.65% with a mean of 86.26% of expected behaviors observed. For structural dimensions of fidelity during Level 2, Rene's fidelity scores ranged from 87.50%–100% with a mean of 95.49%. For process dimensions of fidelity during Level 2, Rene's fidelity scores ranged from 54.55%–96.43% with a mean of 80.77%. During Level 2, Rene implemented the reading intervention for four sessions working with two students during each session. Rene met the pacing requirement twice during Level 2 with overall fidelity scores of 95.65% and 86.54%. Rene met the criteria for overall fidelity during Level 2 by obtaining a fidelity score of

at least 90% for one session and meeting the pacing requirement; however, due to a decreasing trend across Level 2 data, she entered Level 3 coaching support.

During Level 3, Rene's data were stable, and there was an immediate increase in level of fidelity of implementation scores. Rene's Level 3 overall fidelity of implementation data ranged from 83.33%–91.89% with a mean of 87.57% of expected behaviors observed. For structural dimensions of fidelity during Level 3, Rene's fidelity scores ranged from 85.71%–92.11% with a mean of 89.27%. For process dimensions of fidelity during Level 3, Rene's fidelity scores ranged from 76.67%–91.67% with a mean of 85.74%. During Level 3, Rene implemented the reading intervention for three sessions working with two students during one session and with one student during two sessions. Rene met the pacing requirement during all Level 3 sessions, and her overall fidelity scores were all above 80%. Due to the high level of Rene's data and meeting the pacing requirement, she met criteria for overall fidelity across all Level 3 coaching sessions with three consecutive fidelity scores above 80% and one fidelity score above 90%.

Overall, Rene was present to implement the reading tutoring intervention for 12 sessions tutoring two students during eight sessions and one student during four sessions. Rene's overall fidelity of implementation data indicated an immediate increase in level upon entering Level 2 and Level 3 coaching support with the most stable data during Level 3. Rene's mean fidelity of implementation scores related to both structural and process dimensions of fidelity were higher in Levels 2 and 3 than in Level 1. Fidelity of implementation scores related to process dimensions of fidelity were consistently lower than structural dimensions of fidelity scores across each level of the multilevel coaching support. Mean scores for both structural and process dimensions of fidelity were above 80% during Level 2 and Level 3.

Greer

During Level 1, Greer's fidelity of implementation data were stable at a moderately high level with slight decrease in level and a decreasing trend prior to entering Level 2. Her Level 1 overall fidelity of implementation data ranged from 71.88%–81.58% with a mean of 77.27% of expected behaviors observed. For structural dimensions of fidelity during Level 1, Greer's fidelity scores ranged from 68.75%–87.50% with a mean of 77.54%. For process dimensions of fidelity during Level 1, Greer's fidelity scores ranged from 67.86%–86.36% with a mean of 77.11%. During Level 1, Greer implemented the reading intervention for five sessions working with two students during each session. Greer met the pacing requirement during the first Level 1 session with a fidelity score of 71.88%. Due to the slight decrease in level and a decreasing trend, stability of her data, and not meeting the criteria for fidelity, Greer entered Level 2 coaching support.

During Level 2, there was an immediate increase in level of Greer's overall fidelity data, and data were stable at a high level across Level 2. Greer's Level 2 overall fidelity of implementation data ranged from 83.33%–96.00% with a mean of 89.21% of expected behaviors observed. For structural dimensions of fidelity during Level 2, Greer's fidelity scores ranged from 75.00%–100% with a mean of 92.51%. For process dimensions of fidelity during Level 2, Greer's fidelity scores ranged from 77.27%–100% with a mean of 87.53%. During Level 2, Greer implemented the reading intervention for seven sessions working with two students during three sessions and with one student during four sessions. Greer met the pacing requirement during each session working with one student but did not meet the pacing requirement when working with two students. Greer met the criteria for overall fidelity during Level 2 by obtaining a fidelity score of at least 90% for one session and meeting the pacing requirement. She also

obtained at least 80% fidelity across three consecutive sessions and met the pacing requirement during Level 2. Due to meeting the criteria for overall fidelity and the high level of her data, Greer remained in Level 2 coaching support and did not enter Level 3 coaching support during the study. Given that Greer did not meet the pacing requirement when working with two students, Level 2 coaching support was not withdrawn.

Overall, Greer was present to implement the reading tutoring intervention for 12 sessions tutoring two students during eight sessions and one student during four sessions. Greer's overall fidelity of implementation data indicated an immediate increase in level with little variability upon entering Level 2 coaching support. Greer's mean fidelity of implementation scores related to both structural and process dimensions of fidelity were higher in Level 2 than in Level 1 with a mean score above 90% for structural dimensions of fidelity and above 80% for process dimensions of fidelity during Level 2. Fidelity of implementation scores related to process dimensions of fidelity were consistently lower than structural dimensions of fidelity scores across both Level 1 and Level 2.

Peyton

During Level 1, Peyton's fidelity of implementation data indicated an increasing trend with high variability initially. Prior to entering Level 2, Peyton's data continued to indicate an increasing trend but with less variability. Her Level 1 overall fidelity of implementation data ranged from 60.00%–84.38% with a mean of 69.47% of expected behaviors observed. For structural dimensions of fidelity during Level 1, Peyton's fidelity scores ranged from 50.00%–100% with a mean of 74.08%. For process dimensions of fidelity during Level 1, Peyton's fidelity scores ranged from 46.43%–82.14% with a mean of 65.00%. During Level 1, Peyton implemented the reading intervention for eight sessions. She worked with two students during

five sessions and with one student during three sessions. Peyton met the pacing requirement during all three sessions when working with one student, and her fidelity scores were all below 80% during these sessions. Given that Peyton's data indicated less variability across sessions and she did not meet the criteria for overall fidelity during Level 1, she entered Level 2 coaching support.

During Level 2, Peyton's data indicated a similar level as Level 1 data with an increasing trend across all Level 2 data. Peyton's Level 2 overall fidelity of implementation data ranged from 66.67%–82.35% with a mean of 75.09% of expected behaviors observed. For structural dimensions of fidelity during Level 2, Peyton's fidelity scores ranged from 75.00%–100% with a mean of 84.90%. For process dimensions of fidelity during Level 2, Peyton's fidelity scores ranged from 56.67%–81.82% with a mean of 67.81%. During Level 2, Peyton implemented the reading intervention for four sessions working with two students during one session and with one student during three sessions. Peyton met the pacing requirement twice during Level 2 when working with one student and her overall fidelity scores for these two sessions were 76.32% and 75.00%. Peyton did not meet criteria for overall fidelity during Level 2; therefore, she entered Level 3 coaching support.

During Level 3, Peyton's data indicated less variability at a slightly higher level than Level 2 data. Peyton's Level 3 overall fidelity of implementation data ranged from 74.07%–80.56% with a mean of 78.44% of expected behaviors observed. For structural dimensions of fidelity during Level 3, Peyton's fidelity scores ranged from 76.92%–88.46% with a mean of 85.10%. For process dimensions of fidelity during Level 3, Peyton's fidelity scores ranged from 70.00%–75.00% with a mean of 72.86%. During Level 3, Peyton implemented the reading intervention for four sessions working with two students during three session and with one

student during one session. Peyton did not meet the pacing requirement during Level 3 coaching support. Due to not meeting the pacing requirement and not obtaining at least 80% fidelity across three consecutive sessions or 90% for one session, she also did not meet criteria for overall fidelity during Level 3.

Overall, Peyton was present to implement the reading tutoring intervention for 16 sessions tutoring two students during nine sessions and one student during seven sessions. Peyton's overall fidelity of implementation data indicated an increase in level from Level 1 to Level 3 with less variability in her data during Levels 2 and 3. Peyton's mean fidelity of implementation scores related to both structural and process dimensions of fidelity were higher in Levels 2 and 3 as the intensity of coaching support increased. Fidelity of implementation scores related to process dimensions of fidelity were consistently lower than structural dimensions of fidelity scores across each level of the multilevel coaching support. Mean scores for structural dimensions of fidelity were above 80% during Level 2 and Level 3. Mean scores for process dimensions of fidelity did not reach above 80%; however, the highest mean score for process dimensions of fidelity was during Level 3 coaching support.

Dylan

During Level 1, Dylan's fidelity of implementation data indicated an increasing trend with high variability. Prior to entering Level 2, her data indicated a decreasing trend. Her Level 1 overall fidelity of implementation data ranged from 54.54%–87.50% with a mean of 74.10% of expected behaviors observed. For structural dimensions of fidelity during Level 1, Dylan's fidelity scores ranged from 64.29%–100% with a mean of 90.54%. For process dimensions of fidelity during Level 1, Dylan's fidelity scores ranged from 44.44%–90.00% with a mean of 64.95%. During Level 1, Dylan implemented the reading intervention for eight sessions. She

worked with two students during five sessions and with one student during three sessions. Peyton met the pacing requirement during one session when working with one student and obtained a fidelity score of 67.19% for that session. Due to not meeting the criteria for overall fidelity and a decreasing trend, Dylan entered Level 2 coaching support.

During Level 2, there was an immediate increase in level of Dylan's overall fidelity data, and there was less variability in her data across Level 2. Dylan's Level 2 overall fidelity of implementation data ranged from 82.00%–91.67% with a mean of 86.30% of expected behaviors observed. For structural dimensions of fidelity during Level 2, Dylan's fidelity scores ranged from 87.50%–100% with a mean of 93.85%. For process dimensions of fidelity during Level 2, Dylan's fidelity scores ranged from 75.00%–91.67% with a mean of 80.32%. During Level 2, Dylan implemented the reading intervention for six sessions working with two students during four sessions and with one student during two sessions. Dylan met the pacing requirement twice during Level 2 when working with one student, and her overall fidelity scores for these sessions were 91.38% and 82.26%. Dylan met the criteria for overall fidelity during Level 2 by obtaining a fidelity score of at least 90% for one session and meeting the pacing requirement. Due to the high level of Dylan's overall fidelity data and meeting the criteria for overall fidelity, she did not enter Level 3 coaching support.

Overall, Dylan was present to implement the reading tutoring intervention for 14 sessions tutoring two students during nine sessions and one student during five sessions. Dylan's overall fidelity of implementation data indicated an immediate increase in level and less variability upon entering Level 2 coaching support. Dylan's mean fidelity of implementation scores related to both structural and process dimensions of fidelity were higher in Level 2 than in Level 1. Fidelity of implementation scores related to process dimensions of fidelity were consistently lower than

structural dimensions of fidelity scores across each level of the multilevel coaching support. Mean scores for both structural and process dimensions of fidelity were above 80% during Level 2.

Summary of the Effects of Multilevel Coaching Support

Visual analysis of the 6-tier graph indicated there was evidence of an increase in the level of PSTs' overall percentages of fidelity of implementation from Level 1 to Levels 2 and 3, collectively. PSTs entered Level 1 concurrently and Level 2 as dyads in a time-lagged manner to be able to compare Level 1 to Levels 2 and 3 of multilevel coaching support. Level 2 coaching support was applied at three different timepoints across three dyads of PSTs. If no intervention was applied for the first PST dyad, Logan and Ollie, a prediction was made that levels of responding would continue to be similar. Verification of this prediction occurred when there was little to no change in subsequent tiers for the second (Rene and Greer) and third (Peyton and Dylan) PST dyads that continued to receive Level 1 support when Logan and Ollie entered Level 2. There was replication of the effect of the multilevel coaching support (Levels 2 and 3) when the intervention was applied in subsequent tiers and PSTs' fidelity of implementation changed in a similar manner as observed in previous tiers. Due to the demonstration of effect across three dyads of PSTs, a causal effect of the multilevel coaching support (Levels 2 and 3) on changes in PSTs' percentages of fidelity of implementation was established and a functional relation was determined.

Throughout the study, no PSTs met the criteria for overall fidelity of implementation during Level 1. Five of six PSTs met the criteria for overall fidelity of implementation during Level 2 and/or Level 3. Three PSTs met criteria for overall fidelity during Level 2 while working with one student (Dylan and Greer) or two students (Rene). Three PSTs met criteria for overall

fidelity during Level 3 while working with one student (Rene), two students (Ollie), or one to two students across three consecutive sessions (Logan). Last, one PST (Peyton) did not meet criteria for overall fidelity during the study.

Table 2

PSTs' Fidelity of Implementation for Structural Dimensions of Fidelity

	Level 1	Level 2	Level 3
Logan	Range: 71.05%–100% Mean: 82.35%	Range: 83.33%–92.86% Mean: 85.94%	Range: 81.25%–96.88% Mean: 90.58%
Ollie	Range: 75.00%–100% Mean: 85.63%	Range: 81.25%–100% Mean: 90.26%	Range: 96.15%–100% Mean: 99.04%
Rene	Range:64.29%–78.57% Mean: 71.69%	Range: 87.50%–100% Mean: 95.49%	Range: 85.71%–92.11% Mean: 89.27%
Greer	Range: 68.75%–87.50% Mean: 77.54%	Range: 75.00%–100% Mean: 92.51%	N/A
Peyton	Range: 50.00%–100% Mean: 74.08%	Range: 75.00%–100% Mean: 84.90%	Range: 76.92%–88.46% Mean: 85.10%
Dylan	Range: 64.29%–100% Mean: 90.54%	Range: 87.50%–100% Mean: 93.85%	N/A

Table 3

PSTs' Fidelity of Implementation for Process Dimensions of Fidelity

	Level 1	Level 2	Level 3
Logan	Range: 50.00%–65.38% Mean: 59.91%	Range: 53.57%–72.73% Mean: 64.88%	Range: 61.76%–82.35% Mean: 76.57%
Ollie	Range: 55.56%–68.75% Mean: 60.88%	Range: 42.32%–70.00% Mean: 57.45%	Range: 78.57%–88.89% Mean: 83.61%
Rene	Range: 56.25%–77.78% Mean: 63.33%	Range: 54.55%–96.43% Mean: 80.77%	Range: 76.67%–91.67% Mean: 85.74%
Greer	Range: 67.86%–86.36% Mean: 77.11%	Range:77.27%–100% Mean: 87.53%	N/A
Peyton	Range:46.43%–82.14% Mean: 65.00%	Range: 56.67%–81.82% Mean: 67.81%	Range: 70.00%–75.00% Mean: 72.86%
Dylan	Range: 44.44%–90.00% Mean: 64.95%	Range: 75.00%–91.67% Mean: 80.32%	N/A

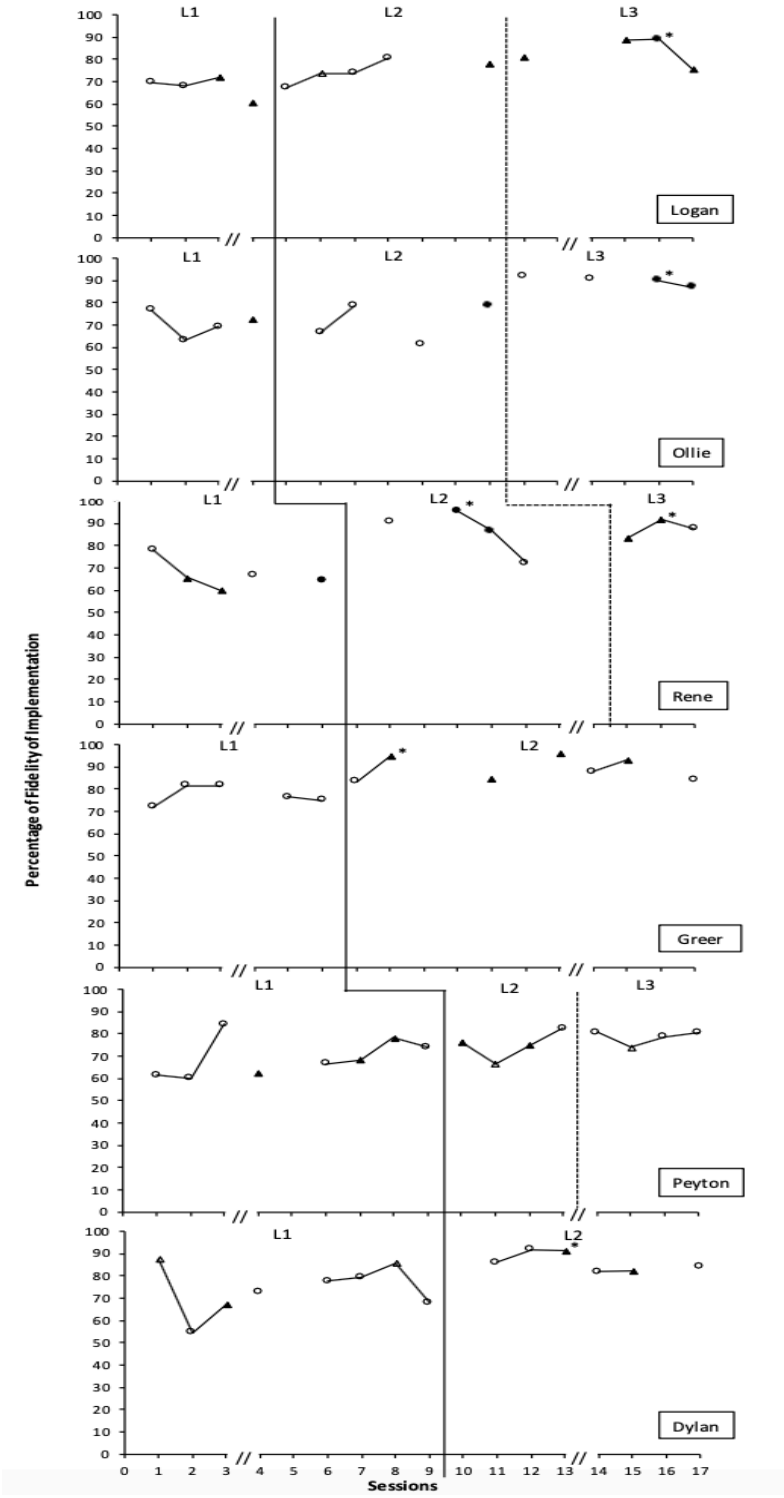


Figure 4. PSTs' fidelity of implementation of the reading intervention. The open data points indicate sessions when PSTs did not meet the pacing expectation. The closed data points indicate sessions when PSTs did meet the pacing expectation. The triangles indicate sessions in which only one student was present instead of two. The asterisk indicates the first session within the level the tutor met the criteria for overall fidelity of implementation.

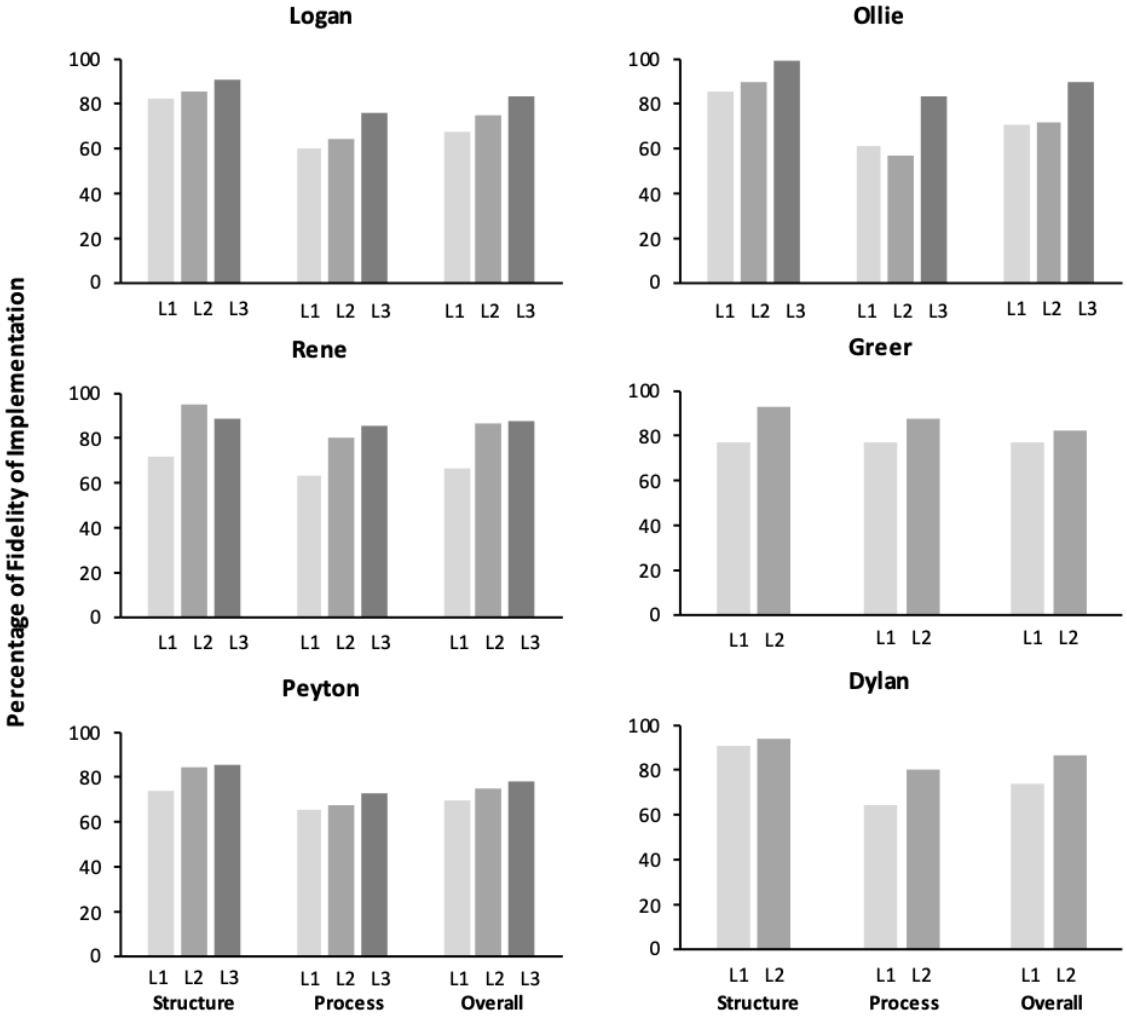


Figure 5. PSTs' mean fidelity of implementation scores for structural, process, and overall dimensions. L1 = Level 1; L2 = Level 2; L3 = Level 3.

Efficiency of Implementation of Components of the Reading Intervention

To further examine the effects of the multilevel coaching support on PSTs' process dimensions of fidelity of implementation, a post-hoc analysis of PSTs' pacing during implementation of the reading intervention was conducted. Figure 6 visually depicts the mean number of minutes PSTs spent implementing intervention components during Level 1 and Levels 2 and 3 which consisted of the tiered coaching support. The number of minutes per intervention component was calculated by dividing the total number of minutes of the tutoring session by the number of components completed rounded to the nearest half component. Rounding to the nearest half component was selected to reflect the pacing scoring from the fidelity of implementation checklist. A mean score was calculated for each PST during Level 1 and Levels 2 and 3.

Data gathered on PSTs' pacing indicated that four PSTs improved their efficiency of intervention component implementation by completing components at a quicker pace during Levels 2 and 3 compared to Level 1. Logan averaged 6.16 min per intervention component during Level 1 which decreased to 5.2 min per intervention component during Levels 2 and 3. Ollie averaged 8.13 min per intervention component during Level 1 which decreased to 5.87 min per intervention component during Levels 2 and 3. Greer averaged 7.86 min per intervention component during Level 1 which decreased to 5.53 min per intervention component during Levels 2 and 3. Dylan averaged 8.33 min per intervention component during Level 1 which decreased to 7.03 min per intervention component during Levels 2 and 3. Two PSTs, Rene and Peyton, increased time spent per intervention component from Level 1 to Levels 2 and 3. Rene averaged 5.21 min per intervention component during Level 1 which increased to 5.78 min per intervention component during Levels 2 and 3. Peyton averaged 6.38 min per intervention

component during Level 1 which increased to 7.02 min per intervention component during Levels 2 and 3. These data indicated that four of six PSTs improved their efficiency of intervention component implementation from Level 1 to Levels 2 and 3. The pacing expectation measured by the fidelity of implementation checklist was that PSTs would require a mean of 5 min per intervention component, and four PSTs averaged within the 5–6 min range during Levels 2 and 3. Although Rene increased her average amount of time per intervention component from Level 1 to Levels 2 and 3, her data indicated she remained within the 5–6 min range for intervention component implementation. Overall, most PSTs improved or maintained their efficiency of intervention component implementation from Level 1 to Levels 2 and 3 by implementing components of the reading intervention at quicker pace while increasing their fidelity of implementation scores.

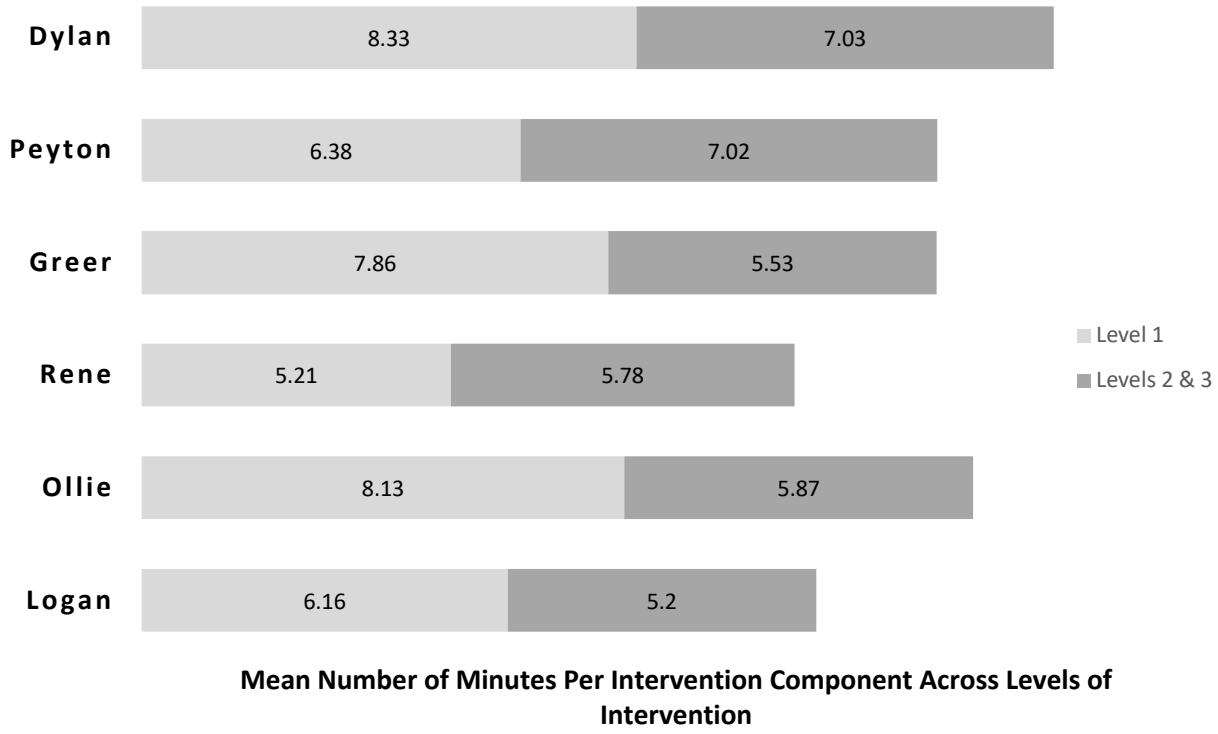


Figure 6. PSTs' efficiency of implementation of intervention components.

Group Size. One factor that may have impacted PSTs' efficiency of intervention component implementation was student group size. At the onset of the study, all PSTs were assigned to provide reading intervention support to two students. However, due to student absences, some PSTs only worked with one student during some tutoring sessions. When working with one student, PSTs met the pacing requirement 82%, 82%, and 83% of sessions during Levels 1, 2, and 3, respectively. When working with two students, PSTs met the pacing requirement 9%, 16%, and 33% of sessions during Levels 1, 2, and 3, respectively. For sessions in which PSTs' fidelity of implementation scores were at or above 80% fidelity while working with one or two students, PSTs only met the pacing requirement during Level 2 or Level 3. No PSTs working with either group size (i.e., one or two students) met the pacing requirement and scored at or above about 80% fidelity during Level 1. Considering the number of sessions at 80%

fidelity when instructional pacing was met with either one or two students was an important context given that PSTs may have met the pacing requirement but may not have implemented components completely or accurately. For example, Dylan's highest Level 1 data points (i.e., session 1 and session 8) were 87.50% and 85.71% fidelity, respectively. During each of these sessions, she was only working with one student and had an efficiency score of 6.67 min during session one and 9.60 min during session eight.

Results for Research Question 2: What are PSTs' perceptions of the feasibility, effectiveness, and future impact of the multilevel coaching intervention?

At the conclusion of the study, all PSTs participated in a social validity questionnaire to gather their perceptions of the social significance of the multilevel coaching intervention. Four PSTs received the questionnaire regarding their perceptions related to all levels of coaching support including supervisory coaching, side-by-side coaching, and general coaching support. Two PSTs who did not receive side-by-side coaching support received the questionnaire regarding their perceptions of supervisory and general coaching support. PSTs participated in the questionnaire anonymously due to the questionnaire being distributed by the coach during the study. Table 4 includes the results from the social validity questionnaire.

For supervisory coaching, all PSTs agreed or strongly agreed they enjoyed supervisory coaching and that having a coach send email feedback improved their knowledge of teaching reading and instructional behaviors. For side-by-side coaching, three of four PSTs agreed or strongly agreed they enjoyed side-by-side coaching and that having a coach model strategies in the moment improved their knowledge of teaching reading and instructional behaviors. One PST stated she was neutral regarding enjoying side-by-side coaching and that having a coach model helped to improve her instructional behaviors. For general coaching support, all PSTs agreed or

highly agreed they enjoyed receiving feedback from a coach, they will use strategies and behaviors learned in the future, would like to have a coach in future teaching experiences, and would recommend a coach to their peers.

PSTs also had the opportunity to answer free response questions about coaching support. Within these questions, one PST noted they enjoyed instant feedback and preferred side-by-side coaching. However, one PST noted that side-by-side coaching was a challenge for her because it made her feel stressed for someone to watch and jump in to model during her tutoring session. Another PST noted that someone watching her videos made her feel nervous and indicated a preference for side-by-side coaching. Additionally, one PST explained that having a coach physically present made the feedback easier for her to remember and implement later. Several PSTs mentioned they appreciated receiving both glows and grows during email feedback to help them to improve their fidelity and acknowledge their strengths. Although PSTs described disparate preferences for supervisory versus side-by-side coaching, results of the social validity questionnaire indicated PSTs found coaching support to be feasible, effective, and impactful on their future teaching experiences.

Table 4

Social Validity Questionnaire Results

Questions	Range of Ratings	Average Rating
Supervisory Coaching		
I enjoyed receiving supervisory coaching (i.e., video observations with email feedback) during the reading tutoring program.	4 – 5	4.83
Having a coach observe video recorded sessions and send email feedback during the reading tutoring program improved my knowledge and skills of teaching reading.	5	5
Having a coach observe video recorded sessions and send email feedback during the reading tutoring program improved my instructional behaviors.	5	5
Side-by-Side Coaching		
I enjoyed receiving side-by-side coaching (i.e., when my coach supported me in the moment) during the reading tutoring program.	3 – 5	4.25
Having a coach model strategies in the moment during the reading tutoring program improved my knowledge and skills of teaching reading.	4 – 5	4.75
Having a coach model strategies in the moment during the reading tutoring program improved my instructional behaviors when teaching reading.	3 – 5	4.5
General Coaching Support		
I enjoyed receiving feedback from a coach as a part of the reading tutoring program.	5	5
I will use reading strategies that I learned from my coach in my future teaching experiences.	5	5
I will use instructional behaviors (e.g., pacing, positive behavior supports) that I learned from my coach in my future teaching experiences.	5	5
Receiving coaching support in the reading tutoring program has helped prepare me for my future teaching experiences.	5	5
I would like to have coaching support in my future teaching experiences.	4 – 5	4.67
I would recommend coaching support during the reading tutoring program to my peers.	5	5

Note. Based on a 5-point Likert scale. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

CHAPTER 5: DISCUSSION

The purpose of this study was to investigate the effects of multilevel coaching on PSTs' fidelity of implementation of an EBP in reading when tutoring students identified as in need of reading support. Overall, visual analysis of PSTs' percentage of observed expected behaviors captured by the Fidelity of Implementation Checklist indicated an increase in level from Level 1 to Levels 2 and 3 across all six tiers. Two PSTs required Level 2 support to obtain sustained and stable high levels of fidelity, and four PSTs required Level 3 support before their data indicated sustained and stable high levels of fidelity. Additionally, no PSTs met the criteria for fidelity during Level 1. Five of six PSTs met the criteria for fidelity during Level 2, Level 3, or during both levels of support, and one PST did not meet the criteria for fidelity during the study. These results indicated that elementary education PSTs demonstrated improved fidelity of implementation after receiving a multilevel coaching intervention support inclusive of supervisory or supervisory plus side-by-side coaching. Collectively, these data suggest that training alone was not a sufficient level of support for PSTs when learning how to implement an EBP with fidelity, and PSTs as novice learners may require ongoing, effective follow-up coaching support post-training to implement EBPs in reading with fidelity during clinical experiences.

The results of the social validity questionnaire indicated that PSTs held positive perceptions of the multilevel coaching intervention during their clinical experience and perceived the intervention as socially valid indicating the feasibility, effectiveness, and future impact of the intervention. The results also indicated that PSTs may hold varying preferences for methods of coaching support.

Outcome Themes

Effective Coaching Support for Preservice Teachers Implementing Evidence-Based Practices in Reading

Previous research investigating the impact of coaching support (e.g., supervisory or side-by-side coaching) on inservice and PSTs' instructional teaching behaviors, use of EBPs, and fidelity of implementation of EBPs has indicated improved effects on teacher and student outcomes (Kraft et al., 2018; Kretlow & Bartholomew, 2010; Tschannen-Moran & McMaster, 2009). Additionally, research has indicated that teachers may require varying levels of support to achieve mastery criteria for fidelity of implementation (Bursuck et al., 2004; Goodnight et al., 2020). This study examined the impact of multilevel coaching, including supervisory and side-by-side coaching, on PSTs' fidelity of implementation of an EBP in reading during a coursework-aligned clinical experience. This study showed that PSTs demonstrated improved fidelity of implementation during the multilevel coaching intervention (Levels 2 and 3) which aligns with previous research demonstrating that coaching is an effective method of providing follow-up support for PSTs during reading instruction (Gettinger & Stoiber, 2016; Jager et al., 2002; Kraft et al., 2018; Kretlow et al., 2009; Lignuaris-Kraft & Marchand-Martella, 1993; Morgan et al., 1994; Schnorr, 2013).

First, two of six PSTs required only supervisory coaching (Level 2) to maintain improved fidelity of implementation. Previous research also has indicated that supervisory coaching following training can be used to improve PSTs' instruction during reading (Capizzi et al., 2010; Lignugaris-Kraft & Marchand-Martella, 1993; Meisner, 2020; Morgan et al.,1994; Peeples et al., 2019). To facilitate supervisory coaching for PSTs, video-recorded sessions served as the method to observe and provide subsequent feedback from an expert coach. Observations of video-

recorded sessions followed by feedback from an expert coach is one method of supervisory coaching that can contribute to improved PSTs' instructional behaviors during reading (Capizzi et al., 2010; Lignugaris-Kraft & Marchand-Martella, 1993; Mallette et al., 1999; Morgan et al.,1994; Peeples et al., 2019).

Second, four of six PSTs required side-by-side plus supervisory coaching (Level 3) to maintain improved fidelity of implementation. Previous research has indicated that side-by-side coaching is an effective form of coaching to improve teachers' fidelity of implementation of EBPs during reading instruction (Kretlow & Bartholomew, 2010; Tschannen-Moran & McMaster; 2009). During this study, side-by-side coaching included immediate feedback via in-the-moment prompting and modeling from an expert coach sitting next to or near PSTs as they implemented the EBP in reading. The results of this study indicated that providing side-by-side coaching support for PSTs can be an effective form of providing feedback for PSTs to improve their fidelity of implementation of an EBP in reading and aligns with previous research indicating improved fidelity of implementation and instructional behaviors for PSTs (Scheeler & Lee, 2002; Scheeler et al., 2012).

Structure Versus Process Dimensions of Fidelity. In this study, both structure (i.e., program adherence) and process (i.e., quality of instructional delivery) dimensions of fidelity compiled the overall fidelity of implementation score. Across all levels, PSTs' mean fidelity of implementation for structural dimensions of fidelity was consistently higher than their mean fidelity of implementation for process dimensions of fidelity. Due to the dynamic nature of process dimensions of fidelity and PSTs' status as less experienced, novice teachers, it is not surprising that PSTs had lower scores related to process dimensions of fidelity compared to structural dimensions. However, the multilevel coaching intervention in this study was effective

at improving PSTs' mean fidelity of implementation scores related to both structure and process dimensions of fidelity from Level 1 to Levels 2 and 3. Previous research has indicated that TPPs do not frequently offer opportunities for PSTs to apply learned knowledge and skills under expert guidance, but providing these opportunities for PSTs may enhance the transfer of their knowledge and skills learned into practice and impact their instructional quality, which can be categorized as process dimensions of fidelity (Gormely & Ruhl, 2007; Hindman et al., 2020; Hudson et al., 2021). The results of this study indicated that PSTs demonstrated higher levels of process dimensions of fidelity and perceived themselves as more knowledgeable and skilled at teaching reading after participating in the multilevel coaching intervention.

Although fidelity levels related to process dimensions were lower overall, the results of this study indicate that process dimensions can be improved with coaching support, and are theorized to have a greater impact on student outcomes (Gersten et al., 2005; Mowbray et al., 2003; Power et al., 2005). Due to the potential impact on student outcomes, researchers have encouraged the importance of measuring process dimensions of fidelity. Higher levels of fidelity of implementation may be a critical factor to impact student outcomes in reading, specifically for students who are at-risk for reading difficulties (Connor et al., 2007; Hamre et al., 2010; Neugebauer et al., 2017; Odom et al., 2010; van Dijk et al., 2021), and for PSTs, who may have less experience and lower instructional quality (Capin et al., 2021; Quinn & Kim, 2017; Vaughn et al., 2015). Due to the potential impact on student outcomes, researchers have encouraged the importance of measuring process dimensions of fidelity.

Individualized Coaching Support for Preservice Teachers as Novice Teachers of Reading

There is limited research in teacher preparation on the effects of employing a multilevel coaching framework on PSTs' fidelity of implementation of EBPs, and the research is even more

limited regarding EBPs in reading. However, research has indicated the improved effects of multilevel coaching on inservice teachers' instructional behaviors and fidelity of implementation of EBPs (Bursuck et al., 2004; Goodnight et al., 2020; Hsieh et al., 2009; Schnorr, 2013). Additionally, research has indicated that coaching provided within a tiered framework of support facilitates accurate and sustained implementation of EBPs (Freeman et al., 2017). This study showed that PSTs required varying levels of coaching support before demonstrating improved fidelity of implementation of an EBP in reading. These results indicate that PSTs may benefit from tiered coaching support that is responsive to data rather than providing universal coaching support for all (Myers et al., 2011).

Within a tiered coaching framework, PSTs as novice teachers of reading may initially require more intensive levels of coaching support and feedback that includes modeling of skills by an expert to implement EBPs effectively and efficiently (Dawkins et al., 2009a, 2009b). The results of this study provided some evidence that PSTs did require coaching support that included modeling of skills in-the-moment to achieve higher levels of fidelity. In this study, four of six PSTs required additional coaching support in the form of side-by-side coaching. Although two PSTs met criteria for fidelity and maintained high, stable levels of fidelity during supervisory coaching, there may have been additional benefits for these two PSTs, Greer and Dylan, if they also would have received side-by-side coaching or received side-by-side coaching initially. For example, although Greer and Dylan maintained high levels of fidelity during Level 2 when working with one or two students, neither PST met the requirements for pacing when working with two students when their fidelity scores were above 80%. However, two PSTs who received Level 3 coaching support, Logan and Ollie, did meet the requirements for pacing when working with two students. Therefore, there may have been knowledge and skills PSTs could

have gained from modeling and demonstration feedback, such as provided in Level 3, that would allow them to subsequently make changes to their own instruction.

These results suggest that PSTs as novice teachers of reading may initially benefit from more intensive levels of coaching, such as side-by-side coaching, especially when other factors (e.g., group size) make instructional delivery more complex. Even though PSTs received training that included explicit explanations and modeling, additional explicit instruction post-training is warranted for novice learners. A gradual release of responsibility model (McVee et al., 2019) that progresses from post-training in-the-moment modeling and explanations to guided and then independent practice with feedback may be an alternative, more effective coaching framework for PSTs as novice learners. Moreover, researchers have hypothesized that teachers cannot teach skills or implement practices they may not possess or understand themselves (Binks-Cantrell et al., 2012). Providing PSTs with email feedback assumes that PSTs have the knowledge and skills already in their repertoire to apply feedback received. When PSTs do not have the knowledge or skills to apply coaching feedback received post-tutoring sessions, such as via email in the current study, PSTs may not be able to successfully implement changes to their instruction.

Relevant theory aligns with the results of this study indicating that PSTs may need varying levels of guidance and feedback based on their actual and potential levels of development to implement interventions with acceptable levels of fidelity ([i.e., 80%; Horner et al., 2004]; Vygotsky, 1978; Warford, 2011). Within TPPs, PSTs can receive continuous, adjusted scaffolded support in response to their levels of fidelity of implementation to advance their individual learning and performance (Berk & Winsler, 1995; Englert et al., 2020; Warford, 2011).

Elementary Education Teachers as Reading Interventionists

With the varying needs of students at-risk for or identified with disabilities accompanied with the increasing number of students who receive instruction in reading in the general education classroom, all teachers, including elementary education teachers, require the knowledge and skills to be effective literacy teachers and meet the differential needs of all students (Irwin et al., 2021). This study showed that elementary education PSTs can be trained and coached to implement evidence-based, Tier 2, supplemental reading intervention with students who require additional reading support. Previous research has highlighted the need for elementary education PSTs to be equipped with the knowledge and skills to implement evidence-based reading intervention to positively impact reading outcomes for elementary-aged students (Leko et al., 2015; McFarland et al., 2017; McFarland et al., 2019). Together, the results of the single case design and social validity questionnaire provide evidence that training and coaching elementary education PSTs to implement a Tier 2 EBP in reading and to serve as an interventionist for students is both feasible and effective. These results substantiate recommendations for general education TPPs to provide PSTs with knowledge and skills to implement EBPs within a MTSS framework (Leko et al., 2015). Furthermore, even when elementary education teachers do not serve as the Tier 2 interventionist, they continue to share the responsibility of engaging in instructional decision-making process for their students who do receive Tier 2 instruction (IRIS Center, 2006).

Moreover, federal legislation encourages teachers' use of EBPs during literacy instruction (ESSA, 2015), and many states have adopted legislation, such as North Carolina's Excellent Public Schools Act of 2021, that require TPPs to provide elementary and special education PSTs with instruction in literacy intervention strategies and practices aligned with the

Science of Reading. This bill also requires that elementary and special education PSTs receive instruction in the application of literacy interventions strategies during their TPP to ensure students' reading proficiency. Relevant legislation highlights the demand for elementary education teachers to be proficient in implementation of interventions aligned with the Science of Reading and that PSTs must receive instruction and be afforded opportunities to apply knowledge and skills learned during their TPPs.

Instructional Pacing as a Measure of Preservice Teacher Efficiency

As a component of fidelity, PSTs' instructional pacing was measured to determine their efficiency of intervention component implementation. The results of this study indicated that most PSTs demonstrated improved efficiency of intervention component implementation by decreasing their average amount of time spent on component implementation from Level 1 to Levels 2 and 3 as their levels of fidelity of implementation improved. Previous research has indicated that when instructional pacing is manipulated, student outcomes may be substantially impacted, and a brisk instructional pace can yield greater results for students (Carnine, 1976; Tincani & De Mars, 2016). For example, Carnine (1976) and Tincani and De Mars (2016) found that a brisk instructional pace produced small increases in students' correct responding and moderate to large decreases in students' challenging behavior. By teaching with a brisk instructional pace, students have higher levels of participation and are afforded more opportunities to respond (Hall et al., 1982). Using a brisk instructional pace also is recognized as an HLP by CEC as a strategy to promote active student engagement (HLP 18) and when providing intensive instruction (HLP 20; McLeskey et al., 2017). Furthermore, Heward (2003) advocated that a slower instructional pace can harm students by leading to poorer instructional

outcomes, lower academic expectations, and greater challenging behavior, specifically for students with or at-risk for disabilities.

In this study, I highlighted efficiency of intervention component implementation as an important skill due to the benefits of a brisk instructional pace for students who require academic support. One factor that seemed to impact PSTs' instructional pacing was group size. All PSTs were assigned to provide reading intervention support to two students; however, due to student absences, the number of students present during tutoring sessions varied from one to two students per tutor. PSTs consistently met the pacing requirement when working with one student more often than when working with two students. Interestingly, the percentage of tutoring sessions that PSTs met instructional pacing criterion remained stagnant across Level 1 (M = 82%), Level 2 (M = 82%), and Level 3 (M = 83%) when working with one student. However, when working with two students, PSTs' instructional pacing incrementally increased from Level 1 (M = 9%) to Level 2 (M = 16%), and Level 2 to Level 3 (M = 33%). There were similar results related to group size and the mean number of minutes per intervention component across levels. When tutoring one student, PSTs implemented intervention components, on average, in 4.37 min during Level 1, 4.42 min during Level 2, and 4.02 min during Level 3. When tutoring two students, PSTs implemented the intervention components, on average, in 8.21 min during Level 1, 7.70 min during Level 2, and 6.92 min during Level 3. Although the average time spent implementing components decreased to a greater degree when tutoring two students compared to one student across levels, adding students to the intervention group may have compromised PSTs' ability to meet the pacing criterion due to the time required to implement the intervention with fidelity in a larger group size (i.e., two students).

In addition to the impact of group size on PSTs' instructional pacing, the criteria for how fidelity was defined in the study may have left little flexibility for adaptations and responding to students' needs, which may have influenced whether PSTs met instructional pacing requirements. Specifically, PSTs were required to complete a mean of one intervention component per 5 min during their tutoring sessions. This criterion was selected due to recommendations from the Sound Partners Tutor Handbook that describes the intervention as being intended to be implemented in 30 min sessions, and lessons oftentimes consist of the six core components. Sound Partners was designed to be implemented with individual students, but research also supports implementation with student dyads.

Following these recommendations, I aimed to capture PSTs' instructional pacing across levels of coaching support. However, several factors related to both the pacing criterion and instructional efficiency may have impacted PSTs' ability to implement the intervention components within the allotted timeframe. A few of these factors include the quantity of error correction procedures applied, students' behavioral considerations, variability in the complexity of intervention components, and, as previously mentioned, group size.

First, some students may have required error correction procedures to be implemented more frequently, and PSTs may have embedded additional support to address student errors made. Incorporating this additional embedded review highlights conflicting research on the extent to which fidelity of implementation, in this case referred to as treatment adherence, impacts student outcomes (Al Otaiba & Fuchs, 2006; Carroll et al., 2007; Durlak & DuPre, 2008; Kaderavek & Justice, 2010; Stein et al., 2008; Vaughn et al., 2015). Given that PSTs are novice teachers, the purpose of this study was to train and coach PSTs to implement the intervention as designed and to follow the standard intervention protocol. Previous research findings have noted

that novice teachers may need to implement EBPs with higher levels of fidelity as highly skilled and experienced teachers may be more likely to effectively adapt a protocol to meet the students' needs (Vaughn et al., 2015; Capin et al., 2021).

Second, some tutored students may have required additional positive behavioral supports or more explicit instruction regarding the behavioral expectations. During sessions when PSTs incorporated these positive behavioral supports, they may not have met the pacing expectation.

Third, some components of Sound Partners require more time to implement. If tutors implemented several components that required additional time, they may not have met the pacing requirement for that session. Even so, there also were instances when additional components were not included in the lesson, but PSTs still did not complete the minimum number of required components.

The aforementioned factors related to both PSTs' instructional efficiency and the criterion for pacing as defined in this study are important considerations to provide additional context regarding PSTs' instructional pacing, and these factors also may have similar implications for TPPs and teacher practice. Although the previously described factors may have impacted PSTs' instructional pacing, measuring PSTs' pacing and providing coaching support is needed to support PSTs in using a brisk instructional pace to produce a greater likelihood of positively impacting student outcomes (Carnine, 1976; Tincani & De Mars, 2016).

Perceptions of Coaching Support and Confidence as a Teacher of Reading

Research has indicated that PSTs who receive instruction through coursework and carefully sequenced and designed clinical experiences demonstrate improved perceptions of their preparedness to teach and are perceived as more effective teachers by supervisors (Boyd et al., 2009; Darling-Hammond & Bransford, 2005; Nougaret et al., 2005; Scott et al., 2018). In this

study, PSTs' perceptions indicated they found the coaching support within the coursework-aligned clinical experience to improve their knowledge and skills of teaching reading and their instructional behaviors. Although PSTs' knowledge was unmeasured and PSTs' skills to teach reading and instructional behaviors were only measured through fidelity of implementation of the EBP in reading, PSTs' perceptions of these improved domains reflect recommendations for TPPs to provide PSTs with situated, scaffolded practice within authentic contexts to impact PSTs' beliefs and future practices in reading (Thomas, 2013).

When surveyed about their perceptions of the coaching support embedded within the clinical experience, PSTs noted disparate preferences for coaching support. For example, some PSTs preferred supervisory coaching because having a coach interject during a lesson made them feel nervous. Conversely, some PSTs explained their preference for side-by-side coaching over supervisory due to feeling nervous a coach was watching their videos and enjoying the instant feedback during lessons. PSTs' varied preferences echo inservice teachers' sentiments about coaching preferences and hesitation about establishing a teacher-coach relationship. To initiate and build strong teacher-coach relationships, L'Allier and Brown (2021) recommended coaches and teachers discuss ways in which they may collaborate to establish clear and open communication as baseline for all future interactions. By listening to and honoring teachers' preferences and needs, collaborative relationships can strengthen over time (Heineke, 2013).

The coaching interactions in this study were centered on observations and modeling which are two coaching activities identified to contribute to the effectiveness of coaching interactions and student achievement (Elish-Piper & L'Allier, 2010, 2011). In this study, the objective of the multilevel coaching support was to recognize and respond to PSTs' needs identified through video-recorded or live observations. Although observations and modeling may

feel intrusive to some PSTs and inservice teachers, teachers and coaches can rely on the importance of engaging in a collaborative relationship early on to establish and maintain a strong teacher-coach relationship that highlights a shared understanding of roles and responsibilities (L'Allier and Brown, 2021).

Specific Contributions of the Study

The findings of the present study are significant as they establish a knowledge base on using a multilevel coaching framework of supports with PSTs who have been trained to implement an EBP in reading. Multilevel coaching support has been implemented with inservice teachers during reading (Bursuck et al., 2004; Goodnight et al., 2020) and to support their use of instructional skills and implementation of practices (Bursuck et al., 2004; Goodnight et al., 2020; Hsieh et al., 2009; Schnorr, 2013). This study contributes to the literature by extending the findings of multilevel coaching to PSTs, specifically when implementing an evidence-based reading intervention. These findings also extend the literature on multilevel coaching and the effects on fidelity of implementation as an outcome variable. Limited studies have examined the impact of multilevel coaching on fidelity of implementation (Stormont & Reinke, 2014), and this study is the first, to date, to examine the extent of the effects of multilevel coaching on PSTs' fidelity of implementation. Moreover, this study provides further evidence that systematically providing coaching support during authentic clinical experiences can improve PSTs' fidelity of implementation when engaged in an EBP in reading.

Next, results from this study provide further support that clinical experiences with coaching support contribute to PSTs' improved perceptions of coaching support and their own knowledge and skills to teach reading and engage in effective instructional behaviors. Results from the social validity questionnaire contribute to the literature on the feasibility, effectiveness,

and future impact of the multilevel coaching intervention. Prior research has indicated that PSTs demonstrate improved perceptions of their own preparedness to teach after engaging authentic, coursework-aligned clinical experiences, such as reading tutoring, during their TPPs (Dawkins et al., 2009a, 2009b). This study's findings show promising results of PSTs' perceptions of coaching support and how coaching support may positively impact their future teaching experiences.

Last, previous studies have indicated that additional research is needed to validate effective pedagogical practices and implementation supports that improve teachers' instructional skills and attitudes about teaching reading (Brownell et al., 2020). This study extends the literature on coaching as an effective pedagogical approach that teacher educators could leverage to build PST capacity to implement EBPs with high fidelity of implementation. Brownell and colleagues (2020) proposed that a transformative research agenda identifying these effective pedagogical approaches, such as coaching, can guide and support teacher educators as they prepare PSTs to positively impact student outcomes. This study demonstrates that coaching support for PSTs is an effective pedagogical approach to impact their implementation of EBPs in reading, perceptions about their own preparedness to teach reading, and perceptions about their ability to engage in effective instructional behaviors across present and future contexts. It is of note that personnel and financial support were required to institute the coaching supports as described in this study, which may be resources that TPPs have limited access to. Perhaps TPPs can consider whether there are other ways to provide effective and ongoing feedback that require fewer resources. One option to consider may be leveraging PSTs who are more advanced in their programming or who have previously participated in similar clinical experience opportunities to serve as coaches. Involving peers as coaches resonates with recommendations from Hindman

and colleagues (2021) who proposed that TPPs should be community centered, specifically citing peers as support for PSTs.

Limitations

This study contains several limitations to consider. First, although this study investigated the effects of multilevel coaching via supervisory and side-by-side plus supervisory coaching, there is limited research to confirm the effects of multilevel coaching on PSTs' fidelity of implementation, specifically when providing reading intervention support. The study was not designed to determine if Level 2 support was necessary prior to Level 3 or if PSTs could have exclusively received Level 3 support. Therefore, the results do not explain the most efficient coaching methods for supporting PSTs when implementing reading interventions with fidelity.

Additionally, a functional relation was established between the multilevel coaching intervention and PSTs' fidelity of implementation of an EBP in reading. The multilevel coaching intervention includes both Level 2 (supervisory coaching) and Level 3 (side-by-side plus supervisory coaching). Regarding the functional relation, the effects of the multilevel coaching intervention cannot be partitioned between Level 2 and Level 3 coaching support. Level 3 coaching support was considered a phase change in this study to provide more intensive coaching support to PSTs based on their fidelity of implementation scores. Therefore, the effects of standalone side-by-side coaching cannot be determined in Level 3.

Next, there are limitations regarding supervisory coaching due to the nature of how feedback was provided. PSTs received emails before each tutoring session with feedback from their most recent tutoring session. Although I made attempts to obtain read receipts on feedback emails, I was not able to determine if PSTs opened and read the feedback emails. Therefore, PSTs may not have engaged fully with the supervisory component of the multilevel coaching

intervention. The increased level of fidelity during Level 2 could be a result of the effects of threats to validity (e.g., history, maturation) that caused an increase in level of fidelity during Level 2 if PSTs did not engage with the email feedback.

Another limitation regarding coaching support provided to PSTs is that tutoring sessions were typically between 25–30 min, and by the end of the study, four PSTs were receiving side-by-side coaching during the same tutoring sessions. When multiple PSTs were receiving Level 3 coaching support, there was a limited amount of time I was able to spend engaged in side-by-side coaching with each PST. The time spent in side-by-side coaching ranged from 4–13 min per PST per tutoring session. The dosage of coaching support is an important factor to consider when providing coaching support to PSTs, and when a small amount of time is spent in side-by-side coaching, it may not be potent enough to impact PSTs' behavior.

Fifth, this study was applied research in schools when PSTs were tutoring real students in an authentic school context. Due to the nature of working in a school context, attendance can be unpredictable. In this study, PSTs were absent from between one to four sessions which created breaks in the data paths. When students were absent, the PST may have only worked with one student. Due to these absences and missing data points, I was not able to collect maintenance data during the study. Therefore, I cannot determine the long-term effects of the multilevel coaching intervention and if PSTs maintained gains in their fidelity of implementation of the EBP in reading after the coaching intervention was withdrawn.

Sixth, related to the limited number of data points in some phases and the lack of maintenance data across all participants, I aligned decisions regarding the coaching support that PSTs required with maintaining the integrity of the single case, multiple baseline across participants design. In my original plan, PSTs would have moved into the maintenance phase

immediately upon meeting the criteria for fidelity. However, this would have impacted the number of data points and limited conclusions to be drawn about the effects of the multilevel coaching support. For example, Greer met the criteria for fidelity during the second session in Level 2. If Greer would have then entered the maintenance phase, there would have only been two data points during Level 2, limiting the ability to establish a demonstration of effect of the intervention. In another example, Rene also would have entered maintenance after meeting criteria for fidelity during the second session in Level 2. By continuing Level 2 with Rene, I noticed a decreasing trend and made the decision to enter Rene into Level 3 coaching support. If coaching support would have been removed during Level 2, Rene may not have had the opportunity to receive Level 3 coaching support, raising the question as to what constitutes acceptable levels of fidelity (e.g., 90% during one session). This deviation from the original plan was necessary to establish demonstrations of the effect of the multilevel coaching intervention across participants, but calls the Multilevel Coaching Framework and Decision Rules into question (Figure 2).

Next, I administered a social validity questionnaire to PSTs to gather their perceptions about the feasibility, effectiveness, and future impact of the multilevel coaching intervention. Although PSTs' responses were anonymous, it is possible they generally indicated positive perceptions of the coaching supports given that I served as their coach and the primary researcher in this study.

Other unmeasured variables in this study included teacher knowledge and student reading outcomes. Although studies generally report that fidelity of implementation is associated with improved outcomes (Al Otaiba & Fuchs, 2006; Benner et al., 2011; Carroll et al., 2007; Durlak & DuPre, 2008; Kaderavek & Justice, 2010; O'Donnell, 2008; Stein et al., 2008; Vaughn et al.,

2015), I am unable to determine the effects of PSTs' fidelity of implementation on their knowledge of teaching reading and the impact of improved PSTs' fidelity of implementation on student reading outcomes. Ultimately, the purpose of the multilevel coaching intervention in this study was to improve student outcomes by improving PSTs' fidelity of implementation. However, these conclusions cannot be drawn due to unmeasured variables.

Last, the secondary observer served as a coach for other PSTs not included in the study who also were participating in the coursework-aligned clinical experience. Given that the secondary observer was working in the same setting in which this study occurred, he was not blind to which PSTs received coaching support and when they received coaching support throughout the semester. This could have led to researcher bias when collecting procedural fidelity of the multilevel coaching intervention and IOA of the primary outcome variable, PSTs' fidelity of implementation.

Suggestions for Future Research

Results from this study provide several suggestions for future research related to teacher preparation, PSTs' implementation of EBPs in reading with fidelity, and multilevel coaching support for PSTs. One suggestion for future research is investigating the efficiency of coaching models at supporting PSTs' implementation of evidence-based reading interventions with high levels of fidelity. By investigating the efficiency of various coaching models, such as supervisory or side-by-side coaching, researchers could determine the most sustainable coaching models and how resources are best allocated. In this study, supervisory coaching was resource intensive due to the time required to view video-recorded tutoring sessions and email feedback to each PST twice weekly. Perhaps by initially providing side-by-side coaching, the need for supervisory coaching could be eliminated and coaches could center their focus on modeling and

demonstrations when engaged in an authentic context with PSTs. In addition to investigating the efficiency of various types of coaching, additional research also is needed to substantiate the findings of this study and add to the literature base to establish the effectiveness of multilevel coaching and the extent to which multilevel coaching produces desired fidelity of implementation levels.

Second, future research should replicate and extend these findings to other groups of PSTs. The participants in this study were all elementary education PSTs, and their coursework and clinical experiences vary from the coursework and clinical experiences of special education PSTs. Future research can include special education PSTs or dual education majors (e.g., elementary and special education majors). Additional groups of PSTs this research could be replicated with include nontraditional students (e.g., students who may already be working in a classroom but currently obtaining licensure) as they have varying backgrounds and experiences from those included in this study.

Third, this study investigated the immediate effects of multilevel coaching on PSTs' fidelity of implementation when tutoring a student identified as in need of additional reading support. Maintenance data were not collected in this study; however, future research could investigate the long-term effects of multilevel coaching on PSTs' fidelity of implementation to determine if PSTs maintain their ability to implement a reading intervention with fidelity in future classroom contexts. Generalization data also were not collected in this study; however, it could be interesting to investigate if PSTs are able to generalize their ability to implement an EBP with fidelity across programs, content areas, or contexts. Research could also investigate to what extent participation in an enhanced clinical experience with coaching support impacts

PSTs' knowledge and skills and if PSTs generalize their learned knowledge and skills across EBPs.

Next, there were several unmeasured variables in this study including PST knowledge and student reading outcomes. Measuring PST knowledge of teaching reading along with student outcomes would allow researchers to determine if and to what extent coaching supports can impact PSTs' knowledge and subsequently impact student outcomes in reading. Research that incorporates direct measures of teacher knowledge and student outcomes would also allow for examining the role that fidelity of implementation serves in impacting these variables. Although fidelity of implementation is believed to positively predict student outcomes, future research is needed to confirm existing research findings (Al Otaiba & Fuchs, 2006; Carroll et al., 2007; Durlak & DuPre, 2008; Kaderavek & Justice, 2010; Stein et al., 2008; Vaughn et al., 2015).

Fifth, PSTs' efficiency of instructional delivery and the criterion for pacing as defined in this study may have compromised PSTs' ability to implement the reading intervention with fidelity. Future research investigating instructional pacing as a factor of process dimensions of fidelity, or instructional quality, could carefully consider pacing requirements, and whether or to what extent adaptations to interventions (e.g., embedded review, positive behavior supports) impact the measure of instructional pacing. Researchers also may consider group size as a factor during tutoring sessions and investigate how varying group sizes may impact PSTs' instructional pacing.

Sixth, due to the nature of single case designs and the small sample size of six PSTs, this study was not designed for generalizability purposes. The results provided some evidence of the effectiveness of a multilevel coaching intervention for the PSTs who participated. These results could inform future studies that employ randomized group designs, which would be intended to

generalize to the population of PSTs. In addition to randomized group designs, closely aligned or distal conceptual replications of the current single case research design are essential to establish scientific credibility (Coyne et al., 2016). Currently, systematic coaching support similar to a multilevel coaching framework has rarely been implemented with PSTs (Dawkins et al., 2009a, 2009b). Due to the limited research on the impact of multilevel coaching with PSTs, additional, larger-scale research and conceptual replications of the current study could extend this study's findings.

Next, previous research sometimes conflicts regarding the impact of teachers' fidelity of implementation, including structure (i.e., adherence) and process (i.e., instructional quality) dimensions, on student outcomes which impacts determining the extent to which less skilled and highly skilled teachers can make adaptations to intervention protocols (Capin et al., 2022). Teachers who are highly skilled and effective may be able to implement interventions at lower levels of adherence whereas novice or less-skilled teachers, such as PSTs, may need to implement interventions with higher levels of adherence (Capin et al., 2022; Quinn & Kim, 2017) to positively impact student outcomes in reading. Therefore, future research can continue to investigate the effects of multiple dimensions of fidelity, such as adherence and instructional quality, and the interaction on student outcomes, specifically in reading.

Last, social validity was measured via a questionnaire in which PSTs answered questions by indicating the extent to which they agreed or disagreed with a statement. PST perceptions are important to highlight, and a social validity questionnaire is a cost-effective method to assess the social validity of an intervention. However, future research could employ a direct measure of PSTs' current knowledge, skills, and instructional behaviors after participating in the

intervention and during their future teaching experiences as a less opinion-based tool to capture findings related to the effectiveness and future impact of the multilevel coaching intervention.

Implications for Practice

Results from this study provide several implications for practice related to the outcome themes of this study. First, there are implications for TPPs to provide opportunities for PSTs to engage in enhanced clinical experiences, inclusive of coaching support, implementing EBPs in reading. Second, there are implications related to measuring PSTs' fidelity of implementation and viewing fidelity as a multidimensional construct that can inform coaching support and teacher practices. Last, PSTs reported positive perceptions of the multilevel coaching supports indicating the social validity of the intervention and its use with PSTs.

The results of this study demonstrated that multilevel coaching is effective at increasing PSTs' fidelity of implementation when providing reading instruction via an EBP to students identified as in need of additional support. Teacher educators can apply the results of this study and consider providing PSTs with enhanced clinical experiences in which they have opportunities to apply their knowledge and skills learned through coursework and trainings and to receive expert feedback when doing so. High-quality TPPs include those that offer well-designed clinical experience opportunities so that PSTs have applied practice opportunities with feedback (Darling-Hammond, 2014; Hemmeter et al., 2008; Leko et al., 2015; Scheeler et al., 2016). These opportunities should be extended across majors as all PSTs (e.g., elementary education majors, special education majors) are considered teachers of reading and will provide instruction to students who need additional reading support. By providing PSTs with clinical experiences designed with effective feedback opportunities, they may be more likely to generalize their knowledge and skills and make explicit connections between their current

training and programming opportunities and their future classroom contexts (Scheeler et al., 2016).

Additional guidance for TPPs includes using a leveled or tiered framework of coaching, such as multilevel coaching, during enhanced clinical experiences as a responsive model of coaching based on PSTs' levels of fidelity. The results of this study showed that two PSTs required supervisory coaching only, and four PSTs required side-by-side plus supervisory coaching to meet a predetermined criteria for acceptable fidelity of implementation. However, no PSTs met 100% fidelity across the study, and one PST's data indicated a decreasing trend during supervisory coaching. Supervisory coaching also proved to be resource intensive due to the time required to view PSTs' video-recorded tutoring sessions and send individualized email feedback, which may or may not have been fully engaged with. Conversely, side-by-side coaching can occur in-the-moment but requires the presence of a coach during instruction. Teacher educators may weigh the benefits of providing various types of coaching support to their PSTs within a tiered system of support based on their access to resources (e.g., personnel, time, financial support). Although future research is needed regarding specific levels of efficiency, effectiveness, and sustainability of multilevel coaching, this leveled framework of coaching support establishes a model for supporting PSTs during clinical experiences. Multilevel coaching could be implemented to support PSTs in obtaining criteria for an acceptable level of fidelity of implementation of an EBP in reading if resources similar to those required in this study are available.

Schools and districts may also consider the implications of using a multilevel coaching framework to support inservice teachers as there is even more diversity in inservice teachers' backgrounds and experiences compared to the PSTs in this study. Oftentimes, schools have

personnel dedicated to serving as teacher or instructional coaches who can provide expert feedback to teachers. It may be more feasible for teacher or instructional coaches to provide side-by-side coaching due to their daily presence in the school building. However, if many teachers require coaching support, supervisory coaching may be a more attainable approach due to feedback being provided after instruction has occurred. If schools and districts adopt a multilevel coaching framework, they may be able to better allocate resources and serve the diverse strengths, needs, and preferences of teachers through tiered coaching support.

Second, teacher educators and schools or districts can measure inservice and PSTs' fidelity of implementation when implementing EBPs to inform the coaching support teachers may require. Fidelity can be measured and captured broadly as both variables related to structure dimensions, or treatment adherence, and process dimensions, or instructional quality. Teacher educators and schools or districts can consider teachers' responding related to adherence and instructional quality and provide feedback as needed across these dimensions of fidelity. Due to previous research on the importance and benefits of studying the multidimensionality of fidelity of implementation (Capin et al., 2021; Gersten et al., 2005; Harn et al., 2013; Odom et al., 2010; Power et al., 2005), personnel who serve as coaches can individualize their coaching efforts by centering on one or more dimensions of fidelity that reflect data gathered.

Additionally, it may be more important that coaches provide coaching support to teachers who are less skilled or novices in the field of education given that they may be less likely to make meaningful and data-informed adaptations to improve students' reading outcomes. Prior research has found that when instructional quality was low, treatment adherence had a stronger impact on student reading outcomes (Capin et al., 2021; Vaughn et al., 2015). Therefore, coaches can monitor teachers' adherence and instructional quality as measures of fidelity of

implementation and make informed decisions about coaching supports needed to have the greatest likelihood at positively impacting student outcomes in reading.

Last, PSTs generally reported positive perceptions of multilevel coaching support, and if PSTs did not agree or highly agree about the feasibility, effectiveness, or future impact of the coaching support, their perceptions were captured as "neutral." The positive perceptions of PSTs can encourage teacher educators to provide coaching support during TPPs as the findings of this study align with previous research that specially designed coursework and clinical experiences can positively impact PSTs' beliefs about teaching reading and their confidence as future teachers (Hikida et al., 2019; Knackstedt et al., 2018). Moreover, by exposing PSTs to coaching support during their TPP, coaching becomes a norm these future teachers may be more amendable to or perhaps seek out as they enter their field as novice teachers.

Summary

The purpose of providing multilevel coaching support to PSTs during their TPPs when engaged in a clinical experience implementing an EBP in reading is, ultimately, to positively impact the reading performance of students identified as in need of additional reading support and their future outcomes. In this study, PSTs engaged in multilevel coaching support based on their fidelity of implementation levels when implementing an EBP in reading. As visually depicted in the Logic Model (Figure 1), PSTs are novice learners, and it may be particularly important for novice teachers to implement EBPs in reading with higher levels of fidelity to positively impact student outcomes. Although student outcomes were unmeasured in this study, it is possible that by providing PSTs with coursework-aligned clinical experiences applying knowledge and skills learned paired with ongoing, effective feedback when doing so, PSTs' knowledge and skills as well as beliefs and perceptions about teaching reading could improve.

The results of this study demonstrated a functional relation between the multilevel coaching intervention and PSTs' fidelity of implementation indicating that multilevel coaching is effective at improving PSTs' fidelity of implementation. Of the six PST participants, two required supervisory coaching only, and four required side-by-side coaching. Overall, five of six PSTs met the predetermined criteria for fidelity. Due to most PSTs requiring coaching support inclusive of modeling and demonstrations post-training, initially providing side-by-side coaching and supplementing with supervisory coaching support according to PSTs' levels of fidelity may be an appropriate next step to investigate using a multilevel coaching framework.

When examining PSTs' levels of fidelity for structure and process dimensions of fidelity, their scores were consistently higher for structure dimensions compared to process dimensions across all levels of the multilevel coaching intervention. This finding indicates that PSTs may require additional or more intensive coaching related to process dimensions, and PSTs may be more likely to have higher levels of adherence, or structural dimensions of fidelity, when implementing EBPs in reading.

Finally, PSTs generally reported they agreed that multilevel coaching supports are feasible to participate in, effective at improving their knowledge and skills to teach reading and instructional behaviors, and contributed to their preparedness to teach reading in future contexts. Although PSTs' perceptions were positive, PSTs held contrasting preferences for supervisory versus side-by-side coaching. Honoring PSTs' preferences for coaching and establishing a collaborative relationship founded on clear and open communication could contribute to a systematic, well-designed coaching process that strengthens the collaborative teacher-coach relationship over time (Heineke, 2013; L'Allier and Brown, 2021). To conclude, implementation of multilevel coaching support during enhanced clinical experiences as a responsive method to

PSTs' levels of fidelity of implementation of EBPs in reading is a socially valid intervention and effective process at improving PSTs' ability to implement interventions with fidelity.

REFERENCES

Al Otaiba, S., & Fuchs, D. (2006). Who are the young children for whom best practices in reading are ineffective? An experimental and longitudinal study. *Journal of Learning Disabilities*, *39*, 414-431. https://doi.org/10.1177/00222194060390050401

Al Otaiba, S., & Lake, V. E. (2007). Preparing special educators to teach reading and use curriculum-based assessments. *Reading and Writing*, *20*(6), 591–617. https://doi.org/10.1007/s11145-007-9056-z

Al Otaiba, S., Lake, V. E., Greulich, L., Folsom, J. S., & Guidry, L. (2010). Preparing beginning reading teachers: An experimental comparison of initial early literacy field experiences. *Reading and Writing*, *25*(1), 109–129. https://doi.org/10.1007/s11145-010-9250-2

Aljadeff-Abergel, E., Peterson, S. M., Wiskirchen, R. R., Hagen, K. K., & Cole, M. L. (2017). Evaluating the temporal location of feedback: Providing feedback following performance vs. prior to performance. *Journal of Organizational Behavior Management*, *37*(2), 171–195. https://doi.org/10.1080/01608061.2017.1309332

Amendum, S. J. (2014). Embedded professional development and classroom-based early reading intervention: Early diagnostic reading intervention through coaching. *Reading and Writing Quarterly*, *30*(4), 348–377. https://doi.org/10.1080/10573569.2013.819181

American Educational Research Association. (2008). *Definition of scientifically-based research.* https://www.aera.net/Research-Policy-Advocacy/Research-Policy-Advocacy-News/Definition-of-Scientifically-based-Research

Archer, A. L. & Hughes, C. A. (2010*). Explicit instruction: Effective and efficient teaching*. Guilford.

Baker, S. K., Fien, H., & Baker, D. L. (2010). Robust reading instruction in the early grades: Conceptual and practical issues in the integration and evaluation of Tier 1 and Tier 2 instructional supports. *Focus on Exceptional Children*, *42*(9), 1–20. https://www.proquest.com/scholarly-journals/robust-reading-instruction-early-grades/docview/808393225/se-2

Baker, S.K., Fien, F., Nelson, N. J., Petscher, Y., Sayko, S., & Turtura, J. (2017). *Learning to read: "The simple view of reading".* U.S. Department of Education, Office of Elementary and Secondary Education, Office of Special Education Programs, & National Center on Improving Literacy. https://improvingliteracy.org/brief/learning-read-simple-view-reading

Barrio, B. L., Lindo, E. J., Combes, B. H., & Hovey, K. A. (2015). Ten years of Response to Intervention: Implications for general education teacher preparation programs. *Action in Teacher Education*, *37*(2), 190–204. https://doi.org/10.1080/01626620.2015.1004603

Begeny, J. C., & Martens, B. K. (2006). Assessing pre-service teachers' training in empirically-validated behavioral instruction practices. *School Psychology Quarterly*, *21*(3), 262–285. https://doi.org/10.1521/scpq.2006.21.3.262

Bell, R. L., Maeng, J. L., & Binns, I. C. (2013). Learning in context: Technology integration in a teacher preparation program informed by situated learning theory. *Journal of Research in Science Teaching*, *50*(3), 348–379. https://doi.org/10.1002/tea.21075

Benner, G. J., Nelson, J. R., Stage, S. A., & Ralston, N. C. (2011). The influence of fidelity of implementation on the reading outcomes of middle school students experiencing reading difficulties. *Remedial and Special Education*, *32*(1), 79–88. https://doi.org/10.1177/0741932510361265

Berk, L. E., & Winsler, A. (1995). *Scaffolding children's learning: Vygotsky and early childhood education* (Vol. 7). National Association for the Education of Young Children Research into Practice Series.

Binks-Cantrell, E., Washburn, E. K., Joshi, R. M., & Hougen, M. (2012). Peter effect in the preparation of reading teachers. *Scientific Studies of Reading*, *16*(6), 526–536. https://doi.org/10.1080/10888438.2011.601434

Birman, B. F., Desimone, L., Porter, A. C., & Garet, M. S. (2000). Designing professional development that works. *Educational Leadership*, *57*(8), 28–33.

Blachman, B. A., Tangel, D. M., Ball, E. W., Black, R., & McGraw, C. K. (1999). Developing phonological awareness and word recognition skills: A two-year intervention with low-income, inner-city children. *Reading and Writing*, *11*, 239–273. https://doi.org/10.1023/A:1008050403932

Blakely, C.H., Mayer, J P., Gottschalk, R. G., Schmitt, N., Davidson, W. S., Roitman, D. B.,& Emshoff, J .G. (2002). The fidelity-adaptation debate: Implications for the implementation of public sector social programs. In T. A. Revenson, A. R. D'Augelli, S. E. French, D. L. Hughes, D. Livert, E. Seidman, M. Shinn, & H. Yoshikawa (Eds.), *A quarter century of community psychology: Readings from the American journal of community psychology* (pp. 163–179). Springer. https://doi.org/10.1007/978-1-4419-8646-7_10

Boardman, A. G., Buckley, P., Vaughn, S., Roberts, G., Scornavacco, K., & Klingner, J. K. (2016). Relationship between implementation of collaborative strategic reading and student outcomes for adolescents with disabilities. *Journal of Learning Disabilities*, *49*(6), 644–657. https://doi.org/10.1177/0022219416640784

Boe, E. E., Shin, S., & Cook, L. H. (2007). Does teacher preparation matter for beginning teachers in either special or general education? *The Journal of Special Education*, *41*(3), 158–170. https://doi.org/10.1177/00224669070410030201

Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. (2009). Teacher preparation and student achievement. *Educational Evaluation and Policy Analysis*, *31*(4), 416–440. https://doi.org/10.3102/0162373709353129

Brady, S., & Moats, L. (1997). *Informed instruction for reading success: Foundations for teacher preparation*. International Dyslexia Association. https://files.eric.ed.gov/fulltext/ED411646.pdf

Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32–42. https://doi.org/10.3102/0013189X018001032

Brownell, M. T., Jones, N. D., Sohn, H., & Stark, K. (2020). Improving teaching quality for students with disabilities: Establishing a warrant for teacher education practice. *Teacher Education and Special Education*, *43*(1), 28–44. https://doi.org/10.1177/0888406419880351

Brownell, M., Kiely, M. T., Haager, D., Boardman, A., Corbett, N., Algina, J., Dingle, M. P., & Urbach, J. (2017). Literacy learning cohorts: Content-focused approach to improving special education teachers' reading instruction. *Exceptional Children*, *83*(2), 143–164. https://doi.org/10.1177/0014402916671517

Brownell, M. T., Ross, D. D., Colón, E. P., & McCallum, C. L. (2005). Critical features of special education teacher preparation: A comparison with general teacher education. *The*

Journal of Special Education, *38*(4), 242–252. https://doi.org/10.1177/00224669050380040601

Brownell, M. T., Sindelar, P. T., Kiely, M. T., & Danielson, L. C. (2010). Special education teacher quality and preparation: Exposing foundations, constructing a new model. *Exceptional Children*, *76*(3), 357–377. https://doi.org/10.1177/001440291007600307

Burns, M. K., & Ysseldyke, J. E. (2009). Reported prevalence of evidence-based instructional practices in special education. *The Journal of Special Education*, *43*(1), 3–11. https://doi.org/10.1177/0022466908315563

Bursuck, W. D., Smith, T., Munk, D., Damer, M., Mehlig, L., & Perry, J. (2004). Evaluating the impact of a prevention-based model of reading on children who are at risk. *Remedial and Special Education*, *25*(5), 303–313. https://doi.org/10.1177/07419325040250050401

Buzhardt, J., Greenwood, C. R., Abbott, M., & Tapia, Y. (2007). Scaling up classwide peer tutoring: Investigating barriers to wide-scale implementation from a distance. *Learning Disabilities: A Contemporary Journal*, *5*(2), 75–96.

Capin, P., Roberts, G., Clemens, N. H., & Vaughn, S. (2022). When treatment adherence matters: Interactions among treatment adherence, instructional quality, and student characteristics on reading outcomes. *Reading Research Quarterly*, *57*(2), 753–774. https://doi.org/10.1002/rrq.442

Capin, P., Walker, M. A., Vaughn, S., & Wanzek, J. (2018). Examining how treatment fidelity is supported, measured, and reported in K–3 reading intervention research. *Educational Psychology Review*, *30*(3), 885–919. https://doi.org/10.1007/s10648-017-9429-z

Capizzi, A. M., Wehby, J. H., & Sandmel, K. N. (2010). Enhancing mentoring of teacher candidates through consultative feedback and self-evaluation of instructional delivery.

Teacher Education and Special Education, *33*(3), 191–212. https://doi.org/10.1177/0888406409360012

Carnine, D. W. (1976). Effects of two teacher-presentation rates on off-task behavior, answering correctly, and participation. *Journal of Applied Behavior Analysis*, *9*(2), 199–206. https://doi.org/10.1901/jaba.1976.9-199

Carroll, C., Patterson, M., Wood, S., Booth, A., Rick, J., & Balain, S. (2007). A conceptual framework for implementation fidelity. *Implementation Science*, *2*(40). https://doi.org/10.1186/1748-5908-2-40

Castles, A., Rastle, K., & Nation, K. (2018). Ending the reading wars: Reading acquisition from novice to expert. *Psychological Science in the Public Interest*, *19*(1), 5–51. https://doi.org/10.1177/1529100618772271

Center for Research and Reform in Education at Johns Hopkins University. (2022). *Sound Partners: Struggling Readers.* Evidence for ESSA. https://www.evidenceforessa.org/programs/reading/sound-partners-struggling-readers

Center for Substance Abuse Prevention. (2002). *Finding the balance: Program fidelity and adaptation in substance abuse prevention: A state-of-the-art review*. U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. https://www.csun.edu/sites/default/files/FindingBalance1.pdf

Center on Multi-Tiered System of Supports. (2022). *Essential Components of MTSS*. American Institutes for Research. https://mtss4success.org/essential-components

Cohen, E., Hoz, R., & Kaplan, H. (2013). The practicum in preservice teacher education: A review of empirical studies. *Teaching Education*, *24*(4), 345–380. https://doi.org/10.1080/10476210.2012.711815

Collet, V. S. (2012). The gradual increase of responsibility model: Coaching for teacher change. *Literacy Research and Instruction*, *51*(1), 27–47. https://doi.org/10.1080/19388071.2010.549548

Compton, D. L., Gilbert, J. K., Jenkins, J. R., Fuchs, D., Fuchs, L. S., Cho, E., Barquero, L. A., & Bouton, B. (2012). Accelerating chronically unresponsive children to tier 3 instruction: What level of data is necessary to ensure selection accuracy? *Journal of Learning Disabilities*, *45*(3), 204–216. https://doi.org/10.1177/0022219412442151

Connor, C. M., Morrison, F. J., Schatschneider, C., Toste, J. R., Lundblom, E., Crowe, E. C., & Fishman, B. (2011). Effective classroom instruction: Implications of child characteristics by reading instruction interactions on first graders' word reading achievement. *Journal of Research on Educational Effectiveness*, *4*(3), 173–207. https://doi.org/10.1080/19345747.2010.510179

Connor, C. M., Morrison, F. J., Fishman, B. J., Schatschneider, C., & Underwood, P. (2007). Algorithm-guided individualized reading instruction. *Science*, *315*(5811), 464–465. https://www.science.org/doi/10.1126/science.1134513

Cook, B. G., Collins, L. W., Cook, S. C., & Cook, L. (2019). Evidence-based reviews: How evidence-based practices are systematically identified. *Learning Disabilities Research and Practice*, *35*(1), 6–13. https://doi.org/10.1111/ldrp.12213

Cook, B. G., Cook, L., & Landrum, T. J. (2013). Moving research into practice: Can we make dissemination stick? *Exceptional Children*, *79*(3), 163–180. https://doi.org/10.1177/001440291307900203

Cook, B. G., & Odom, S. L. (2013). Evidence-based practices and implementation science in special education. *Exceptional Children*, *79*(2), 135–144. https://doi.org/10.1177/001440291307900201

Cooper, J., Heron, T., & Heward, W. (2019). *Applied behavior analysis* (3rd ed.) Pearson.

Cornelius, K. E., & Nagro, S. A. (2014). Evaluating the evidence base of performance feedback in preservice special education teacher training. *Teacher Education and Special Education*, *37*(2), 133–146. https://doi.org/10.1177/0888406414521837

Council for Exceptional Children. (2015). *Initial practice-based professional preparation standards for special educators*. https://exceptionalchildren.org/sites/default/files/2021-03/K12%20Initial%20Standards%20and%20Components.pdf

Coyne, M. D., Cook, B. G., & Therrien, W. J. (2016). Recommendations for replication research in special education: A framework of systematic, conceptual replications. *Remedial and Special Education*, *37*(4), 244–253. https://doi.org/10.1177/0741932516648463

Cunningham, A. E., Zibulsky, J., Stanovich, K. E., & Stanovich, P. J. (2009). How teachers would spend their time teaching language arts: The mismatch between self-reported and best practices. *Journal of Learning Disabilities*, *42*(5), 418–430. https://doi.org/10.1177/0022219409339063

Cutting, L. E., & Levine, T. M. (2010). Cognitive profile of children with neurofibromatosis and reading disabilities. *Child Neuropsychology*, *16*(5), 417–432. https://doi.org/10.1080/09297041003761985

D'Angiulli, A., Siegel, L.S., & Maggi, S. (2004). Literacy instruction, SES, and word-reading achievement in English-language learners and children with English as a first language:

A longitudinal study. *Learning Disabilities Research and Practice*, *19*(4), 202–213. https://doi.org/10. 1111/j.1540-5826.2004.00106.x

Danielson, C. (2013). *The Framework for Teaching Evaluation Instrument.* https://www.nctq.org/dmsView/2013_FfTEvalInstrument_Web_v1_2_20140825

Danielson, L., Doolittle, J., & Bradley, R. (2007). Professional development, capacity building, and research needs: Critical issues for Response to Intervention implementation. *School Psychology Review*, *36*(4), 632–637. https://doi.org/10.1080/02796015.2007.12087922

Darling-Hammond, L. (2014). Strengthening clinical preparation: The holy grail of teacher education. *Peabody Journal of Education*, *89*(4), 547–561. https://doi.org/10.1080/0161956X.2014.939009

Darling-Hammond, L., & Bransford, J. (Eds.). (2005). *Preparing teachers for a changing world: What teachers should learn and be able to do* (1st ed.). Jossey-Bass.

Darling-Hammond, L., & Oakes, J. (2019). *Preparing teachers for deeper learning*. Harvard Education Press.

Dawkins, S., Ritz, M. E., & Louden, W. (2009a). Evaluating the practicability and sustainability of a reading intervention programme, using preservice teachers as trained volunteers. *Australian Journal of Language and Literacy*, *32*, 136–147. https://search.informit.org/doi/10.3316/ielapa.801807739740232

Dawkins, S., Ritz, M. E., & Louden, W. (2009b). Learning by doing: Preservice teachers as reading tutors. *Australian Journal of Teacher Education*, *34*(2), 40–49. https://search.informit.org/doi/10.3316/aeipt.181114

Denton, C. A. (2012). Response to intervention for reading difficulties in the primary grades: Some answers and lingering questions. *Journal of Learning Disabilities*, *45*(3), 232–243. https://doi.org/10.1177/0022219412442155

DePaoli, J. L., Fox, J. H., Ingram, E. S., Maushard, M., Bridgeland, J. M., Balfanz, R. (2015). *Building a grad nation: Progress and challenge in ending the high school dropout epidemic*. Civic Enterprises. http://gradnation.americaspromise.org/sites/default/files/d8/18006_CE_BGN_Full_vFNL.pdf

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, *38*(3), 181–199. https://doi.org/10.3102/0013189X08331140

DeWalt, D. A., & Hink, A. (2009). Health literacy and child health outcomes: A systematic review of the literature. *Pediatrics*, *124*(S3), S265–S274. https://doi.org/10.1542/peds.2009-1162B

Diamond, K. E., & Powell, D. R. (2011). An iterative approach to the development of a professional development intervention for Head Start teachers. *Journal of Early Intervention*, *33*(1), 75–93. https://doi.org/10.1177/1053815111400416

DiGennaro, F. D., Martens, B. K., & Kleinmann, A. E. (2007). A comparison of performance feedback procedures on teachers' treatment implementation integrity and students' inappropriate behavior in special education classrooms. *Journal of Applied Behavior Analysis*, *40*(3), 447–461. https://doi.org/10.1901/jaba.2007.40-447

du Plessis, A. E., Cullinan, M., Gramotnev, G., Gramotnev, D. K., Hoang, N. T., Mertens, L., Roy, K., & Schmidt, A. (2020). The multilayered effects of initial teacher education programs on the beginning teacher workforce and workplace: Perceptions of beginning

teachers and their school leaders. *International Journal of Educational Research*, *99*. https://doi.org/10.1016/j.ijer.2019.09.010

Durlak, J. A. (2010). The importance of doing well in whatever you do: A commentary on the special section, "implementation research in early childhood education." *Early Childhood Research Quarterly*, *25*(3), 348–357. https://doi.org/10.1016/j.ecresq.2010.03.003

Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology*, *41*(3-4), 327–350. https://doi.org/10.1007/s10464-008-9165-0

Ehri, L. C., & Flugman, B. (2018). Mentoring teachers in systematic phonics instruction: effectiveness of an intensive year-long program for kindergarten through 3rd grade teachers and their students. *Reading and Writing*, *31*(2), 425–456. https://doi.org/10.1007/s11145-017-9792-7

Elbaum, B., Vaughn, S., Hughes, M. T., & Watson Moody, S. (2000). How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. *Journal of Educational Psychology*, *92*(4), 605–619. https://doi.org/10.1037/0022-0663.92.4.605

Elish-Piper, L., & L'Allier, S. (2010). Exploring the relationship between literacy coaching and student reading achievement in grades K–1. *Literacy Research and Instruction*, *49*(2), 162–174. https://doi.org/10.1080/19388070902913289

Elish-Piper, L., & L'Allier, S. (2011). Examining the relationship between literacy coaching and student reading gains in grades K–3. *The Elementary School Journal*, *112*(1), 83–106. https://doi.org/10.1086/660685

Englert, C.S., Mariage, T.V., Truckenmiller, A.J., Brehmer, J., Hicks, K., & Chamberlain, C. (2020). Preparing special education preservice teachers to teach phonics to struggling readers: Reducing the gap between expert and novice performance. *Teacher Education and Special Education*, *43*(3), 235–256. https://doi.org/10.1177/0888406419863365

Every Student Succeeds Act, Public Law No. 114-95 § 114 Stat. 1177 (2015).

Excellent Public Schools Act (2021). *SL 2021-8*. https://www.ncleg.gov/BillLookup/2021/S387

Fallon, L. M., Collier-Meek, M. A., Maggin, D. M., Sanetti, L. M. H., & Johnson, A. H. (2015). Is performance feedback for educators an evidence-based practice? A systematic review and evaluation based on single-case research. *Exceptional Children*, *81*(2), 227–246. https://doi.org/10.1177/0014402914551738

Felner, R. D., Favazza, A., Shim, M., Brand, S., Gu, K., & Noonan, N. (2001). Whole school improvement and restructuring as prevention and promotion. *Journal of School Psychology*, *39*(2), 177–202. https://doi.org/10.1016/S0022-4405(01)00057-7

Fien, H., Chard, D. J., & Baker, S. K. (2021). Can the evidence revolution and multi-tiered systems of support improve education equity and reading achievement? *Reading Research Quarterly*, 56(S1), S105–S118. https://doi.org/10.1002/rrq.391

Fletcher, J. M., Lyon, G. R., Fuchs, L. S., & Barnes, M. A. (2019). *Learning disabilities: From identification to intervention* (2nd ed.). Guilford Press.

Foorman, B., Beyler, N., Borradaile, K., Coyne, M., Denton, C. A., Dimino, J., Furgeson, J., Hayes, L., Henke, J., Justice, L., Keating, B., Lewis, W., Sattar, S., Streke, A., Wagner, R., & Wissel, S. (2016, July). *Foundational skills to support reading for understanding in kindergarten through 3rd grade* (NCEE 2016-4008). National Center for Education

Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. https://ies.ed.gov/ncee/wwc/practiceguide/21

Foorman, B. R., Koon, S., Petscher, Y., Mitchell, A., & Truckenmiller, A. (2015). Examining general and specific factors in the dimensionality of oral language and reading in 4th–10th grades. *Journal of Educational Psychology*, *107*(3), 884–899. https://doi.org/10.1037/edu00 00026

Foorman, B. R., Schatschneider, C., Eakin, M. N., Fletcher, J. M., Moats, L. C., & Francis, D. J. (2006). The impact of instructional practices in Grades 1 and 2 on reading and spelling achievement in high poverty schools. *Contemporary Educational Psychology*, *31*(1), 1–29. https://doi.org/10.1016/j.cedpsych.2004.11.003

Freeman, J., Sugai, G., Simonsen, B., & Everett, S. (2017). MTSS coaching: Bridging knowing to doing. *Theory into Practice*, *56*(1), 29–37. https://doi.org/10.1080/00405841.2016.1241946

Fuchs, D., Fuchs, L. S., & Stecker, P. M. (2010). The "blurring" of special education in a new continuum of general education placements and services. *Exceptional Children*, *76*(3), 301–323. https://doi.org/10.1177/001440291007600304

Fuller, J. L., & Fienup, D. M. (2018). A preliminary analysis of mastery criterion level: Effects on response maintenance. *Behavior Analysis in Practice*, *11*(1), 1–8. https://doi.org/10.1007/s40617-017-0201-0

Furtak, E. M., Ruiz-Primo, M. A., Shemwell, J. T., Ayala, C. C., Brandon, P. R., Shavelson, R. J., & Yin, Y. (2008). On the fidelity of implementing embedded formative assessments and its relation to student learning. *Applied Measurement in Education*, *21*(4), 360–389. https://doi.org/10.1080/08957340802347852

Garet, M. S., Cronen, S., Eaton, M., Kurki, A., Ludwig, M., Jones, W., Uekawa, K., Falk, A., Bloom, H. S., Doolittle, F., & Sztejnberg, L. (2008, September). *The impact of two professional development interventions on early reading instruction and achievement* (NCEE 2008-4030). National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. https://ies.ed.gov/ncee/pdf/20084030.pdf

Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal*, *38*(4), 915–945. https://www.jstor.org/stable/3202507

Gerber, M. M. (2005). Teachers are still the test: Limitations of response to instruction strategies for identifying children with learning disabilities. *Journal of learning disabilities*, *38*(6), 516–524. https://doi.org/10.1177/00222194050380060701

Gersten, R., Compton, D., Connor, C. M., Dimino, J., Santoro, L., Linan-Thompson, S., Tilly, W. D. (2009, February). *Assisting students struggling with reading: Response to intervention and multitier intervention for reading in the primary grades* (NCEE 2009-4045). National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. https://ies.ed.gov/ncee/wwc/docs/practiceguide/rti_reading_pg_021809.pdf

Gersten, R., Fuchs, L. S., Compton, D., Coyne, M., Greenwood, C., & Innocenti, M. S. (2005). Quality indicators for group experimental and quasi-experimental research in special education. *Exceptional Children*, *71*(2), 149–164. https://doi.org/10.1177/001440290507100202

Gersten, R., Haymond, K., Newman-Gonchar, R., Dimino, J., & Jayanthi, M. (2020). Meta-analysis of the impact of reading interventions for students in the primary grades. *Journal of Research on Educational Effectiveness*, *13*(2), 401–427. https://doi.org/10.1080/19345747.2019.1689591

Gersten, R., Morvant, M., & Brengelman, S. (1995). Close to the classroom is close to the bone: Coaching as a means to translate research into classroom practice. *Exceptional Children*, *62*(1), 52–66. https://doi.org/10.1177/001440299506200105

Gettinger, M., & Stoiber, K. C. (2016). Coaching and demonstration of evidence-based book-reading practices: Effects on Head Start teachers' literacy-related behaviors and classroom environment. *Journal of Early Childhood Teacher Education*, *37*(2), 117–141. https://doi.org/10.1080/10901027.2016.1168329

Gilmour, A. F., Fuchs, D., & Wehby, J. H. (2019). Are students with disabilities accessing the curriculum? A meta-analysis of the reading achievement gap between students with and without disabilities. *Exceptional Children*, *85*(3), 329–346. https://doi.org/10.1177/0014402918795830

Glazerman, S., Isenberg, E., Dolfin, S., Bleeker, M., Johnson, A., Grider, M., & Jacobus, M. (2010). *Impacts of comprehensive teacher induction: Final results from a randomized controlled study* (NCEE 2010-4028). National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education https://ies.ed.gov/ncee/pubs/20104027/pdf/20104028.pdf

Goodnight, C. I., Wood, C. L., & Thompson, J. L. (2020). Effects of in-service and coaching to increase teachers' use of research-based strategies in beginning reading. *Preventing School Failure*, *64*(1), 67–76. https://doi.org/10.1080/1045988X.2019.1680944

Gormley, S., & Ruhl, K. L. (2007). Language structure knowledge of preservice teachers: Connecting speech to print. *Teacher Education and Special Education*, *30*(2), 83–92. https://doi.org/10.1177/088840640703000203

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, *7*(1), 6–10. https://doi.org/10.1177/074193258600700104

Greenberg, J., McKee, A., & Walsh, K. (2013, June 1). *Teacher prep review: A review of the nation's teacher preparation programs*. National Council on Teacher Quality. https://dx.doi.org/10.2139/ssrn.2353894

Griffin, C. C., & Kilgore, K. L. (1995). Framing the problems of practice: The effects of self-assessment in a study of special education students' internships. *Teacher Education and Special Education*, *18*(1), 56–71. https://doi.org/10.1177/088840649501800107

Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching: Theory and Practice*, *15*(2), 273–289. https://doi.org/10.1080/13540600902875340

Grossman, P., & McDonald, M. (2008). Back to the future: Directions for research in teaching and teacher education. *American Educational Research Journal*, *45*(1), 184–205. https://doi.org/10.3102/0002831207312906

Guyton, E., & McIntyre, D. J. (1990). Student teaching and school experiences. In W. R. Houston (Ed.), *Handbook of research on teacher education* (pp. 514–534). MacMillan.

Haager, D., Klinger, J., & Vaughn, S. (Eds.). (2007). *Evidence-based reading practices for Response to Intervention*. Brookes.

Hall, R. V., Delquadri, J., Greewood, C. R., & Thurston, L. (1982). The importance of opportunity to respond in children's academic success. In E. B. Edgar, N. G. Haring, J. R.

Jenkins, & C. G. Pious (Eds.), *Mentally handicapped children: Education and training* (pp. 107–140). University Park Press.

Hamre, B. K., Justice, L. M., Pianta, R. C., Kilday, C., Sweeney, B., Downer, J. T., & Leach, A. (2010). Implementation fidelity of MyTeacherPartner literacy and language activities: Association with preschoolers' language and literacy growth. *Early Childhood Research Quarterly*, *25*(3), 329–347. https://doi.org/10.1016/j.ecresq.2009.07.002

Han, S. S., & Weiss, B. (2005). Sustainability of teacher implementation of school-based mental health programs. *Journal of Abnormal Child Psychology*, *33*(6), 665–679. https://doi.org/10.1007/s10802-005-7646-2

Hanford, E. (Host). (2019). *At a loss for words: How a flawed idea is teaching millions of kids to be poor readers* [Audio podcast]. APM Reports. https://www.apmreports.org/episode/2019/08/22/whats-wrong-how-schools-teach-reading

Harn, B., Parisi, D., & Stoolmiller, M. (2013). Balancing fidelity with flexibility and fit: What do we really know about fidelity of implementation in schools? *Exceptional Children*, *79*(2), 181–193. https://doi.org/10.1177/001440291307900204

Harris, D. N., & Sass, T. R. (2011). Teacher training, teacher quality and student achievement. *Journal of Public Economics*, *95*(7–8), 798–812. https://doi.org/10.1016/j.jpubeco.2010.11.009

Harvey, M. W., Yssel, N., Bauserman, A. D., & Merbler, J. B. (2010). Preservice teacher preparation for inclusion: An exploration of higher education teacher-training institutions. *Remedial and Special Education*, *31*(1), 24–33. https://doi.org/10.1177/0741932508324397

Haverback, H. R., & Parault, S. J. (2008). Pre-service reading teacher efficacy and tutoring: A review. *Educational Psychology Review*, *20*(3), 237–255. https://doi.org/10.1007/s10648-008-9077-4

Hazelkorn, M., Bucholz, J. L., Goodman, J. I., Duffy, M. L., & Brady, M. P. (2010). Response to intervention: General or special education? Who is responsible? *The Educational Forum*, *75*(1), 17–25. https://doi.org/10.1080/00131725.2010.528552

Heineke, S. F. (2013). Coaching discourse: Supporting teachers' professional learning. *The Elementary School Journal*, *113*(3), 409–433. https://doi.org/10.1086/668767

Hemmeter, M. L., Santos, R. M., & Ostrosky, M. M. (2008). Preparing early childhood educators to address young children's social-emotional development and challenging behavior. *Journal of Early Intervention*, *30*(4), 321–340. https://doi.org/10.1177/1053815108320900

Heward, W. L. (2003). Ten faulty notions about teaching and learning that hinder the effectiveness of special education. *The Journal of Special Education*, *36*(4), 186–205. https://doi.org/10.1177/00224690303600401

Hikida, M., Chamberlain, K., Tily, S., Daly-Lesch, A., Warner, J. R., & Schallert, D. L. (2019). Reviewing how preservice teachers are prepared to teach reading processes: What the literature suggests and overlooks. *Journal of Literacy Research*, *51*(2), 177–195. https://doi.org/10.1177/1086296X19833297

Hilaski, D. M., Maxwell, N., & Jones, J. (2021). "It opened my eyes...": The potential of an embedded clinical experience in teacher preparation. *Reading Horizons: A Journal of Literacy and Language Arts*, *60*(2). https://scholarworks.wmich.edu/reading_horizons/vol60/iss2/3

Hindman, A. H., Morrison, F. J., Connor, C. M., & Connor, J. A. (2020). Bringing the science of reading to preservice elementary teachers: Tools that bridge research and practice. *Reading Research Quarterly*, *55*(S1), S197–S206. https://doi.org/10.1002/rrq.345

Hoffman, J. V., Roller, C., Maloch, B., Sailors, M., Duffy, G., & Beretvas, S. N. (2005). Teachers' preparation to teach reading and their experiences and practices in the first three years of teaching. *The Elementary School Journal*, *105*(3), 267–287. https://doi.org/10.1086/428744

Hoffman, J. V., Svrcek, N., Lammert, C., Daly-Lesch, A., Steinitz, E., Greeter, E., & DeJulio, S. (2019). A research review of literacy tutoring and mentoring in initial teacher preparation: Toward practices that can transform teaching. *Journal of Literacy Research*, *51*(2), 233–251. https://doi.org/10.1177/1086296X19833292

Horner, R. H., Todd, A. W., Lewis-Palmer, T., Irvin, L. K., Sugai, G., & Boland, J. B. (2004). The school-wide evaluation tool (SET) a research instrument for assessing school-wide positive behavior support. *Journal of Positive Behavior Interventions*, *6*(1), 3–12. https://doi.org/10.1177/10983007040060010201

Hsieh, W.-Y., Hemmeter, M. L., McCollum, J. A., & Ostrosky, M. M. (2009). Using coaching to increase preschool teachers' use of emergent literacy teaching strategies. *Early Childhood Research Quarterly*, *24*(3), 229–247. https://doi.org/10.1016/j.ecresq.2009.03.007

Hudson, A. K., Moore, K. A., Han, B., Wee Koh, P., Binks-Cantrell, E., & Malatesha Joshi, R. (2021). Elementary teachers' knowledge of foundational literacy skills: A critical piece of the puzzle in the science of reading. *Reading Research Quarterly*, *56*(S1), S287–S315. https://doi.org/10.1002/rrq.408

Hurlbut, A. R., & Tunks, J. (2016). Elementary preservice teachers' experiences with Response to Intervention. *Teacher Education Quarterly*, *43*(3), 25–48. https://www.jstor.org/stable/10.2307/teaceducquar.43.3.25

Individuals With Disabilities Education Act, 20 U.S.C. § 1400 et seq. (2004).

International Literacy Association. (2018). *Standards for the preparation of literacy professionals 2017*. https://www.literacyworldwide.org/docs/default-source/resource-documents/draft-ila-standards-2017.pdf

International Literacy Association. (2020). *What's hot in literacy: 2020 report*. https://www.literacyworldwide.org/docs/default-source/resource-documents/whatshotreport_2020_final.pdf

International Literacy Association & National Council of Teachers of English. (2017). *Research advisory: Literacy teacher preparation*. https://www.literacyworldwide.org/docs/default-source/where-we-stand/ila-ncte-teacher-prep-advisory.pdf

IRIS Center. (2006). *RTI (part 2): Assessment*. https://iris.peabody.vanderbilt.edu/module/rti02-assessment/

Irwin, V., De La Rosa, J., Wang, K., Hein, S., Zhang, J., Burr, R., Roberts, A., Barmer, A., Bullock Mann, F., Dilig, R., & Parker, S. (2022, May). *Report on the Condition of Education 2022* (NCES 2022-144). National Center for Education Statistics, U.S. Department of Education. https://nces.ed.gov/pubs2022/2022144.pdf

Irwin, V., Zhang, J., Wang, X., Hein, S., Wang, K., Roberts, A., York, C., Barmer, A., Bullock Mann, F., Dilig, R., & Parker, S. (2021, May). *Report on the Condition of Education 2021* (NCES 2021-144). National Center for Education Statistics, U.S. Department of Education. https://nces.ed.gov/pubs2021/2021144.pdf

Jacob, B. A., & Lefgren, L. (2004). The impact of teacher training on student achievement quasi-experimental evidence from school reform efforts in Chicago. *Journal of Human Resources*, *39*(1), 50–79. https://doi.org/10.3368/jhr.XXXIX.1.50

Jager, B., Reezigt, G. J., & Creemers, B. P. (2002). The effects of teacher training on new instructional behaviour in reading comprehension. *Teaching and Teacher Education*, *18*(7), 831–842. https://doi.org/10.1016/S0742-051X(02)00046-X

Joshi, R. M., Binks, E., Hougen, M. C., Dean, E. O., Graham, L., & Smith, D. L. (2009). The role of teacher education programs in preparing teachers for implementing evidence-based reading practices. In S. Rosenfield & V. Berninger (Eds.), *Implementing evidence based academic interventions in school settings* (pp. 605–625). Oxford University Press. https://psycnet.apa.org/doi/10.1093/med:psych/9780195325355.003.0022

Joyce, B. R., & Showers, B. (2002). *Student achievement through staff development* (Vol. 3). Association for Supervision and Curriculum Development.

Justice, L. M., Mashburn, A. J., Hamre, B. K., & Pianra, R. C. (2008). Quality of language and literacy instruction in preschool classrooms serving at-risk pupils. *Early Childhood Research Quarterly*, *23*(1), 51–68. http://dx.doi.org/ 10.1016/j.ecresq.2007.09.004

Kaderavek, J. N. & Justice, L. M. (2010). Fidelity: An essential component of evidence-based practice in speech-language pathology. *American Journal of Speech Language Pathology*, *19*(4), 369–379. https://doi.org/10.1044/1058-0360(2010/09-0097)

Kazdin, A. E. (2010). Single-case research designs. Methods for clinical and applied settings (2nd ed). New York, NY: Oxford Press.

Kennedy, M. J., Alves, K. D., & Rodgers, W. J. (2015). Innovations in the delivery of content knowledge in special education teacher preparation. *Intervention in School and Clinic*, *51*(2), 73–81. https://doi.org/10.1177/1053451215579268

Kershaw, S., & Schatschneider, C. (2012). A latent variable approach to the simple view of reading. *Reading and Writing*, *25*(2), 433–464. https://doi.org/10.1007/s11145-010-9278-3

Klingner, J. K., Urbach, J., Golos, D., Brownell, M., & Menon, S. (2010). Teaching reading in the 21st century: A glimpse at how special education teachers promote reading comprehension. *Learning Disability Quarterly*, *33*(2), 59–74. https://doi.org/10.1177/073194871003300201

Klingner, J. K., Vaughn, S., Hughes, M. T., & Arguelles, M. E. (1999). Sustaining research-based practices in reading: A 3-year follow-up. *Remedial and Special Education*, *20*(5), 263–274. https://doi.org/10.1177/074193259902000502

Knackstedt, K. M., Leko, M. M., & Siuty, M. B. (2018). The effects of secondary special education preparation in reading: Research to inform state policy in a new era. *Teacher Education and Special Education*, *41*(1), 70–85. https://doi.org/10.1177/0888406417700960

Knowles, M. (1980). *The modern practice of adult education: From pedagogy to andragogy*. Cambridge Adult Education.

Knowles, M. (1984). *Andragogy in action: Applying modern principles of adult learning*. Jossey-Bass.

Knowles, M. S., Holton III, E. F., & Swanson, R. A. (2005). *The adult learner: The definitive classic in adult education and human resource development* (6th ed.). Taylor & Francis Ltd.

Kovaleski, J. F., Gickling, E. E., Morrow, H., & Swank, P. R. (1999). High versus low implementation of instructional support teams: A case for maintaining program fidelity. *Remedial and Special Education*, *20*(3), 170–183. https://doi.org/10.1177/074193259902000308

Kraft, M. A., Blazar, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research*, *88*(4), 547–588. https://doi.org/10.3102/0034654318759268

Kretlow, A. G., & Bartholomew, C. C. (2010). Using coaching to improve the fidelity of evidence-based practices: A review of studies. *Teacher Education and Special Education*, *33*(4), 279–299. https://doi.org/10.1177/0888406410371643

Kretlow, A. G., & Helf, S. S. (2013). Teacher implementation of evidence-based practices in tier 1: A national survey. *Teacher Education and Special Education*, *36*(3), 167–185. https://doi.org/10.1177/0888406413489838

Kretlow, A. G., Wood, C. L., & Cooke, N. L. (2009). Using in-service and coaching to increase kindergarten teachers' accurate delivery of group instructional units. *The Journal of Special Education*, *44*(4), 234–246. https://doi.org/10.1177/0022466909341333

L'Allier, S. K., & Brown, E. M. (2021). Teachers' questions about coaching: Pathways to productive collaborations. *The Reading Teacher*, *75*(2), 197–206. https://doi.org/10.1002/trtr.2048

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Ledford, J. R. & Gast, D. L. (2018). *Single case research methodology: Applications in special education and behavioral sciences* (3rd ed.). Routledge.

Ledford, J. R., & Wolery, M. (2013). The effects of graphing a second observer's data on judgments of functional relations when observer bias may be present. *Journal of Behavioral Education*, *22*(4), 312–324. https://www.jstor.org/stable/43551353

Leko, M. M., & Brownell, M. T. (2011). Special education preservice teachers' appropriation of pedagogical tools for teaching reading. *Exceptional Children*, *77*(2), 229–251. https://doi.org/10.1177/001440291107700205

Leko, M. M., Brownell, M. T., Sindelar, P. T., & Kiely, M. T. (2015). Envisioning the future of special education personnel preparation in a standards-based era. *Exceptional Children*, *82*(1), 25–43. https://doi.org/10.1177/0014402915598782

Levine, A. (2006). *Educating school teachers*. The Education Schools Project. https://files.eric.ed.gov/fulltext/ED504144.pdf

Lignugaris-Kraft, B., & Marchand-Martella, N. (1993). Evaluation of pre-service teachers' interactive teaching skills in a direct instruction practicum using student teachers as supervisors. *Teacher Education and Special Education*, *16*(4), 309–318. https://doi.org/10.1177/088840649301600404

Lonigan, C. J., Burgess, S. R., & Schatschneider, C. (2018). Examining the simple view of reading with elementary school children: Still simple after all these years. *Remedial and Special Education*, *39*(5), 260–273. https://doi.org/10.1177/07419 32518 764833

Lyon, G., & Weiser, B. (2009). Teacher knowledge, instructional expertise, and the development of reading proficiency. *Journal of Learning Disabilities*, *42*(5), 475–480. https://doi.org/10.1177/0022219409338741

Maheady, L., Harper, G. F., Mallette, B., & Karnes, M. (2004). Preparing preservice teachers to implement class wide peer tutoring. *Teacher Education and Special Education*, *27*(4), 408–418. https://doi.org/10.1177/088840640402700408

Maheady, L., Smith, C., & Jabot, M. (2013). Utilizing evidence-based practice in teacher preparation. In B. G. Cook, M. Tankersley, & T. J. Landrum (Eds.), *Evidence-based practices* (pp. 121–147). Emerald. https://psycnet.apa.org/doi/10.1108/S0735-004X(2013)0000026008

Mallette, B., Maheady, L., & Harper, G. F. (1999). The effects of reciprocal peer coaching on preservice general educators' instruction of students with special learning needs. *Teacher Education and Special Education*, *22*(4), 201–216. https://doi.org/10.1177/088840649902200402

Maloch, B., Flint, A. S., Eldridge, D., Harmon, J., Loven, R., Fine, J., Bryant-Shanklin, M., & Martinez, M. (2003). Understandings, beliefs, and reported decision making of first-year teachers from different reading teacher preparation programs. *The Elementary School Journal*, *103*(5), 431–457. https://doi.org/10.1086/499734

Markelz, A., Riden, B., & Scheeler, M. C. (2017). Generalization training in special education teacher preparation: Does it exist? *Teacher Education and Special Education*, *40*(3), 179–193. https://doi.org/10.1177/0888406417703752

McKenna, J. W., Flower, A., & Ciullo, S. (2014). Measuring fidelity to improve intervention effectiveness. *Intervention in School and Clinic*, *50*(1), 15–21. https://doi.org/10.1177/1053451214532348

McCutchen, D., Green, L., Abbott, R. D., & Sanders, E. A. (2009). Further evidence for teacher knowledge: supporting struggling readers in grades three through five. *Reading and Writing*, *22*(4), 401–423. https://doi.org/10.1007/s11145-009-9163-0

McCutchen, D., Harry, D. R., Cox, S., Sidman, S., Covill, A. E., & Cunningham, A. E. (2002). Reading teachers' knowledge of children's literature and English phonology. *Annals of Dyslexia*, *52*(1), 205–228. https://doi.org/10.1007/s11881-002-0013-x

McFarland, J., Hussar, B., de Brey, C., Snyder, T., Wang, X., Wilkinson-Flicker, S., Gebrekristos, S., Zhang, J., Rathbun, A., Barmer, A., Bullock Mann, F., & Hinz, S. (2017, May). *The Condition of Education 2017* (NCES 2017- 144). National Center for Education Statistics, U.S. Department of Education. https://nces.ed.gov/pubs2017/2017144.pdf

McFarland, J., Hussar, B., Zhang, J., Wang, X., Wang, K., Hein, S., Diliberti, M., Forrest Cataldi, E., Bullock Mann, F., & Barmer, A. (2019, May). *The Condition of Education 2019* (NCES 2019-144). National Center for Education Statistics, U.S. Department of Education. https://nces.ed.gov/pubs2019/2019144.pdf

McLellan, H. (1996). *Situated learning perspectives*. Educational Technology.

McLeskey, J., Barringer, M-D., Billingsley, B., Brownell, M., Jackson, D., Kennedy, M., Lewis, T., Maheady, L., Rodriguez, J., Scheeler, M. C., Winn, J., & Ziegler, D. (2017, January). *High-leverage practices in special education*. Council for Exceptional Children &

CEEDAR Center. https://ceedar.education.ufl.edu/wp-content/uploads/2017/07/CEC-HLP-Web.pdf

McLeskey, J., & Billingsley, B. S. (2008). How does the quality and stability of the teaching force influence the research-to-practice gap? A perspective on the teacher shortage in special education. *Remedial and Special Education*, *29*(5), 293–305. https://doi.org/10.1177/0741932507312010

McLeskey, J., Hoppey, D., Williamson, P., & Rentz, T. (2004). Is inclusion an illusion? An examination of national and state trends toward the education of students with learning disabilities in general education classrooms. *Learning Disabilities Research and Practice*, *19*(2), 109–115. https://doi.org/10.1111/j.1540-5826.2004.00094.x

McVee, M. B., Ortlieb, E., Reichenberg, J., & Pearson, P. D. (Eds.) (2019). *The gradual release of responsibility in literacy research and practice*. Emerald Publishing Limited.

Meeks, L., Madelaine, A., & Stephenson, J. (2020). New teachers talk about their preparation to teach early literacy. *Australian Journal of Learning Difficulties*, *25*(2), 161–181. https://doi.org/10.1080/19404158.2020.1792520

Meisner, J. (2020). *Understanding pre-service teachers' perceptions of instructional coaching during student teaching* (Publication No. 28092818) [Doctoral dissertation, Utah State University]. ProQuest Dissertations and Theses Global. https://www.proquest.com/dissertations-theses/understanding-preservice-teachers-perceptions/docview/2455935765/se-2

Menzies, H. M., Mahdavi, J. N., & Lewis, J. L. (2008). Early intervention in reading: From research to practice. *Remedial and Special Education*, *29*(2), 67–77. https://doi.org/10.1177/0741932508315844

Moats, L. (2009). Knowledge foundations for teaching reading and spelling. *Reading and Writing*, *22*(4), 379–399. https://doi.org/10.1007/s11145-009-9162-1

Moats, L. (2014). What teachers don't know and why they aren't learning it: Addressing the need for content and pedagogy in teacher education. *Australian Journal of Learning Difficulties*, *19*(2), 75–91. https://doi.org/10.1080/19404158.2014.941093

Moats, L. C. (2020). Teaching reading" is" rocket science: What expert teachers of reading should know and be able to do. *American Educator*, *44*(2), 4+. https://link.gale.com/apps/doc/A627507679/AONE?u=char69915&sid=bookmark-AONE&xid=106f9f94

Moats, L. C., & Foorman, B. R. (2003). Measuring teachers' content knowledge of language and reading. *Annals of Dyslexia*, *53*(1), 23–45. https://doi.org/10.1007/s11881-003-0003-7

Moncher, F. J., & Prinz, R. J. (1991). Treatment fidelity in outcome studies. *Clinical Psychology Review*, *11*(3), 247–266. https://doi.org/10.1016/0272-7358(91)90103-2

Morgan, P. L., Farkas, G., & Wu, Q. (2011). Kindergarten children's growth trajectories in reading and mathematics: Who falls increasingly behind? *Journal of Learning Disabilities*, *44*(5), 472–488. https://doi.org/10.1177/0022219411414010

Morgan, R. L., Menlove, R., Salzberg, C. L., & Hudson, P. (1994). Effects of peer coaching on the acquisition of direct instruction skills by low-performing pre-service teachers. *The Journal of Special Education*, *28*(1), 59–76. https://doi.org/10.1177/002246699402800105

Mowbray, C. T., Holter, M. C., Teague, G. B., & Bybee, D. B. (2003). Fidelity criteria: Development, measurement, and validation. *American Journal of Evaluation*, *24*(3), 315–340. https://doi.org/10.1016/S1098-2140(03)00057-2

Myers, D. M., Simonsen, B., & Sugai, G. M. (2011). Increasing teachers' use of praise with a Response-to-Intervention approach. *Education and Treatment of Children*, *34*(1), 35–59. https://doi.org/10.1353/etc.2011.0004

National Center on Improving Literacy. (2022). *Learning literacy glossary*. Office of Elementary and Secondary Education, Office of Special Education Programs. https://improvingliteracy.org/glossary/literacy

National Comprehensive Center for Teacher Quality. (2007). *America's challenge: Effective teachers for at-risk schools and students.* U.S. Department of Education. https://files.eric.ed.gov/fulltext/ED543777.pdf

National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (NIH Publication No. 00-4754). National Institute of Child Health and Human Development. https://www.nichd.nih.gov/sites/default/files/publications/pubs/nrp/Documents/report.pdf

Neugebauer, S., Coyne, M., McCoach, B., & Ware, S. (2017). Teaching beyond the intervention: The contribution of teacher language extensions to vocabulary learning in urban kindergarten classrooms. *Reading and Writing Quarterly*, *30*(3), 543–567. https://doi.org/10.1007/s11145-016-9689-x

Neuman, S. B., & Cunningham, L. (2009). The impact of professional development and coaching on early language and literacy instructional practices. *American Educational Research Journal*, *46*(2), 532–566. https://doi.org/10.3102/0002831208328088

Newman Thomas, C. (2014). Considering the impact of preservice teacher beliefs on future practice. *Intervention in School and Clinic*, *49*(4), 230–236. https://doi.org/10.1177/1053451213509490

Nougaret, A. A., Scruggs, T. E., & Mastropieri, M. A. (2005). Does teacher education produce better special education teachers?.*Exceptional Children*, *71*(3), 217–229. https://doi.org/10.1177/001440290507100301

Odom, S. L. (2009). The tie that binds: Evidence-based practice, implementation science, and outcomes for children. *Topics in Early Childhood Special Education*, *29*(1), 53–61. https://doi.org/10.1177/0271121408329171

Odom, S. L., Fleming, K., Diamond, K., Lieber, J., Hanson, M., Butera, G., Horn, E., Palmer, S., & Marquis, J. (2010). Examining different forms of implementation and in early childhood curriculum research. *Early Childhood Research Quarterly*, *25*(3), 314–328. https://doi.org/10.1016/j.ecresq.2010.03.001

O'Donnell, C. L. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research*, 78, 33–84. http://dx.doi.org/ 10.3102/0034654307313793

O'Reilly, M. F., Renzaglia, A., Hutchins, M., Koterba-Bass, L., Clayton, M., Halle, J. W., & Izen, C. (1992). Teaching systematic instruction competencies to special education student teachers: An applied behavioral supervision model. *Journal of the Association for Persons with Severe Handicaps*, *17*(4), 104–111. https://doi.org/10.1177/154079699201700205

O'Reilly,M. F., Renzaglia, A.,& Lee, S. (1994). An analysis of acquisition, generalization and maintenance of systematic instruction competencies by preservice teachers using behavioral supervision techniques. *Education and Training in Mental Retardation and Developmental Disabilities*, *29*(1), 22–33. https://www.jstor.org/stable/23879183

Papineau, S. J. (2017). *Special education teacher perceptions of effectiveness and knowledge in literacy instruction: Implications of literacy coaching* [Doctoral dissertation, St. Cloud State University]. The Repository at St. Cloud State. https://repository.stcloudstate.edu/edad_etds/25

Peeples, K. N., Hirsch, S. E., Gardner, S. J., Keeley, R. G., Sherrow, B. L., McKenzie, J. M., Randall, K. N., Romig, J. E., & Kennedy, M. J. (2019). Using multimedia instruction and performance feedback to improve preservice teachers' vocabulary instruction. *Teacher Education and Special Education*, *42*(3), 227–245. https://doi.org/10.1177/0888406418801913

Peltier, T. K., Washburn, E. K., Pulos, J. M., & Peltier, C. (2020). Measuring special education preservice teachers' knowledge, reflective ability, and tutored student outcomes on foundational literacy skills. *Insights into Learning Disabilities*, *17*(1), 1–33. https://eric.ed.gov/?id=EJ1258312

Petscher, Y., Cabell, S. Q., Catts, H. W., Compton, D. L., Foorman, B. R., Hart, S. A., Lonigan, C. J., Phillips, B .M., Schatschneider, C., Steacy, L .M., Terry, N. P., & Wagner, R. K. (2020). How the science of reading informs 21st-century education. *Reading Research Quarterly*, *55*(S1), S267–S282. https://doi.org/10.1002/rrq.352

Pierce, T., & Peterson Miller, S. (1994). Using peer coaching in preservice practica. *Teacher Education and Special Education*, *17*(4), 215–223. https://doi.org/10.1177/088840649401700402

Pittman, R. T., Zhang, S., Binks-Cantrell, E., Hudson, A., & Joshi, R. M. (2020). Teachers' knowledge about language constructs related to literacy skills and student achievement in

low socio-economic status schools. *Dyslexia*, *26*(2), 200–219. https://doi.org/10.1002/dys.1628

Podhajski, B., Mather, N., Nathan, J., & Sammons, J. (2009). Professional development in scientifically based reading instruction: Teacher knowledge and reading outcomes. *Journal of Learning Disabilities*, *42*(5), 403–417. https://doi.org/10.1177/0022219409338737

Powell, D. R., Diamond, K. E., Burchinal, M. R., & Koehler, M. J. (2010). Effects of an early literacy professional development intervention on head start teachers and children. *Journal of Educational Psychology*, *102*(2), 299–312. https://doi.org/10.1037/a0017763

Power T. J., Blom-Hoffman J., Clarke A. T., Riley-Tillman T. C., Kelleher C., & Manz P. H. (2005). Reconceptualizing intervention integrity: A partnership-based framework for linking research with practice. *Psychology in the Schools*, *42*(5), 495–507. https://doi.org/10.1002/pits.20087

Prater, M. A., & Sileo, T. W. (2004). Fieldwork requirements in special education preparation: A national study. *Teacher Education and Special Education*, *27*(3), 251–263. https://doi.org/10.1177/088840640402700305

Putman, H. & Walsh, K. (2021). *State of the states 2021: Teacher preparation policy*. National Council on Teacher Quality. https://www.nctq.org/dmsView/PrintReadyStateoftheStates2021TeacherPreparationPolicy

Quick, H. E., Holtzman, D. J., & Chaney, K. R. (2009). Professional development and instructional practice: Conceptions and evidence of effectiveness. *Journal of Education for Students Placed at Risk*, *14*(1), 45–71. https://doi.org/10.1080/10824660802715429

Quinn, D. M., & Kim, J. S. (2017). Scaffolding fidelity and adaptation in educational program implementation: Experimental evidence from a literacy intervention. *American Educational Research Journal*, *54*(6), 1187–1220. https://doi.org/10.3102/0002831217717692

Rayner, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest*, *2*(2), 31–74. https://doi.org/10.1111/1529-1006.00004

Rickenbrode, R., Drake, G., Pomerance, L., & Walsh, K. (2018). *2018 teacher prep review*. National Council on Teacher Quality. https://files.eric.ed.gov/fulltext/ED590748.pdf

Risko, V. J., & Reid, L. (2019). What really matters for literacy teacher preparation? *The Reading Teacher*, *72*(4), 423–429. https://doi.org/10.1002/trtr.1769

Risko, V. J., Roller, C. M., Cummins, C., Bean, R. M., Block, C. C., Anders, P. L., & Flood, J. (2008). A critical analysis of research on reading teacher education. *Reading Research Quarterly*, *43*(3), 252–288. https://doi.org/10.1598/RRQ.43.3.3

Robinson, V., & Swanton, C. (1980). The generalization of behavioral teacher training. *Review of Educational Research*, *50*(3), 486–498. https://doi.org/10.3102/00346543050003486

Rock, M. L., Schumacker, R. E., Gregg, M., Howard, P. W., Gable, R. A., & Zigmond, N. (2014). How are they now? Longer term effects of eCoaching through online bug-in-ear technology. *Teacher Education and Special Education*, *37*(2), 161–181. https://doi.org/10.1177/0888406414525048

Rose, D. J., & Church, R. J. (1998). Learning to teach: The acquisition and maintenance of teaching skills. *Journal of Behavioral Education*, *8*(1), 5–35. https://doi.org/10.1023/A:1022860606825

Rosenshine, B. (1987). Explicit teaching and teacher training. *Journal of Teacher Education, 38*(3), 34–36. https://doi.org/10.1177/002248718703800308

Rupley, W. H., Blair, T. R., & Nichols, W. D. (2009). Effective reading instruction for struggling readers: The role of direct/explicit teaching. *Reading and Writing Quarterly*, *25*(2–3), 125–138. https://doi.org/10.1080/10573560802683523

Sabatini, J. P., Sawaki, Y., Shore, J. R., & Scarborough, H. S. (2010). Relationships among reading skills of adults with low literacy. *Journal of Learning Disabilities*, *43*(2), 122–138. https://doi.org/10.1177%2F0022219409359343

Sailor, W., Skrtic, T. M., Cohn, M., & Olmstead, C. (2021). Preparing teacher educators for statewide scale-up of Multi-Tiered System of Support (MTSS). *Teacher Education and Special Education*, *44*(1), 24–41. https://doi.org/10.1177/0888406420938035

Sailors, M., Keehn, S., Martinez, M., Harmon, J., Hedrick, W., Fine, J., & Eldridge, D. (2004). Features of early field experiences at sites of excellence in reading teacher education programs. In C. M. Fairbanks, J. Worthy, B. Malock, J. V. Hoffman, & D. L. Schallert (Eds.), *53rd yearbook of the National Reading Conference* (pp. 342–355).

Sailors, M., & Price, L. R. (2010). Professional development that supports the teaching of cognitive reading strategy instruction. *The Elementary School Journal*, *110*(3), 301–322. https://doi.org/10.1086/648980

Scheeler, M. C. (2008). Generalizing effective teaching skills: The missing link in teacher preparation. *Journal of Behavioral Education*, *17*(2), 145–159. https://doi.org/10.1007/s10864-007-9051-0

Scheeler, M. C., Bruno, K., Grubb, E., & Seavey, T. L. (2009). Generalizing teaching techniques from university to K-12 classrooms: Teaching pre-service teachers to use what they learn. *Journal of Behavioral Education*, *18*(3), 189–210. https://doi.org/10.1007/s10864-009-9088-3

Scheeler, M. C., Budin, S., & Markelz, A. (2016). The role of teacher preparation in promoting evidence-based practice in schools. *Learning Disabilities: A Contemporary Journal*, *14*(2), 171–187. https://eric.ed.gov/?id=EJ1118433

Scheeler, M. C., & Lee, D. L. (2002). Using technology to deliver immediate corrective feedback to preservice teachers. *Journal of Behavioral Education*, *11*(4), 231–241. https://doi.org/10.1023/A:1021158805714

Scheeler, M. C., McKinnon, K., & Stout, J. (2012). Effects of immediate feedback delivered via webcam and bug-in-ear technology on preservice teacher performance. *Teacher Education and Special Education*, *35*(1), 77–90. https://doi.org/10.1177/0888406411401919

Schles, R. A., & Robertson, R. E. (2019). The role of performance feedback and implementation of evidence-based practices for preservice special education teachers and student outcomes: A review of the literature. *Teacher Education and Special Education*, *42*(1), 36–48. https://doi.org/10.1177/0888406417736571

Schnorr, C. I. (2013). *Effects of multilevel support on first-grade teachers' use of research-based strategies during beginning reading instruction* [Unpublished doctoral dissertation]. University of North Carolina at Charlotte.

Scott, C. E., McTigue, E. M., Miller, D. M., & Washburn, E. K. (2018). The what, when, and how of preservice teachers and literacy across the disciplines: A systematic literature review of nearly 50 years of research. *Teaching and Teacher Education*, *73*, 1–13. https://doi.org/10.1016/j.tate.2018.03.010

Seidenberg, M. (2017). *Language at the speed of sight: How we read, why so many cannot, and what can be done about it*. Basic Books.

Seidenberg, M. S., Cooper Borkenhagen, M., & Kearns, D. M. (2020). Lost in translation? Challenges in connecting reading science and educational practice. *Reading Research Quarterly*, *55*(S1), S119–S130. https://doi.org/10.1002/rrq.341

Sindelar, P. T., Brownell, M. T., & Billingsley, B. (2010). Special education teacher education research: Current status and future directions. *Teacher Education and Special Education*, *33*(1), 8–24. https://doi.org/10.1177/0888406409358593

Skinner, B. F. (1953). Some contributions of an experimental analysis of behavior to psychology as a whole. *American Psychologist*, *8*(2), 69. https://psycnet.apa.org/doi/10.1037/h0054118

Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. National Academy Press. https://doi.org/10.17226/6023-78.

Snyder, P. A., Hemmeter, M. L., & Fox, L. (2015). Supporting implementation of evidence-based practices through practice-based coaching. *Topics in Early Childhood Special Education*, *35*(3), 133–143. https://doi.org/10.1177/0271121415594925

Spear-Swerling, L. (2009). A literacy tutoring experience for prospective special educators and struggling second graders. *Journal of Learning Disabilities*, *42*(5), 431–443. https://doi.org/10.1177/0022219409338738

Spear-Swerling, L. (2019). Structured literacy and typical literacy practices: Understanding differences to create instructional opportunities. *Teaching Exceptional Children*, *51*(3), 201–211. https://doi.org/10.1177/0040059917750160

Spear-Swerling, L., & Brucker, P. O. (2004). Preparing novice teachers to develop basic reading and spelling skills in children. *Annals of Dyslexia*, *54*(2), 332–364. https://doi.org/10.1007/s11881-004-0016-x

Spear-Swerling, L., & Cheesman, E. (2012). Teachers' knowledge base for implementing Response-to-Intervention models in reading. *Reading and Writing*, *25*(7), 1691–1723. https://doi.org/10.1007/s11145-011-9338-3

Stein, M. L., Berends, M., Fuchs, D., McMaster, K., Sáenz, L., Yen, L., Fuchs, L. S., & Compton, D. L. (2008). Scaling up an early reading program: Relationships among teacher support, fidelity of implementation, and student performance across different sites and years. *Educational Evaluation and Policy Analysis*, *30*(4), 368–388. https://doi.org/10.3102/0162373708322738

Stichter, J. P., Lewis, T. J., Richter, M., Johnson, N. W., & Bradley, L. (2006). Assessing antecedent variables: The effects of instructional variables on student outcomes through in-service and peer coaching professional development models. *Education and Treatment of Children*, *29*(4), 665–692. https://www.jstor.org/stable/42900558

Stormont, M., & Reinke, W. M. (2014). Providing performance feedback for teachers to increase treatment fidelity. *Intervention in School and Clinic*, *49*(4), 219–224. https://doi.org/10.1177/1053451213509487

Sutherland, K. S., McLeod, B. D., Conroy, M. A., & Cox, J. R. (2013). Measuring implementation of evidence-based programs targeting young children at risk for emotional/behavioral disorders: Conceptual issues and recommendations. *Journal of Early Intervention*, *35*(2), 129–149. https://psycnet.apa.org/doi/10.1177/1053815113515025

Sutherland, K. S., Wehby, J. H., & Copeland, S. R. (2000). Effect of varying rates of behavior-specific praise on the on-task behavior of students with EBD. *Journal of Emotional and Behavioral Disorders*, *8*(1), 2–8. https://doi.org/10.1177/106342660000800101

Swanson, E., Wanzek, J., Haring, C., Ciullo, S., & McCulley, L. (2013). Intervention fidelity in special and general education research journals. *The Journal of Special Education*, *47*(1), 3–13. https://doi.org/10.1177/0022466911419516

Sweigart, C. A., Collins, L. W., Evanovich, L. L., & Cook, S. C. (2016). An evaluation of the evidence base for performance feedback to improve teacher praise using CEC's quality indicators. *Education and Treatment of Children*, *39*(4), 419–444. http://www.jstor.org/stable/44684119

Theobald, R. J., Goldhaber, D. D., Holden, K. L., & Stein, M. L. (2022). Special education teacher preparation, literacy instructional alignment, and reading achievement for students with high-incidence disabilities. *Exceptional Children*, *8*8(4), 381–400. https://doi.org/10.1177/00144029221081236

Tincani, M., & De Mers, M. (2016). Meta-analysis of single-case research design studies on instructional pacing. *Behavior Modification*, *40*(6), 799–824. https://doi.org/10.1177/0145445516643488

Torgesen, J. K., Alexander, A. W., Wagner, R. K., Rashotte, C. A., Voeller, K. K. S., & Conway, T. (2001). Intensive remedial instruction for children with severe reading disabilities: Immediate and long-term outcomes from two instructional approaches. *Journal of Learning Disabilities*, *34*(1), 33–58. https://doi.org/10.1177/002221940103400104

Tortorelli, L. S., Lupo, S. M., & Wheatley, B. C. (2021). Examining teacher preparation for code-related reading instruction: An integrated literature review. *Reading Research Quarterly*, *56*(1), S317–S337. https://doi.org/10.1002/rrq.396

Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy: Four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *The Elementary School Journal*, *110*(2), 228–245. https://doi.org/10.1086/605771

Vadasy, P. F., Wayne, S. K., O'Connor, R. E., Jenkins, J. R., Pool, K., Firebaugh, M., & Peyton, J. (2004). *Sound Partners: A supplementary, one-to-one tutoring program in phonics-based early reading skills*. Sopris West.

van Dijk, W., Huggins-Manley, A. C. Gage, N. A., Lane, H. B., & Coyne, M. (2022). Why does construct validity matter in measuring implementation fidelity? A methodological case study. *Assessment for Effective Intervention*, *47*(2), 67–78. http://doi.org/10.35542/osf.io/vhrp5

van Dijk, W., Lane, H., & Gage, N. A. (2021). *The relation between implementation fidelity and students' reading outcomes: A systematic review of the literature* (Rev. ed.). EdArXiv. https://doi.org/10.35542/osf.io/vhrp5

Valli, L., & Rennert-Ariev, P. L. (2000). Identifying consensus in teacher education reform documents: A proposed framework and action implications. *Journal of Teacher Education*, *51*(1), 5–17. https://doi.org/10.1177/002248710005100102

Varghese, C., Bratsch-Hines, M., Aiken, H., & Vernon-Feagans, L. (2021). Elementary teachers' intervention fidelity in relation to reading and vocabulary outcomes for students at risk for reading-related disabilities. *Journal of Learning Disabilities*, *54*(6), 484–496. https://doi.org/10.1177/0022219421999844

Vaughn, S., & Fletcher, J. (2021). Explicit instruction as the essential tool for executing the science of reading. *The Reading League Journal*, *2*(2), 4–11. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9004595/

Vaughn, S., & Fuchs, L. S. (2003). Redefining learning disabilities as inadequate response to instruction: The promise and potential problems. *Learning Disabilities Research and Practice*, *18*(3), 137–146. https://doi.org/10.1111/1540-5826.00070

Vaughn, S., Linan-Thompson, S., & Hickman, P. (2003). Response to instruction as a means of identifying students with reading/learning disabilities. *Exceptional Children, 69*(4), 391–409. https://doi.org/10.1177/001440290306900401

Vaughn, S., Roberts, G., Swanson, E. A., Wanzek, J., Fall, A.-M., & Stillman-Spisak, S. J. (2015). Improving middle-school students' knowledge and comprehension in social studies: A replication. *Educational Psychology Review*, *27*(1), 31–50. https://doi.org/10.1007/s10648-014-9274-2

Vaughn, S., & Wanzek, J. (2014). Intensive interventions in reading for students with reading disabilities: Meaningful impacts. *Learning Disabilities Research and Practice*, *29*(2), 46–53. https://doi.org/10.1111/ldrp.12031

Vaughn, S., Wanzek, J., Murray, C. S., Scammacca, N., Linan-Thompson, S., & Woodruff, A. L. (2009). Response to early reading intervention examining higher and lower responders. *Exceptional Children*, *75*(2), 165–183. https://doi.org/10.1177/001440290907500203

Vaughn, S., Wanzek, J., Woodruff, A. L., & Linan-Thompson, S. (2007). Prevention and early identification of students with reading disabilities. In D. Haager, J. Klinger, & S. Vaughn (Eds.), *Evidence-based reading practices for Response to Intervention* (pp. 11–27). Brookes.

Vellutino, F. R., Tunmer, W. E., Jaccard, J. J., & Chen, R. (2007). Components of reading ability: Multivariate evidence for a convergent skills model of reading development. *Scientific Studies of Reading*, *11*(1), 3–32. https://doi.org/10.1207/s1532799xssr1101_2

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Warford, M. K. (2011). The zone of proximal teacher development. *Teaching and Teacher Education*, *27*(2), 252–258. https://doi.org/10.1016/j.tate.2010.08.008

Washburn, E. K., Binks-Cantrell, E. S., Joshi, R. M., Martin-Chang, S., & Arrow, A. (2016). Preservice teacher knowledge of basic language constructs in Canada, England, New Zealand, and the USA. *Annals of Dyslexia*, *66*(1), 7–27. https://doi.org/10.1007/s11881-015-0115-x

Washburn, E. K., Mulcahy, C. A., Musante, G., & Joshi, R. (2017). Novice teachers' knowledge of reading-related disabilities and dyslexia. *Learning Disabilities: A Contemporary Journal*, *15*(2), 169–191. https://eric.ed.gov/?id=EJ1160653

Wayne, A. J., Yoon, K. S., Zhu, P., Cronen, S., & Garet, M. S. (2008). Experimenting with teacher professional development: Motives and methods. *Educational Researcher*, *37*(8), 469–479. https://doi.org/10.3102/0013189X08327154

Webster-Stratton, C., Reinke, W. M., Herman, K. C., & Newcomer, L. L. (2011). The incredible years teacher classroom management training: The methods and principles that support fidelity of training delivery. *School Psychology Review*, *40*(4), 509–529. https://doi.org/10.1080/02796015.2011.12087527

Wei, R. C., Darling-Hammond, L., Andree, A., Richardson, N., & Orphanos, S. (2009). *Professional learning in the learning profession: A status report on teacher development in the U.S. and abroad*. National Staff Development Council and the School Redesign Network at Stanford University. https://edpolicy.stanford.edu/sites/default/files/publications/professional-learning-learning-profession-status-report-teacher-development-us-and-abroad.pdf

What Works Clearinghouse. (2010, September). *What Works Clearinghouse intervention report: Sound Partners*. U. S. Department of Education, Institute of Education Sciences. https://files.eric.ed.gov/fulltext/ED511908.pdf

What Works Clearinghouse (2022, August). *What Works Clearinghouse procedures and standards handbook, version 5.0*. U. S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance. https://ies.ed.gov/ncee/wwc/Handbooks

Will, M. (2013, December 3). Will the Science of Reading catch on in teacher prep? *Education Week*. https://www.edweek.org/teaching-learning/will-the-science-of-reading-catch-on-in-teacher-prep/2019/12

Wood, C. L., Goodnight, C. I., Bethune, K. S., Preston, A. I., & Cleaver, S. L. (2016). Role of professional development and multi-level coaching in promoting evidence-based practice in education. *Learning Disabilities: A Contemporary Journal*, *14*(2), 159–170.

Yeaton, W. H., & Sechrest, L. (1981). Meaningful measures of effect. *Journal of Consulting and Clinical Psychology, 49*(5), 766–767. https://doi.org/10.1037/0022-006X.49.5.766

Yoon, K. S., Duncan, T., Lee, S. W., Scarloss, B., & Shapley, K. (2007). *Reviewing the evidence on how teacher professional development affects student achievement* (REL 2007 No. 003). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. https://ies.ed.gov/ncee/edlabs/regions/southwest/pdf/REL_2007033.pdf

Zakierski, M., & Siegel, A. (2010). Creating collaborative literacy teams to increase reading achievement in urban settings. *Journal of College Teaching and Learning*, *7*(4), 25–28. https://doi.org/10.19030/tlc.v7i4.111

APPENDIX A: PRESERVICE TEACHER CONSENT FORM

Department of Special Education and Child Development
9201 University City Boulevard, Charlotte, NC 28223-0001

Consent to be Part of a Research Study

Title of the Project: The Impact of a Multilevel Coaching Intervention on Preservice Teachers' Fidelity of Implementation of a Reading Intervention

Principal Investigator: Corinne Kingsbery, M.Ed., UNC Charlotte
Co-investigators: Samantha Gesel, Ph.D., UNC Charlotte
Erin Washburn, Ph.D., UNC Charlotte

Faculty Advisor: Kristen Beach, Ph.D., UNC Charlotte

You are invited to participate in a research study. Participation in this research study is voluntary. The information provided is to help you decide whether or not to participate. If you have any questions, please ask.

Important Information You Need to Know

- The purpose of this study is to examine the impact of multilevel coaching on preservice teachers' (PSTs) fidelity of implementation of a reading intervention during their reading tutoring clinical experience.

- You will be asked to complete course requirements for READ 4161 (the course in which you are enrolled in and are participating in the reading tutoring clinical experience program). An existing programmatic component of the reading tutoring clinical experience is being assigned a coach. You will be asked to participate in a coaching intervention and will receive feedback twice weekly and may receive in-person coaching throughout the semester. You will also be asked to complete a social validity questionnaire at the conclusion of the study.

- If you choose to participate in these additional activities, it will require about 1 hour and 25 minutes of your time, above and beyond the time expected for the required coursework and clinical experience expectations.

- Risks or discomforts from this research are minimal. You may feel nervous knowing your videos will be observed for feedback twice per week and receiving one additional weekly feedback email. We will provide positive feedback and praise to reduce this anxiety.

- Benefits may include improved reading instruction when working with students with reading difficulties.

- If you choose not to participate, you will be required to complete the course requirements and clinical experience expectations for READ 4161 but will not be asked to participate in additional activities (i.e., additional weekly feedback emails, social validity questionnaire) and your video-recordings will not be used for research purposes. None of your course related data will be used for research purposes if you do not consent to participate.

- Participants who choose to participate in these additional activities will be selected for participation in the intervention based on predetermined inclusion criteria. If you choose to participate in these additional activities and are selected for inclusion, you will be notified via email. Your course grade will not be influenced in any way whether you choose to participate or not. If you choose to participate in the study and are not selected for inclusion based on predetermined inclusion criteria, your data will be deidentified if it is reported in the results of the study.

Please read this form and ask any questions you may have before you decide whether to participate in this research study.

Why are we doing this study?

The purpose of this study is to examine the impact of a multilevel coaching (e.g., email feedback and in-the moment support) intervention on preservice teachers' (PSTs) fidelity of implementation of a reading intervention during their reading tutoring clinical experience. The coaching intervention includes video observations with emailed feedback and side-by-side coaching support. This study will help us learn about how to support PSTs teaching reading to students with reading difficulties. We also hope to understand PSTs' perceptions of the multilevel coaching intervention during the reading tutoring clinical experience.

Why are you being asked to be in this research study.

You are being asked to be in this study because you are a PST enrolled in READ 4161, who will be participating in the reading tutoring clinical experience program in Spring 2023.

What will happen if I take part in this study?

Regardless of your participation in the study, you will be asked to complete course requirements for READ 4161, the course in which you are enrolled and participating in the reading tutoring clinical experience. You will be asked to fulfill any expectations related to the reading tutoring clinical experience.

If you choose to participate in this study, you will be asked to participate in the coaching package intervention during your reading tutoring clinical experience. This will take place at Niner University Elementary where you will be participating in your clinical experience for READ 4161. As a part of the clinical experience requirements, you will be assigned a coach who will provide you with side-by-side coaching support and email feedback based on in person and video observations once weekly. As a part of this study, you will be asked to video your sessions knowing each session will be observed and you will receive email feedback twice weekly. At the end of the study, you will also be asked to complete a social validity questionnaire about your perceptions of multilevel coaching.

Your time commitment will be about 1 hours and 25 minutes. Each additional weekly email will require 5 minutes to review. You will receive an additional weekly email for up to 12 weeks. The social validity questionnaire will require about 20 minutes to complete at the end of the study. This time commitment is above and beyond the time commitment required by course expectations and your clinical experience expectations.

What are the benefits of this study?

By participating in this study, you may experience improved knowledge, skills, and ability to implement a reading intervention with students with reading difficulties. Even if you do not benefit directly from being in this study, your target student(s) in your clinical experience may benefit from your intervention work with them. Additionally, future PSTs might benefit because the results of this study will help us understand ways to improve the reading tutoring clinical experience program for future semesters. These improvements may improve the ways that the reading tutoring clinical experience may support PSTs' knowledge and skills related to literacy instruction and assessment.

What risks might I experience?

Risks or discomfort from this research are minimal. You may feel nervous about your video recordings being observed twice per week. To minimize this risk, we will provide positive feedback and praise to reduce this anxiety.

There is also an unlikely risk for breach of confidentiality. Our procedures to minimize this risk are outlined below under "How will my information be protected?". There is a chance that people in the study may be recognized on the video recordings if a person watching or listening to the video recordings is familiar with a participant's physical characteristics, voice, or name. These files will only be used for research purposes and shared among our UNC Charlotte research team.

How will my information be protected?

Everything we learn about you or other people in the study will be kept confidential. Only the PST and research staff will know about participants being in this study. We will store all data (i.e., video recordings) on a password-protected, secure server. Only research staff will have access to these data. We will remove all identifying information from data.

We plan to publish the results of this study. To protect your privacy we will not include any information that could identify you. We will protect the confidentiality of the research data by storing identifiers separately from data collected. All identifiers will be destroyed at the conclusion of data collection. The video recordings will be deleted one year after data analysis is completed and the study has closed.

Other people may need to see the information we collect about you, including people who work for UNC Charlotte and other agencies as required by law or allowed by federal regulations. Information needed to issue the incentive and information needed for tax reporting purposes related to the incentive will be provided to people who work for UNC Charlotte.

How will my information be used after the study is over?

After this study is complete, identifiers will be removed from the data and the data could be used for future research studies or distributed to another investigator for future research studies without additional informed consent. The data we share will NOT include information that could identify you. Data will not be publicly available.

Will I receive an incentive for taking part in this study?

You will receive an $80 Amazon gift card if you return this consent form and are randomly selected to participate in the study.

If your total payments from UNC Charlotte are greater than $600 in a calendar year, this information will be submitted to the Internal Revenue Service (IRB) for tax reporting purposes. By law, payments to subjects are considered taxable income.

What other choices do I have if I don't take part in this study?

If you choose not to participate, you will complete the course requirements for READ 4161 and the reading tutoring clinical experience expectations but will not be asked to participate in the activities related to the multilevel coaching intervention.

What are my rights if I take part in this study?

It is up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer. If you withdraw from this study, you may request that we do not use any data collected to date for our analyses.

Who can answer my questions about this study and my rights as a participant?

For questions about this research, you may contact Corinne Kingsbery by email (ckingsb1@uncc.edu) or phone (803-517-1249), Dr. Kristen Beach by email (kbeach4@uncc.edu), or Dr. Erin Washburn by email (ewashbu1@uncc.edu) or phone (704-687-8893).

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Office of Research Protections and Integrity at uncc-irb@uncc.edu.

Consent to Participate

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. You will receive a copy of this document for your records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I understand what the study is about and my questions so far have been answered. I agree to take part in this study.

_____
Name (PRINT)

_____
_____
Signature Date

_____
_____
Name and Signature of person obtaining consent Date

Consent to be video recorded

To assist with accurate recording of observations of participants, observations will be video recorded and scored for fidelity. In this study, the video observations will be used for research purposes. Participants have the right to refuse to allow such recording without penalty. Please select one of the following options:

_____I consent to the use of video recording.
_____I do not consent to the use video recording.

_____
Signature Date

APPENDIX B: FIDELITY OF IMPLEMENTATION CHECKLIST

Sound Partners (Vadasy et al., 2004)

Implementation Checklist for Fidelity

Observer		**Time Start**	
Participant ID		**Time End**	
Date		**# of Expected Components**	0
SP Lesson		**Side-by-Side Coaching Time Start**	
Level of Intervention		**Side-by-Side Coaching Time End**	
# of Students		**Time Spent Side-by-Side Coaching**	0

Directions: Save as PARTICIPANT ID_Fidelity_MM.DD.YY (e.g., PST1_Fidelity_02.04.23)

For each behavior, type 1 if it occurred, 0.5 if it partially occurred (as in, some but not all pieces were present), 0 if it did not occur. Use the notes column to track nuances of instruction that are not clearly captured by check boxes, including reasons for 0s. If the lesson does not include a component, score N/A in the score column for each line item of that component (e.g., there is no Book Reading for Lessons 1-5).

*Note: For a 35 minute observation, tutor should complete at least six lesson activities/components. If the lesson is less than 35 minutes long, prorate the number of components that should be completed (i.e., 5 min per component). Round to the nearest whole number for the number of components that should be completed. (e.g., 2.6=3 components for pacing).

- If a tutor runs out of time to complete a component ***after having completed six components already***, code all items within the extra component as N/A.

-If a tutor gets through more than six components, continue to score fidelity as long as the component is not repeated in the lesson. If a tutor repeats a component, continue to score until 6 components are completed. Once 6 components are completed and the tutor is repeating components (early lessons) stop scoring and note the extra pieces in the **Additional Notes** at the bottom. Each **Additional Component** counts as an activity/component. If a tutor repeats a component as part of the 6 components, copy and paste that section into additional components to score.

-If a tutor administers a **Mastery Test** as part of the lesson, prorate the number of components completed. If the tutor does not complete the required number of components of a lesson, select 0 for the first line item and then N/A for each item thereafter within each missed component. Be sure to score the Mastery Test line item if the test was administered at the appropriate time in the lesson sequence.

Overall Session Tasks	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
Materials: Has lesson materials (lesson/book/sound cards) cued up and ready to go.		
Behavior/Engagement: (a) Used visual schedule to reviewed expectations and (b) set daily goal (e.g., X points earned or X lesson components).		
Behavior/Engagement: (a) Tracked points during/end of lesson; (b) Reviewed daily goal at end of lesson and determined if met.		
Activity Log: Completed weekly.		
Pacing: Tutor completed at least appropriate number of components (5 min per component).		

Sound Partners: Say the Sounds	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
Model: If applicable, (a) models sound(s) in box correctly and (b) adheres to any additional prompts.		
Reading: Have student say all the sounds		
Spelling: (a) Covers/hides print as student spells sounds. (b) Has student spell a new, reviewed, and mastered letter. (c) Has student read back letter sounds spelled.		
Praise: Provides specific praise at least once within Say the Sounds		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy (ask question again, use sound card scaffold, etc). **(b) Ends with repeating line of sounds when error occurs.**		

Sound Partners: Segmenting	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
Model: If applicable, models how to segment boxed word correctly (says word, segments into sound boxes, says word again)		
Uses fingers or digital tools to (a) identify/count sounds when segmenting (student and teacher) with (b) no print input.		
Praise: Provides specific praise at least once within Segmenting		
Error Correction: If applicable, (a) corrects errors immediately using appropriate error correction strategy (ask question again, provide segmenting model) and (b) **has student repeat correct segmentation.**		

Sound Partners: Word Reading	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
Model: If applicable, models segmenting (sounding out) then blending (reading) boxed word, using a blending routine.		
***Reading**:* (a) Has student read all the words. (b) If student sounds out first, has student read whole word before moving on to next word		
Auditory Questions: If applicable, (a) covers/hides words, (b) asks oral-only questions about first/middle/last sounds in words, and (c) does so for at least 2 words per question.		
***Spelling**:* (a) Covers/hides print as student spells words. (b) Has student spell a new, reviewed, and mastered word with segmenting-to-spell as needed. (c) Has student read back words spelled.		
Praise: Provides specific praise at least once within Word Reading		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy (give student a chance to self-correct, ask targeted question based on troublesome sound, use sound card scaffold, etc). (b) **Ends with repeating line of words when error occurs.**		

Sound Partners: Sight Words	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
Model: If applicable, models reading, spelling, and rereading the boxed Sight Word(s)		
***Reading**:* (a) Has student read all the words. (b) If student takes >2 s to read word, has student read, spell, and reread word.		
Spelling: If applicable, (a) Covers/hides print as student spells words. (b) Has student spell a new, reviewed, and mastered word. (c) Has student read back words spelled.		
Praise: Provides specific praise at least once within Sight Words		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy (give student a chance to self-correct, provide word, has student read, spell, and reread word with and within print input). (b) **Ends with repeating line of words when error occurs.**		

Sound Partners: Sentence Reading	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
(a) If applicable, preteaches words as indicated by lesson script. (b) Has student read sentences twice.		
Praise: Provides specific praise at least once within Sentence Reading		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy for the type of word error (e.g., decodable words vs. sight words). (b) **Ends with repeating sentence with the error when error occurs.**		

Sound Partners: Additional Components *Some lessons have >1 additional component. Each component can count as 1 activity (of the 6 required for a "full" lesson).*	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
Additional Component 1		
1. **Modeled** Additional Component boxed items (as applicable), using lesson script/sequence for teaching explanation		
2. Asked **oral-only questions** from lesson script/sequence, if applicable		
3. Had student **read** word/letter pair lists, if applicable		
4. Had student **spell** words/letter pairs, if applicable		
Praise: Provides specific praise at least once within Additional Components		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy based on component. (b) **Ends with repeating line of words when error occurs.**		
Additional Component 2		
1. **Modeled** Additional Component boxed items (as applicable), using lesson script/sequence for teaching explanation		
2. Asked **oral-only questions** from lesson script/sequence, if applicable		
3. Had student **read** word/letter pair lists, if applicable		
4. Had student **spell** words/letter pairs, if applicable		
Praise: Provides specific praise at least once within Additional Components		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy based on component. (b) **Ends with repeating line of words when error occurs.**		
Additional Component 3		
1. **Modeled** Additional Component boxed items (as applicable), using lesson script/sequence for teaching explanation		
2. Asked **oral-only questions** from lesson script/sequence, if applicable		
3. Had student **read** word/letter pair lists, if applicable		
4. Had student **spell** words/letter pairs, if applicable		
Praise: Provides specific praise at least once within Additional Components		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy based on component. (b) **Ends with repeating line of words when error occurs.**		
Additional Component 4		
1. **Modeled** Additional Component boxed items (as applicable), using lesson script/sequence for teaching explanation		
2. Asked **oral-only questions** from lesson script/sequence, if applicable		
3. Had student **read** word/letter pair lists, if applicable		
4. Had student **spell** words/letter pairs, if applicable		
Praise: Provides specific praise at least once within Additional Components		
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy based on component. (b) **Ends with repeating line of words when error occurs.**		
Mastery Test: 1. Administers Mastery Test at the appropriate time (e.g., end of 10 lessons)		

Sound Partners: Book Reading *Begins Lesson 6*	**Score** *Yes=1, No=0, Partial=.5, N/A=N/A*	**Notes**
Has student read book(s), following book reading protocol (e.g., new book twice, review book twice, or two different books for review books)		
Praise: Provides specific praise at least once within Book Reading		
Error Correction: If applicable, corrects errors immediately using appropriate error correction strategy for the type of word error (e.g., decodable words vs. sight words). **Ends with repeating sentence with the error when error occurs.**		

Additional General Notes/Observations				
Notes.				
	TOTAL POINTS EARNED			
	TOTAL APPLICABLE POINTS			
	% OVERALL FIDELITY		0	
	Structural Dimensions of Fidelity: Adherence		0	
	Process Dimensions of Fidelity: Insructional Quality		0	

The Fidelity of Implementation Checklist was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

APPENDIX C: EXAMPLE OF EMAIL FEEDBACK

Hi [TUTOR]!

Thank you for letting me join your tutoring session on Tuesday. You are so willing to problem solve to make sure you are supporting [STUDENT]'s needs, and it is awesome to watch you take the initiative to do so.

Here are some things I noticed during your reading tutoring session:

GLOWS! Here are a few things that stood out about your lesson:

- During Sentence Reading, you made sure to preteach the sight words that were included in the sentences. Great job catching that and making sure that you provided [STUDENT] with those words so that she could be successful when reading them in the sentences.
- During Say the Sounds, you did a great job of modeling the difference between the /m/ and /n/ sound for [STUDENT]. You clearly provided the sounds to her and had her practice following the script. Nice work!

GROWS! Smallest changes or continuations for your next lesson:

- During Word Reading, be sure to ask the auditory questions by removing the tutor handbook so that [STUDENT] does not see the printed words and ask the questions about the first sound, last sound, and middle sound (if included in the lesson) in words after she has segmented and blended all words. You will want to choose two words per question. It might sound something like, "What is the first sound in Sam?" and she would answer with /s/.

You got through 6 lessons of Sound Partners, which is amazing! Your pacing is great, and you provided her with breaks at appropriate times. I love how you are able to keep the lesson moving!

Keep it up, [TUTOR]!

[COACH]

APPENDIX D: QUICK REFERENCE GUIDE

Sound Partners Quick Reference Guide

*Always adhere to prompts and components included in the lesson script. Use this guide as an additional support.

Component	Key Procedures	Error Correction Scaffold
Say the Sounds	***Reading*** ☐ Model boxed sound ***(This is '[letter]', it says /[sound]/, like in [keyword].)*** ☐ Student says all the sounds. ***(Point to each letter. Say the sound.)*** ***Spelling*** ☐ Cover letters as student spells new, review, and mastered sounds. ☐ Student reads back sounds spelled. ☐ ***Specific Praise***	☐ Ask student again. Give opportunity to self-correct. ☐ Provide **sound card**. ☐ Provide model of letter name, keyword, and sound. ****Student repeats line with error or spells again.***
Segmenting	☐ Model segmenting boxed word. ***(My word is [word]. The sounds are [sound] [sound] [sound]. Your turn!)*** ☐ Student segments all words. ***(Break this word into [#] parts.)*** ☐ Use fingers/tools to identify sounds. ☐ ***Specific Praise***	☐ Ask student again. Give opportunity to self-correct. ☐ Model segmenting with student. ****Student repeats segmenting correctly.***
Word Reading	***Reading*** ☐ Model segmenting and blending boxed word. ***(Watch me. [sound] [sound] [sound] [word].)*** ☐ Student reads all words. If segmenting each word, must also read fast after. ***(Sound these out and say them fast).*** ***Oral-Only Questions*** ☐ Ask oral-only questions with words covered. ***(What sound does [word] [start/end] with? What is the middle sound in [word]?)*** ***Spelling*** ☐ Cover words as student spells new, review, and mastered words. ☐ Student reads back words spelled. ☐ ***Specific Praise***	***Hesitations***: ☐ Ask for sound(s) or provide using **sound card**. Student reads whole word. ***Errors***: ☐ Ask student again. Give opportunity to self-correct. ☐ Isolate sound and provide **sound card**. ***Blending Errors:*** ☐ Model using continuous blending. Student repeats. ****Student repeats line with hesitation/errors.*** ***Spelling Errors:*** ☐ Ask student again. Give opportunity to self-correct. ☐ Isolate sound and provide **sound card**. ☐ Model correct spelling. ****Student spells word again.***

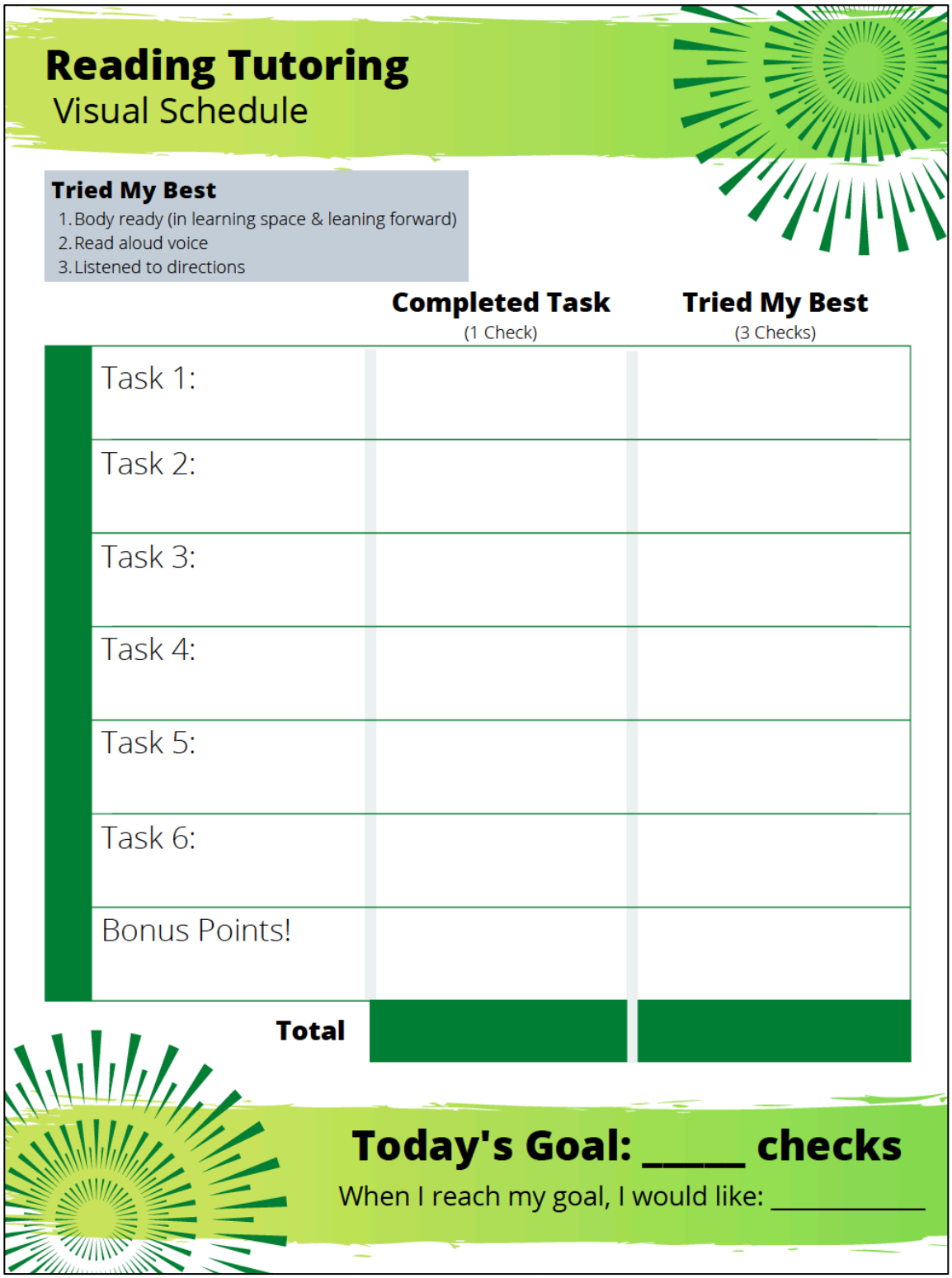
Sound Partners Quick Reference Guide

*Always adhere to prompts and components included in the lesson script. Use this guide as an additional support.

Component	Key Procedures	Error Correction Scaffold
Sight Words	***Reading*** ☐ Model read, spell, reread for boxed word. ***(The [word] is. You read it. Point and spell. What word?).*** ☐ Student reads all words. ***(Read these words. [If student hesitates (>2 s) or makes error, have them read-spell-reread]).*** ***Spelling*** ☐ Cover words as student spells new, review, mastered. ☐ Student reads back words spelled. ☐ ***Specific Praise***	***Reading Errors:*** ☐ Ask student again. Give opportunity to self-correct. ☐ Provide student with word. ****Student repeats line with error.*** ***Spelling Errors:*** ☐ Ask student again. Give opportunity to self-correct. ☐ Show student word. Ask to read, spell, reread. Have student finger spell. Take away print. ****Student spells word again.***
Sentence Reading	☐ Preteach underlined words. ☐ Student reads all sentences 2x. ***(Read these sentences. Point to each word.).*** ☐ ***Specific Praise***	☐ Decodable words → Follow word reading prompts ☐ Sight words → Follow sight words prompts ****Student rereads sentence with error.***
Book Reading	☐ Preteach indicated words. ☐ Student reads book(s) 2x. ***(Let's read our book! The title of the book is [Title]. What's the title? Let's read! Be sure to point to each word.).*** ☐ ***Specific Praise***	☐ Decodable words → Follow word reading prompts ☐ Sight words → Follow sight word prompts ****Student rereads sentence with error.***

The Quick Reference Guide was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

APPENDIX E: VISUAL SCHEDULE



The Visual Schedule was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

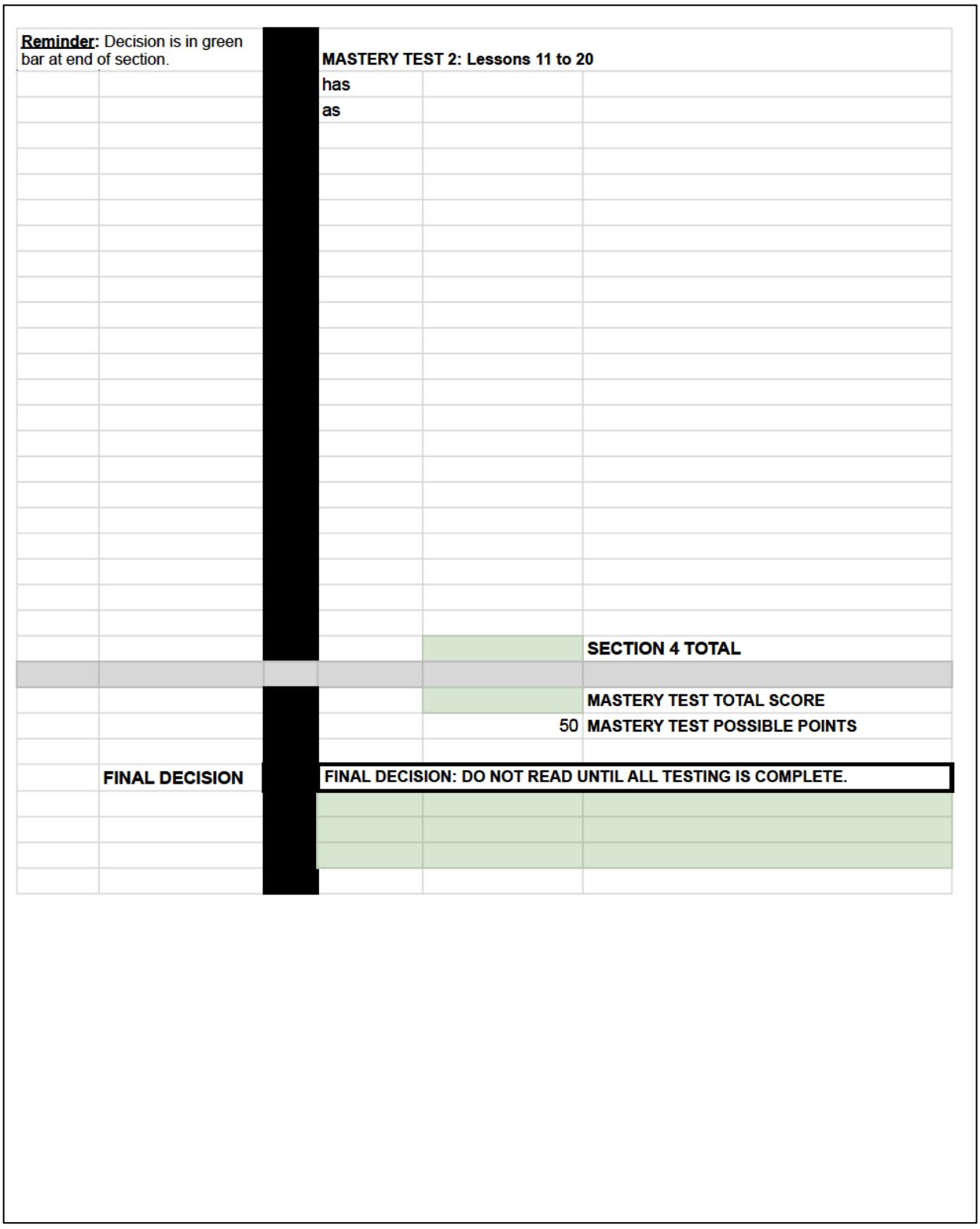
APPENDIX F: ACTIVITY AND ASSESSMENT LOG

STUDENT INFORMATION	
Student Name(s)	
Student Grade(s)	
Student Teacher	

SESSION		MASTERY TESTS *Mastery Tests occur for initial placement and every 10 lessons.*				LESSON INFORMATION *Sessions may cut across multiple lesson numbers (i.e., >1 lesson in a session) You may also start a day in the middle of a lesson.*						
Date	Attendance	Administered Mastery Test (MT)?	*If Applicable:* MT #	*If Applicable:* MT Score	*If Applicable:* Lesson Placement Decision	Beginning Lesson Number	Beginning Activity *Type Name of Beginning Activity.*	*If Applicable:* Additional Lesson Number(s)	Ending Activity *Type Name of Ending Activity.*	Books Read *Write all titles read during lesson.*	Session Length *Number of min the student spent in instruction. Do not count off-task time, technology glitch time, breaks, etc.*	Session Notes *Include notes on areas to review; need for mastery testing; behavior notes; etc.*
EXAMPLE DATA ENTRY #1: *Showcases Mastery Test and completed lesson.*												
8/30	Present	yes	3	45/50	Continue to next lesson set (>90% overall)	41	Say the Sounds	N/A	Book Reading	Sox the Fox (x2)	45 min	Student needed error correction for "sh" - will review tomorrow
EXAMPLE DATA ENTRY #1: *Showcases starting mid-lesson and continuing through portion of next lesson.*												
8/30	Present	no	N/A	N/A	N/A	41	Sight Words	42	Word Reading	Sox the Fox (x2)	25 min	Student needed error correction for "wh" - will review tomorrow
ACTIVITY LOG												

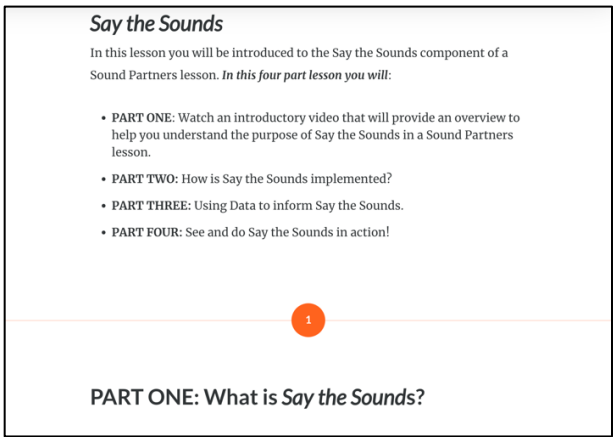
Reminder: Decision is in green bar at end of section.			**MASTERY TEST 2: Lessons 11 to 20**		
Student:			***Section 1a: Sound Decoding*** *"Point to each letter. Say the sound."*		
Teacher:		Lesson	Sound to Read	Student Response *Correct = 1, Incorrect = 0*	Specific Error *For incorrect, write the child said instead.*
		11	**g**		
		12	**r**		
		13	**b**		
		15	**i**		
		18	**p**		
		19	**w**		
		20	**j**		
		8	**o**		
		10	**d**		
					1A SUBTOTAL
			Section 1b: Sound Spelling *"Write the letter that makes the ___ sound as in _____."*		
			Sound to Spell	Student Response *Correct = 1, Incorrect = 0*	Specific Error *For incorrect, write the child wrote instead.*
		11	**/g/** *as in girl*		
		12	**/r/** *as in rat*		
		13	**/b/** *as in ball*		
		15	**/i/** *as in itch*		
		18	**/p/** *as in pig*		
		19	**/w/** *as in window*		
		20	**/j/** *as in jet*		
		8	**/o/** *as in octopus*		
		10	**/d/** *as in dog*		
					1B SUBTOTAL
					SECTION 1 TOTAL
	DECISION				
			Section 2: Word Reading *"Sound these words out, then read them fast."*		
			Word to Read	Student Response *Correct = 1, Incorrect = 0*	Specific Error *For incorrect, write the child said instead.*

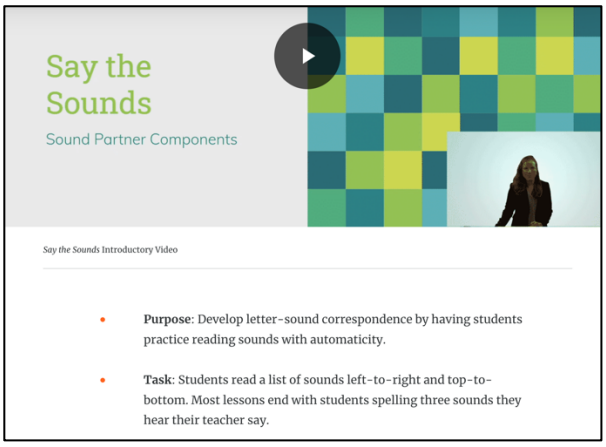
Reminder: Decision is in green bar at end of section.				
		MASTERY TEST 2: Lessons 11 to 20		
		jog		
		rat		
		big		
		tin		
		wag		
		hop		
		mop		
		dim		
		pad		
		win		
		hit		
		jam		
				SECTION 2 TOTAL
		Section 3: Spelling *"I say the word, and you write the word."*		
		Word to Spell	Student Response *Correct = 1, Incorrect = 0*	Specific Error *For incorrect, write the child wrote instead.*
		pit		
		dip		
		got		
		jam		
		rid		
		wig		
		pan		
		bad		
		wag		
		ran		
		job		
		bog		
				SECTION 3 TOTAL
		Section 4: Sight Word Reading *"Read these words."*		
		Word to Read	Student Response *Correct = 1, Incorrect = 0*	Specific Error *For incorrect, write the child wrote instead.*
		you		
		is		
		the		
		of		
		his		
		to		

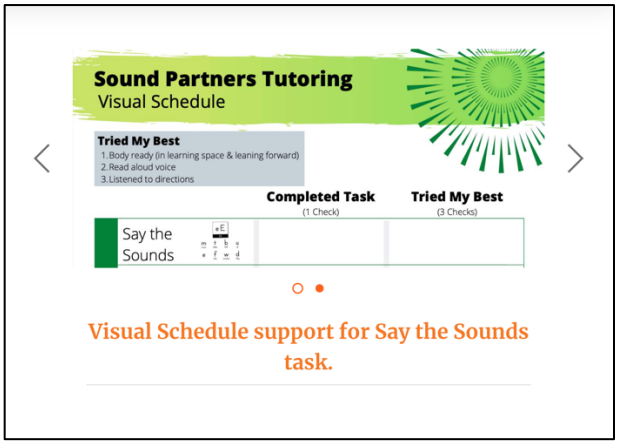


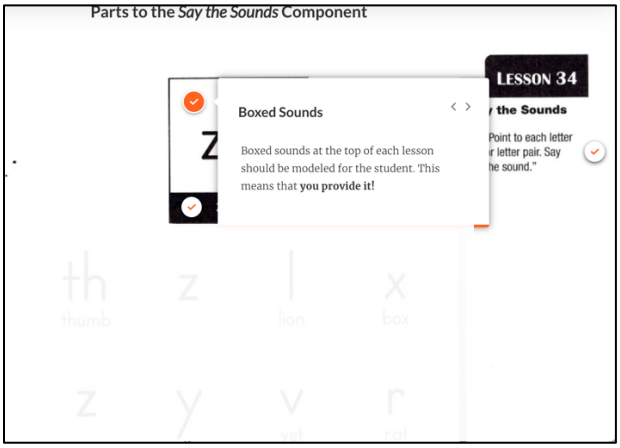
The Activity and Assessment Log was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

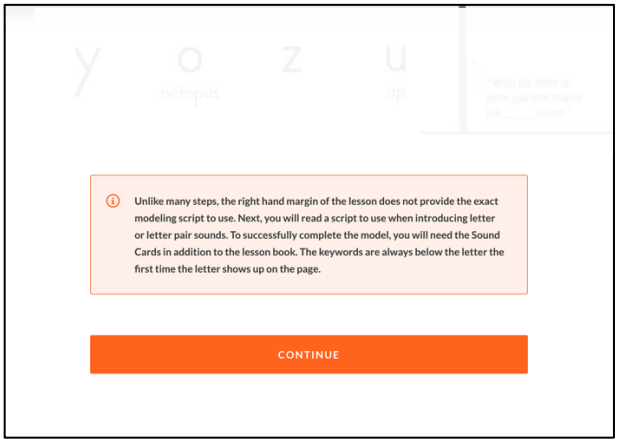
APPENDIX G: SAMPLE OF ASYNCHRONOUS TRAINING MODULE

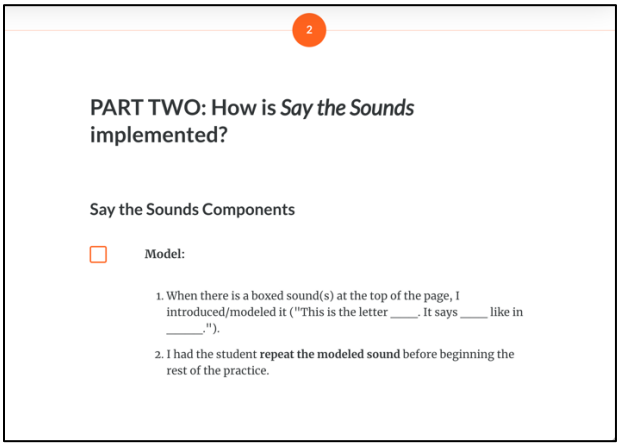


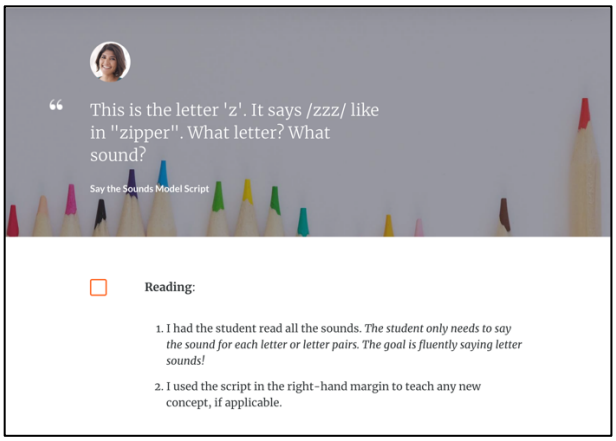










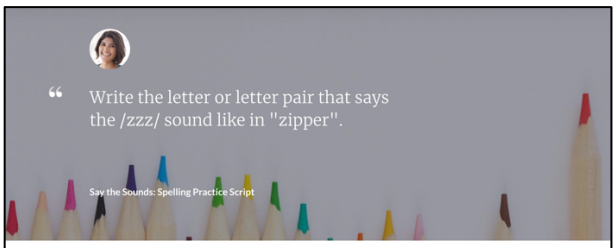


Reading:

1. I had the student read all the sounds. *The student only needs to say the sound for each letter or letter pairs. The goal is fluently saying letter sounds!*
2. I used the script in the right-hand margin to teach any new concept, if applicable.

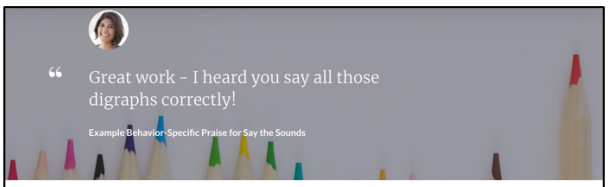
Spelling

1. I took the book away so the student couldn't see it.
2. I had the student spell 1 new (the boxed sound at the top of the page), 1 review (a missed sound from the lesson), and 1 mastered letter.
3. At the end of Spelling Sounds, I had the student read the sounds they spelled.



Positive Behavior Supports

1. At the end of the step, I provided specific praise about what the child did really well with during Say the Sounds.
2. I worked with the student to give points for Say the Sounds upon completion of all the pieces of the step.



Fidelity Form: Say the Sounds Component

How do I know I'm implementing Say the Sounds properly?

The modified fidelity form to the left provides the primary components of the Say the Sounds step.

CONTINUE

Error Correction

When students are saying the sounds or spelling sounds, plan to correct errors immediately after the student makes the error. After error correction procedures, be sure to give the student additional practice with the correct response. Error Correction follows three basic steps:

1. If an error occurred, I paused the student and asked "What Sound?" again to give a **chance to self-correct**.
2. If the student repeats error, I used the **sound card as a scaffold** so the student could identify the sound based on the keyword picture.
3. At the end of correcting the error, I had the student **repeat the line** of sounds where the error occurred.

- **Spell Sounds**: During error correction, have the students rewrite the letter below their first letter. When re-reading each sound spelled, have the students read all sounds spelled, including the initial error.

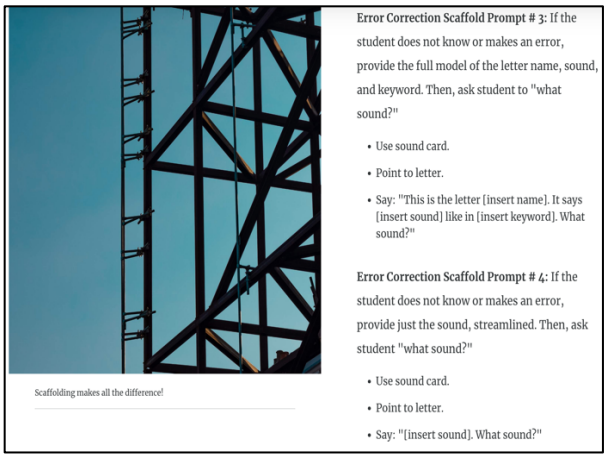
SAYING SOUNDS

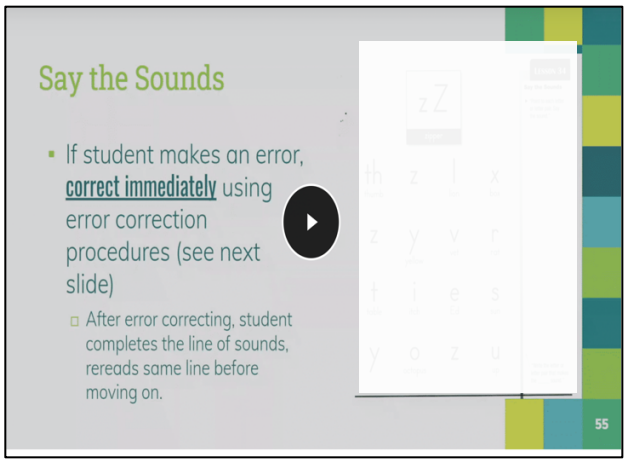
Error Correction Scaffold Prompt # 1: Give students a chance to self-correct.

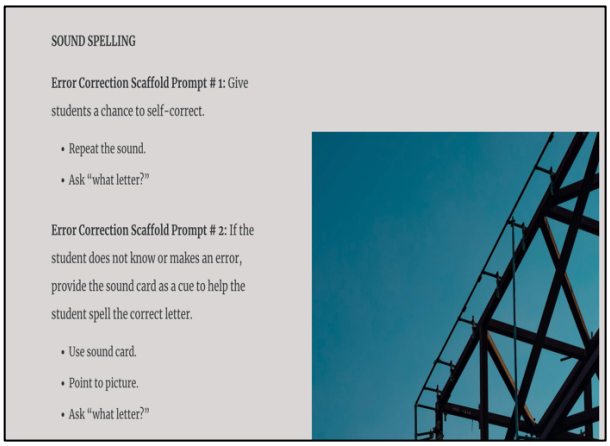
- Point to letter in book.
- Ask "what sound?"

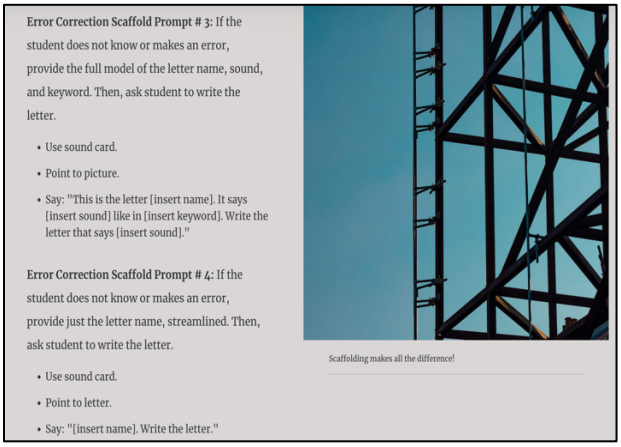
Error Correction Scaffold Prompt # 2: If the student does not know or makes an error, provide the sound card as a cue to help the student give the correct sound.

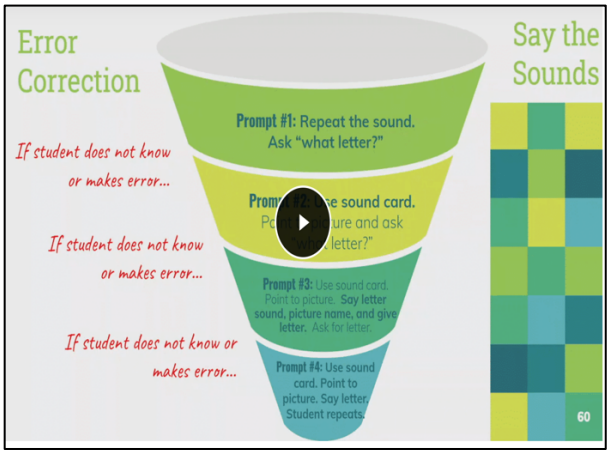
- Use sound card.
- Point to letter.
- Ask "what sound?"

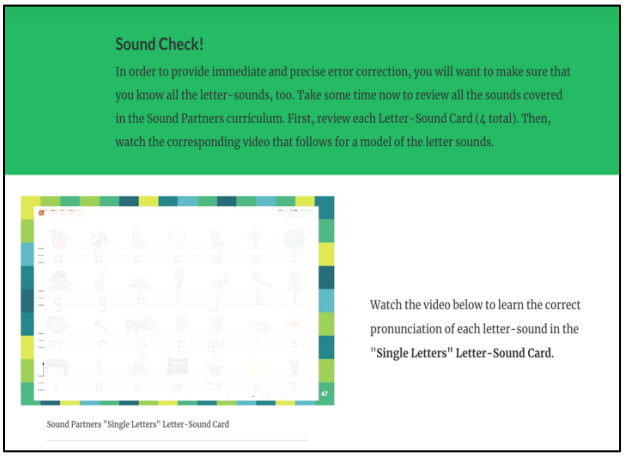

Error Correction Scaffold Prompt # 3: If the student does not know or makes an error, provide the full model of the letter name, sound, and keyword. Then, ask student to "what sound?"
• Use sound card.
• Point to letter.
• Say: "This is the letter [insert name]. It says [insert sound] like in [insert keyword]. What sound?"
Error Correction Scaffold Prompt # 4: If the student does not know or makes an error, provide just the sound, streamlined. Then, ask student "what sound?"
• Use sound card.
• Point to letter.
• Say: "[insert sound]. What sound?"
Scaffolding makes all the difference!

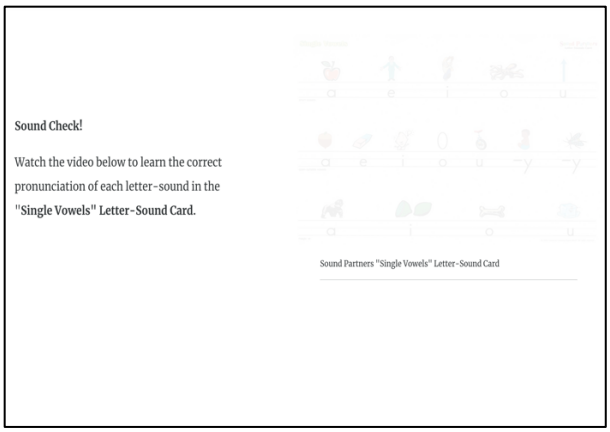

Say the Sounds
If student makes an error, correct immediately using error correction procedures (see next slide)
After error correcting, student completes the line of sounds, rereads same line before moving on.
55

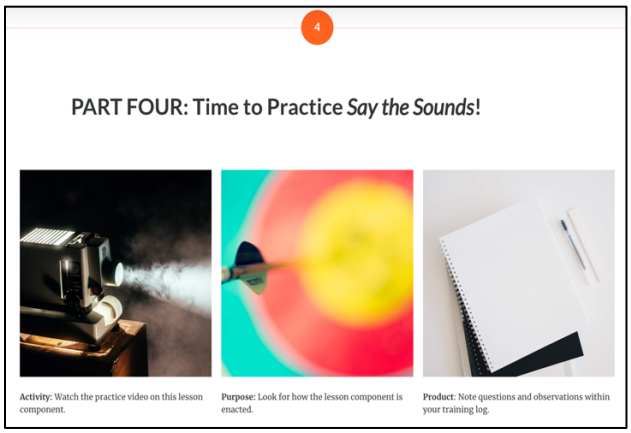

SOUND SPELLING
Error Correction Scaffold Prompt # 1: Give students a chance to self-correct.
• Repeat the sound.
• Ask "what letter?"
Error Correction Scaffold Prompt # 2: If the student does not know or makes an error, provide the sound card as a cue to help the student spell the correct letter.
• Use sound card.
• Point to picture.
• Ask "what letter?"

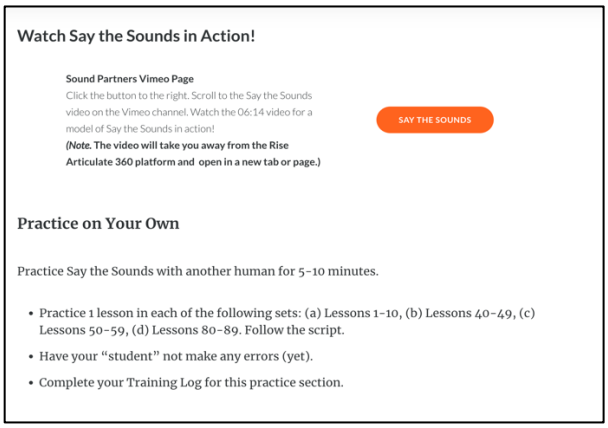

Error Correction Scaffold Prompt # 3: If the student does not know or makes an error, provide the full model of the letter name, sound, and keyword. Then, ask student to write the letter.
• Use sound card.
• Point to picture.
• Say: "This is the letter [insert name]. It says [insert sound] like in [insert keyword]. Write the letter that says [insert sound]."
Error Correction Scaffold Prompt # 4: If the student does not know or makes an error, provide just the letter name, streamlined. Then, ask student to write the letter.
• Use sound card.
• Point to letter.
• Say: "[insert name]. Write the letter."
Scaffolding makes all the difference!


Error Correction
If student does not know or makes error...
If student does not know or makes error...
If student does not know or makes error...
Prompt #1: Repeat the sound. Ask "what letter?"
Prompt #3: Use sound card. Point to picture. Say letter sound, picture name, and give letter. Ask for letter.
Prompt #4: Use sound card. Point to picture. Say letter. Student repeats.
Say the Sounds
60


Sound Check!
In order to provide immediate and precise error correction, you will want to make sure that you know all the letter-sounds, too. Take some time now to review all the sounds covered in the Sound Partners curriculum. First, review each Letter-Sound Card (4 total). Then, watch the corresponding video that follows for a model of the letter sounds.
Watch the video below to learn the correct pronunciation of each letter-sound in the "Single Letters" Letter-Sound Card.
Sound Partners "Single Letters" Letter-Sound Card







The asynchronous training module was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

APPENDIX H: SAMPLE OF TRAINING LOG

Sound Partners Training Module - Part 4: Say the Sounds

Note. Below is space with some general questions for you to take notes during this part of the Sound Partners Training Module.

- What is the Say the Sounds component of a Sound Partners lesson?
- How is the Say the Sounds component of a Sound Partners lesson implemented?

Video Analysis: Say the Sounds

 **Activity**	Watch the practice video on this lesson component.
	• Sound Partners Vimeo Channel
	  ○ https://vimeo.com/channels/soundpartners
	  ○ Say the Sounds video on page 1 (6:14)
	  ▪ *Context: Lesson 25 (p. 69 in Sound Partners lesson book)*
	Optional for additional video example on own time.
	• Lesson 34 (p. 98): Say the Sounds (3:02)
	  ○ https://drive.google.com/file/d/1MQqC3SFpjtt_JwCMm-RVarbg0rigwb60/view?usp=sharing

 **Purpose**	Look for how the lesson component is enacted.

 **Product**	Note questions and observations here.
	• **Questions:**
	  ○ Notes:
	• **Observations:**
	  ○ Notes:

Say the Sounds Practice on Your Own

- Practice Say the Sounds component of a Sound Partners lesson with another human for 5-10 minutes.
  - *Practice 1 lesson in any of the following sets: (a) Lessons 1-10, (b) Lessons 40-49, (c) Lessons 50-59, (d) Lessons 80-89. Follow the script.*
  - *Have your "student" not make any errors (yet).*
  - *Don't forget the "spell the sound" portion!*
  - Complete your Training Log for this practice section.

Clicks: *What part of the practice went well?*	**Clunks:** *What do you want to practice further?*	**Questions:** *What questions do you have about the lesson component?*
• Notes:	• Notes:	• Notes:

The Training Log was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

APPENDIX I: SAMPLE OF SYNCHRONOUS TRAINING SLIDES

UNC Charlotte Reads
Sound Partners Training

A Request! Please create a name tag with a folded piece of paper!

Training Purpose and Goals

Purpose: Prepare tutors to: (a) implement the Sound Partners (SP) tutoring program with fidelity and (b) use data entry and Mastery Testing procedures to track student progress.

Goals:
- Review SP instructional methodology and supports for behavior
- Review each SP basic component
- Practice each SP step, applying error correction procedures
- Practice data entry using SP Activity Log
- Practice administering SP Mastery Testing procedures

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Roadmap

Sound Partners Overview
Step-by-Step Review --with practice--
Tutoring Site Logistics
Start Tutoring!
Positive Behavior Supports --with practice--
Data Entry --with practice--

Guiding Questions for Training Time

1. What is *Sound Partners*?
   - Explicit, Systematic Instruction in Foundational Reading Skills
2. How do I support *engagement and positive behavior* during a *Sound Partners* lesson?
   - Visual Schedule and Goal Setting
   - Behavior Specific Praise
3. How do I teach *Sound Partners*?
   - Review and Practice Each Sound Partners Component
     - Questions?
     - Quick Reference Guide for Implementation and Practice of each component
     - Error Correction Procedures and Practice
4. How do I keep track of *student progress*?
   - Sound Partners Activity Log
   - Sound Partners Mastery Testing
5. Site Logistics Discussion

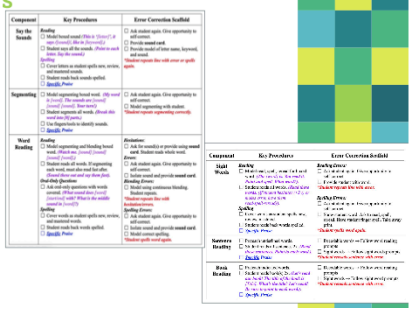
Part One:
Sound Partners Overview

Sound Partners Materials

- Sound Partners Tutor handbook
- Sound Partners Lesson Book and Mastery Tests
- Bob Books
- Letter sound cards
- Whiteboards
- Activity logs (UNC Charlotte designed)
- Fidelity checklist (UNC Charlotte designed)
- Sound Partners/Summer Reading Camp Visual Schedule

6

Sound Partners Materials: Lessons



Core Instructional Methodology:
Systematic Instruction

Concept Progression
Gradual introduction of new sounds and skills (1 new sound/15-20 min lesson; move through lessons in order/not random)

Cumulative Review
Based on student need, cumulative practice and review (embedded and tutor-added)

Across Building Skills
Teaches letter-sound correspondences and decoding/encoding of letters/sounds, words, sentences, and connected text (paragraphs, etc.)

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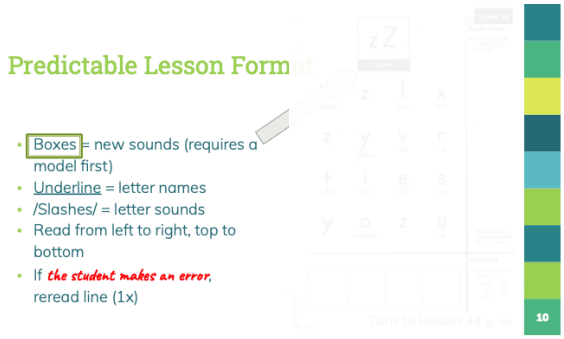

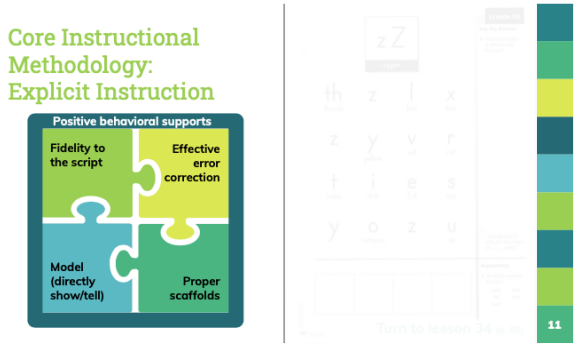

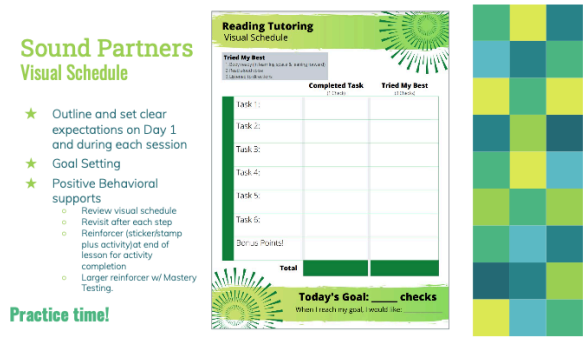

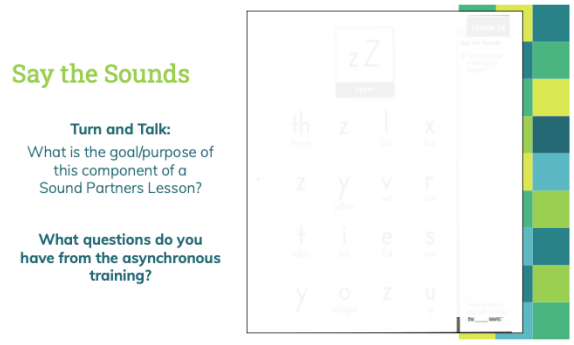

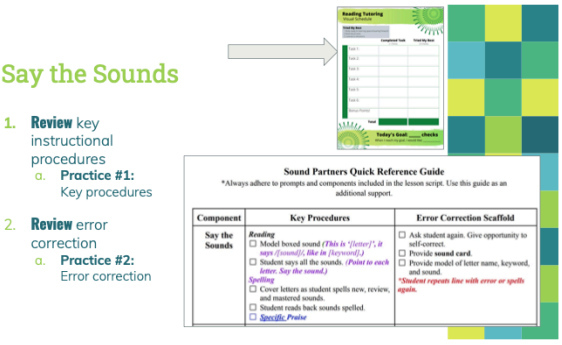

The synchronous training slides were developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

APPENDIX J: EXAMPLE OF SYSTEMATIC COACHING FEEDBACK

Component	Specific Behavior Within Component	Sample Email Feedback
Sound Partners: Word Reading		
Model: If applicable, models segmenting (sounding out) then blending (reading) boxed word, using a blending routine.		During Word Reading, be sure to model the new boxed word if one is provided during the lesson. This might sound like, "My Turn! Watch me sound this word out. /k/ /a/ /t/ cat."
Reading: *(a) Has student read all the words. (b) If student sounds out first, has student read whole word before moving on to next word*	Word Endings	Your goal is to help your student consolidate skills to be able to use/apply them across contexts. The big idea is to give your student the word reading strategy to independently: (a) identify a word ending when they see it, (b) "strip" the word ending off to read the base word (sound-by-sound is okay!), then (c) read the base word as a whole word, plus add the word ending!
Auditory Questions: *If applicable, (a) covers/hides words, (b) asks oral-only questions about first/middle/last sounds in words, and (c) does so for at least 2 words per question.*	Auditory Questions	During Word Reading, be sure to ask the auditory questions by removing the tutor handbook so that your student does not see the printed words and asking the questions about first sound, last sound, and middle sound (if included in the lesson) in words after she has segmented and blended all words. You will want to choose two words per question. It might sound something like, "What is the first sound in Sam?" The student shound answer with /s/.
Spelling: *(a) Covers/hides print as student spells words. (b) Has student spell a new, reviewed, and mastered word with segmenting-to-spell as needed. (c) Has student read back words spelled.*	Spelling: New, Review, Mastered	I would encourage you to make sure that during word spelling, you want to follow the guidelines of “new, review, and mastered” for the words that you have your student spell. That means that the first word you have them spell is the new word or the boxed word at the top. Then have your student spell a “review” word which is a word that they need additional practice with - perhaps a word that they had difficulty segmenting and blending. And then finally, have them spell a “mastered” word - a word that they read correctly and has spelled correctly in the past. This allows them to end on a positive note!
	Reading Back Spelled Words	During the spelling portion of Word Reading, be sure to always have the student read back anything that they spell. So, after writing the new, review, and mastered words, ask them “What word?” have them read back to you.
Error Correction: (a) If applicable, corrects errors immediately using appropriate error correction strategy (give student a chance to self-correct, ask targeted question based on troublesome sound, use sound card scaffold, etc). (b) Ends with repeating line of words when error occurs.	Error Correction	When error correcting during word reading, remember to provide an opportunity to self-correct first. Second, if needed, you should ask a targeted question that draws attention to the tricky part of the word ("hmm..what's this sound?"). Third, if needed, you should pull out the Sound Card to give the visual support and ask again "What sound?". Finally, you can bring in the model with the child repeating. After the kiddo gets the error corrected, be sure to do a reread of the line (or sentence) that had the error.

The Systematic Coaching Feedback document was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

APPENDIX K: EXAMPLE OF COACHING LOG

Tutor: Logan

			Level 2: Supervisory Coaching			Level 3: Side-by-Side + Supervisory Coaching							
Session Date	**TC Present**	**Study Phase**	**Feedback Email Sent**	**Date Email Sent**	**Link to Email Feedback Sent Prior to Tutoring Session**	**In-the-Moment Coaching**	**Start Time**	**Stop Time**	**Length of Coaching Session**	**Notes from Email Feedback**	**Glows**	**Grows**	**Debrief/Next Steps?** *What areas were you able to provide in-the-moment support?What component? Specific Praise? Visual Schedule? etc.*
2/9	Yes	Level 1	N/A			N/A							
2/14	Yes	Level 1	N/A			N/A							
2/16	Yes	Level 1	N/A			N/A							
3/7	Yes	Level 1	N/A			N/A							
3/9	Yes	Level 2	☑	3.9.23	3.9.23 Feedback	N/A							
3/14	Yes	Level 2	☑	3.13.23	3.13.23 Feedback	N/A							
3/16	Yes	Level 2	☑	3.16.23	3.16.23 Feedback	N/A							
3/21	Yes	Level 2	☑	3.20.23	3.20.23 Feedback	N/A							
3/23	No	Level 2	☑	3.23.23	3.23.23 Feedback	N/A							
3/28	Testing	Level 2	☑	3.27.23	3.27.23 Feedback (Resent 3.23.23)	N/A							
3/30	Yes	Level 2	☑	3.30.23	3.30.23 Feedback (Resent 3.23.23)	N/A							
4/4	Yes	Level 3	☑	4.3.23	4.3.23 Feedback	☑	4:20	4:27	7 min	Specific praise, read back sounds and words spelled, cover printed text during word endings for oral only questions	speciifc praise (awesome job with the e sound) "You found the one with the final m blend!" Consisntly aksed students to repeat lines with errors	Make sure to prompt students to spell on whiteboard if there is a pencil included in the lesson book	*needs markers Final m and n Blends, Word Reading
4/6	No	Level 3	☑	4.6.23	4.6.23 Feedback	**Tutor Absent**				Support with specific reading back spelled words, making sure students spell on whiteboards			
4/20	No	Level 3	☑	4.19.23	4.19.23 Feedback (Resent 4.6.23)	**Tutor Absent**				Support with specific reading back spelled words, making sure students spell on whiteboards			
4/25	Yes	Level 3	☑	4.24.23	4.24.23 Feedback	☑	4:27	4:35	8 min	Support with specific reading back spelled words, making sure students spell on whiteboards	Great job with error correction during word reading; remembered to select new, review, and mastered words during sight words for spelling	Remind to to use "read, spell, reread" procedures during Sight Words	Word Reading
4/27	Yes	Level 3	☑	4.27.23	4.27.23 Feedback	☑	4:33	4:36	4 min	Sight Words error correction procedures	Great job having her respell words with an error and repeating the line; love the praise for self-correction	N/A	Word Reading, Sight Words
5/2	Yes	Level 3	☑	5.1.23	5.1.23 Feedback (Resent 4.27.23)	☑	4:36	4:40	4 min	Sight Words error correction procedures	Pacing was excellent and very consistent with error correction procedures; great job on modeling for additional components	Use specific praise consistently	Sentence Reading, Additional Components

The Coaching Log was developed by the following list of authors in alphabetical order by last name: Kristen Beach, Samantha Gesel, Corinne Kingsbery, and Erin Washburn.

APPENDIX L: LEVEL 1 PROCEDURAL FIDELITY CHECKLIST

Level 1 and Maintenance Procedural Fidelity Checklist

Observer	
Tutor	
Date	

Directions: Make a Copy of this Google Sheet (File > Make a Copy). Save it in Measures > Coaching Fidelity > IOA. Save as TUTOR ID_Coaching Fidelity_MM.DD.YY (e.g., P1_Coaching Fidelity_1.24.23).

For each behavior, **select 0 if it occurred or 1 if it did not occur**. Use the notes column to indicate any additional information not clearly captured by the score. If the feedback is not applicable to the coaching session, select N/A.

Level 1 Procedural Fidelity	**Score** *No=1, Yes=0, N/A=N/A*	**Notes**
The coach documented that supervisory coaching occurred by uploading email feedback.		
The coach documented that side-by-side coaching occurred on the coaching log by recording time that coaching occurred.		

TOTAL POINTS EARNED	
TOTAL APPLICABLE POINTS	
% FIDELITY	

APPENDIX M: LEVEL 2 PROCEDURAL FIDELITY CHECKLIST

Level 2 Procedural Fidelity Checklist

Observer	
Tutor	
Date	

Directions: Make a Copy of this Google Sheet (File > Make a Copy). Save it in Measures > Coaching Fidelity > IOA. Save as TUTOR ID_Coaching Fidelity_MM.DD.YY (e.g., P1_Coaching Fidelity_1.24.23).

For each behavior, select 1 if it occurred or 0 if it did not occur. Use the notes column to indicate any additional information not clearly captured by the score. If the feedback is not applicable to the coaching session, select N/A.

Level 2 Supervisory Coaching Procedural Fidelity	**Score** *Yes=1, No=0, N/A=N/A*	**Notes**
Email **feedback** was **sent** to the tutor **prior to their next tutoring session.**		
The coach provided feedback in at least 2 areas of "**glows**."		
For each glow, the coach **provided feedback that is specific** so that the tutor could clearly understand what to continue to say or do (e.g., described how the tutor implemented a strategy, specific language used by the tutor, or procedures the tutor used).		
The coach provided feedback in 1 to 2 areas of "**grows**."		
For each grow, the coach **provided feedback that is specific** so that the tutor could clearly understand what to say or do differently (e.g., described how the tutor could implement a strategy, provided specific language to use, provided step by step procedures).		
Side-by-side coaching ***DID NOT*** occur based on the coaching log (e.g., no record of observation notes in-the-moment or time spent side-by-side coaching). Select 1 if side-by-side coaching ***DID NOT*** occur.		

TOTAL POINTS EARNED	
TOTAL APPLICABLE POINTS	
% FIDELITY	

APPENDIX N: LEVEL 3 PROCEDURAL FIDELITY CHECKLIST

Level 3 Procedural Fidelity Checklist

Observer	
Tutor	
Date	

Directions: Make a Copy of this Google Sheet (File > Make a Copy). Save it in Measures > Coaching Fidelity > IOA. Save as TUTOR ID_Coaching Fidelity_MM.DD.YY (e.g., P1_Coaching Fidelity_1.24.23).

For each behavior, select 1 if it occurred or 0 if it did not occur. Use the notes column to indicate any additional information not clearly captured by the score. If the feedback is not applicable to the coaching session, select N/A.

Supervisory Coaching Procedural Fidelity	**Score** *Yes=1, No=0, N/A=N/A*	**Notes**
Email **feedback** was **sent** to the tutor **prior to their next tutoring session.**		
The coach provided feedback in at least 2 areas of "**glows**."		
For each glow, the coach **provided feedback that is specific** so that the tutor could clearly understand what to continue to say or do (e.g., described how the tutor implemented a strategy, specific language used by the tutor, or procedures the tutor used).		
The coach provided feedback in 1 to 2 areas of "**grows**."		
For each grow, the coach **provided feedback that is specific** so that the tutor could clearly understand what to say or do differently (e.g., described how the tutor could implement a strategy, provided specific language to use, provided step by step procedures).		

Side-by-Side Coaching Procedural Fidelity	**Score** *Yes=1, No=0, N/A=N/A*	**Notes**
The coach provided side-by-side coaching during the tutoring session by documenting **time spent** during side-by-side coaching on the **Coaching Log**.		
The coach provided side-by-side coaching during the tutoring session by **recording observation notes** (e.g. debrief, glows, grows, next steps) during the session on the **Coaching Log**.		
If the tutor made an error/did not implement a step related to **structural components of fidelity (i.e., adherence)**, the coach **prompted** the tutor to reference the lesson plan/quick reference guide or **modeled** the component.		
There are no missed opportunities for **prompting** or **modeling** related to **structural components of fidelity (i.e., adherence)** during the time spent in side-by-side coaching.		
If the tutor made an error/did not implement a step related to **process dimensions of fidelity (e.g., error correction, praise, etc)**, the coach **prompted** the tutor to reference the lesson plan/quick reference guide or **modeled** the component.		
There are no missed opportunities for **prompting** or **modeling** related to **process dimensions of fidelity (e.g., error correction, praise, etc)** during the time spent in side-by-side coaching.		

TOTAL POINTS EARNED	
TOTAL APPLICABLE POINTS	
% FIDELITY	

APPENDIX O: SOCIAL VALIDITY QUESTIONNAIRE

Coaching Social Validity Questionnaire

Thank you so much for participating in the reading tutoring program with a coach this semester and for providing feedback on your experience. All responses to this survey are anonymous.

Supervisory Coaching
Please provide feedback on your experience with supervisory coaching (i.e., video observations with email feedback).

1. I enjoyed receiving supervisory coaching (i.e., video observations with email feedback) during the reading tutoring program.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

2. Having a coach observe video recorded sessions and send email feedback during the reading tutoring program improved my knowledge and skills of teaching reading.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

3. Having a coach observe video recorded sessions and send email feedback during the reading tutoring program improved my instructional behaviors (e.g., pacing, positive behaviors supports).

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

Side-by-Side Coaching
Please provide feedback on your experience with side-by-side coaching (i.e., when my coach supported me in-the-moment).

4. I enjoyed receiving side-by-side coaching (i.e., when my coach supported me in-the-moment) during the reading tutoring program.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

5. Having a coach model strategies in the moment during the reading tutoring program improved my knowledge and skills of teaching reading.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

6. Having a coach model strategies in the moment during the reading tutoring program improved my instructional behaviors when teaching reading (e.g, pacing, positive behavior supports).

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

Coaching Support

Please provide feedback on your experience with having a coach during reading tutoring.

7. I enjoyed receiving feedback from a coach as a part of the reading tutoring program.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

8. I will use reading strategies that I learned from my coach in my future teaching experiences.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

9. I will use instructional behaviors (e.g., pacing, positive behavior supports) that I learned from my coach in my future teaching experiences.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

10. Receiving coaching support in the reading tutoring program has helped prepare me for my future teaching experiences.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

11. I would like to have coaching support in my future teaching experiences.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

12. I would recommend coaching support during the reading tutoring program to my peers.

1 - strongly disagree 2 - disagree 3 - neutral 4 - agree 5 - strongly agree

13. What did you enjoy most about receiving coaching support during the reading tutoring program?

14. Were there any challenges to receiving coaching support during the reading tutoring program?

15. Did you prefer supervisory coaching (i.e., video observations with email feedback) or side-by-side coaching (i.e., when my coach supported me in the moment)? Why did you choose this type of coaching support?

16. Please provide any additional comments you would like for the coaching support provided in the reading tutoring program. Feel free to elaborate on any above scoring.