THE EFFECTS OF TRAINING PRE-KINDERGARTEN TEACHERS TO USE SELF-MANAGEMENT STRATEGIES TO INCREASE AT-RISK STUDENTS' OPPORTUNITIES TO RESPOND TO LITERACY PROMPTS

by

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Abstract

Students with risk factors such as disability and poverty are at greatest risk for developing reading problems in school, and these reading deficits begin prior to kindergarten. Therefore, it is critical for teachers to address early language and literacy skills in pre-kindergarten (Pre-K) for all students, especially those who are at risk. Frequent opportunities for student responding (OTR) during language and literacy instruction has the potential to increase student engagement and ultimately improve academic achievement. However, evidence suggests that teachers do not elicit OTR at sufficient levels. One way to improve quality of literacy instruction is to train teachers to increase OTR. The purpose of this study is to examine the impact of training teachers in self-management strategies to increase their rate of OTR during language and literacy instruction, and to measure the impact on student responding and students' language and literacy growth. A multiple-baseline design across four Pre-K teachers was used to evaluate the degree of change in teachers' OTR, students' responding, and students' language and literacy skills. Results indicated that brief teacher training in OTR and self-management strategies increased teacher initiated OTR during whole group instruction. Student responding also increased during the intervention phase for three out of four teachers. Student mean alphabet knowledge increased for students in all four teachers' classrooms and impact was not demonstrated on vocabulary knowledge measures. Threats to internal validity impacted findings related to student outcomes. Implications for professional development practice and future research are discussed.

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CHAPTER I

INTRODUCTION

The No Child Left Behind Act of 2001 (NCLB) emphasized the need for effective reading instruction to address literacy problems in the United States where approximately two thirds of fourth grade students were not proficient readers according to the National Assessment of Education Progress (NAEP; U.S. Department of Education, 2002). More specifically, NCLB urged early childhood education programs to promote early language and literacy development in domains such as phonological and vocabulary skills. This recommendation was further supported by findings from the National Early Literacy Panel (NELP) which identified early language and literacy development as precursors to later reading skills (NELP, 2008). However, recent data from the NAEP suggest that the literacy problem continues to exist with 59% of fourth graders scoring below the proficiency level in reading (U.S. Department of Education, 2013). Evidence strongly suggests reading deficits begin prior to children entering kindergarten (NELP, 2008) especially for children from economically disadvantaged families (Hart & Risely, 2003; NELP, 2008; Storch & Whitehurst, 2002; Winsler et al., 2012). Therefore, children should receive quality language and pre-literacy instruction before entering kindergarten to improve school readiness and close the achievement gap for at-risk students.

State funded pre-kindergarten (Pre-K) programs attempt to promote school readiness across academic and social/emotional developmental domains (Barnett, Lamy, & Jung, 2005). State-funded Pre-K has been defined in published evaluations as programs in public schools or centers, including Head Start, for 4-year-olds that are funded in full or part by state education agencies and are operated under state and local education agencies (Barnett, Carolan, Squires, & Clarke Brown, 2013; Brown & Scott-

Little, 2003; Clifford et al., 2005). Currently, 40 states offer state-funded Pre-K programs and more than 1.3 million children attended Pre-K during the 2012-2013 school year (Barnett et al., 2013). Early studies of state-funded Pre-K found improved school readiness for participants (Gilliam & Zigler, 2001), and positively impacted child outcomes for vocabulary, print awareness and math (Barnett et al., 2005). Similarly, a recent study found improvements in phonological awareness and early reading skills for students who attended Pre-K compared to kindergarten children who did not (Skibbe, Hindman, Connor, Housey, & Morrison, 2013) suggesting the potential for Pre-K to improve reading readiness skills.

Despite increased availability of Pre-K programs across states and improved school readiness for preschoolers, children continue to lack readiness skills when they enter kindergarten (Claessens, Duncan, & Engel, 2009; Hair, Halle, Terry-Humen, Lavelle, & Calkins, 2006). In addition, instructional support and engagement in literacy activities in some Pre-K programs are low (Greenwood et al., 2012). The purpose of this chapter is to demonstrate why it is critical for Pre-K teachers to provide effective instruction in language and literacy. Rationale will be established based on (a) risk factors associated with children who lack readiness skills, (b) the relationship between early language and literacy development and later achievement in school, and (c) the effects of quality language and literacy instruction in Pre-K. This chapter will conclude with an overview of the research to support teachers' implementation of frequent opportunities to respond (OTR) as an effective instructional practice that has potential to increase quality of language and literacy instruction in Pre-K classrooms, and the importance of training Pre-K teachers to increase OTR.

Risk Factors

Students from economically disadvantaged families and students with disabilities are at greater risk for developing later reading problems (Denton Flanagan & McPhee, 2009; Jeon et al., 2011). This is largely due to varied experiences children are involved with in their natural environments from birth through their early years (Fewell & Deutscher, 2004; Rodriquez & Tamis-LeMonda, 2011). Children who live in poverty receive less exposure to language and positive communicative interactions with caregivers (Hart & Risely, 2003). In addition, children from low-income families have less exposure to literacy experiences (Burger, 2010). Therefore, children from economically disadvantaged families enter school with less developed vocabularies and pre-literacy skills compared to higher SES peers.

Academic differences already exist when children enter preschool among children from economically disadvantaged families and their higher SES peers (Rodriquez, & Tamis-LeMonda, 2011). Not only do students from low-income families enter school at a disadvantage, evidence also suggests that they do not receive equitable educational experiences in school. A multi-state study of Pre-K characteristics found that Pre-K classes with the greatest concentration of low-income students were more likely to be taught by teachers without a bachelor's degree (Clifford et al., 2005). Differences also exist in the type of early language and literacy experiences among students identified as at-risk due to poverty (Cabell, Justice, Konold, & McGinty, 2011). Findings suggested that children with lower language skills had limited engagement and participation in literacy activities (Cabell et al., 2011). Taken together, these finding suggested that

students who are in the most need of quality instruction may not be receiving equitable resources compared to their more advantaged peers.

Disability is another factor that puts preschool children at risk for less developed school readiness skills and problems with later achievement (Harrison, McLeod, Berthelsen, & Walker, 2009; Jeon et al., 2011; Scarborough et al., 2004). Children identified with suspected developmental delays before age three often have lower language and cognitive skills compared to children without disabilities at kindergarten entry (Jeon et al., 2011). In addition, children diagnosed with language impairment prior to becoming school-aged experienced later problems with decoding, spelling, and reading comprehension compared to a matched sample of typically developing preschoolers over time (Snowling, Bishop, & Stothard, 2000) and children with language impairment in kindergarten were more likely to be identified with a reading disability by fourth grade (Catts, Fey, Tomblin, & Zhang, 2002). Similarly, oral language impairment was also associated with slower rates of progress over time in phonemic awareness and word reading skills compared to non-disabled peers (Gillon, 2002). Further compounding the problem are the complex family mechanisms that influence child development such as the child's social and cognitive competence, family patterns of interaction, and the family's resources (Guralnick, 2011).

Considering the combined effects of poverty and disability, results of the National Early Intervention Longitudinal Study (NEILS) indicated that children who received early intervention services were twice as likely to receive welfare in the year of entry or year prior (Scarborough et al., 2004). More specifically, children born into poverty are at greater risk for language delays, and as children get older the discrepancy increases for

vocabulary of those raised in poverty compared to those who were not (Harrison et al., 2009; Hart & Risely, 2003). A comparison among students who received special education services indicated that low-income students had lower standardized test scores in reading and were less engaged in the classroom than higher SES peers who received similar special education services (US Department of Education, 2004). Further compounding the problem, data from a national survey of language arts teachers as part of the Special Education Elementary Longitudinal Study (SEELS) indicated that students with disabilities were less likely to participate in class discussions, complete writing assignments, or work on projects and presentations compared to students without disabilities. This finding was consistent across general education settings, special education settings in regular schools and in the small percentage of settings within special schools. In addition, students with disabilities were less likely to read aloud or silently (US Department of Education, 2009). Again, these findings suggest that children in need of the most practice are not receiving equitable opportunities compared to their higher-achieving peers. These findings go against recommendations by the National Associated for the Education of Young Children's shared position statement with the Division of Early Childhood (DEC) that young children, particularly those with disabilities, learn best when actively engaged in learning activities with peers and adults (DEC, 2007). Children who are at-risk for reading difficulties require more explicit, comprehensive, and intensive instruction than their typically developing counterparts (Foorman & Torgesen, 2001) but evidence suggests the opposite is occurring which may perpetuate the continued achievement gap among at-risk students. It is critical to address this

problem in Pre-K due to the relationship between early language and literacy skills and later achievement.

Relationship between Early Language/Literacy and Later Achievement

As described above, children enter school with differences in their language and early literacy skills due to a variety of risk factors associated with their environment and disability. These differences continue to exist later in children's schooling partly because early language and literacy skills are related to later achievement in school (Fewell & Deutscher, 2004; Hart & Risely, 2003). La Paro and Pianta (2000) conducted a meta-analysis of 70 published studies to determine the degree to which readiness domains at preschool or kindergarten were related to later performance in early elementary grades. Readiness domains were categorized as academic/cognitive skills and social/behavioral skills. Correlations between preschool and early grades for academic/cognitive skills yielded a moderate (r = .49) overall effect size and small effect size (r = .27) for social/behavioral predictors which suggested academic performance was a better predictor of later achievement in school than social/behavioral readiness skills. However, La Paro and Pianta (2000) did not examine specific academic skills within each domain that contributed to later achievement or influence of home or classroom contexts on student outcomes in their analyses.

Pre-K programs should emphasize specific language and pre literacy skills that contribute to more successful literacy outcomes. Lonigan, Burgess, and Anthony (2000) found that children's oral language, phonological skills, and letter knowledge in preschool predicted children's ability to decode in first grade. Similarly, Storch and Whitehurst (2002) examined specific language and early literacy skills as predictors of

later reading achievement and found that different types of skills were related to later decoding and comprehension skills. Their findings were consistent with previous analyses that established relationships between early language and later literacy skills (La Paro & Pianta, 2000; Lonigan et al., 2000) but demonstrated relationships between more specific skills as predictors. For example, oral language skills, such as vocabulary, were associated with comprehension and phonological skills were related to later decoding skills. Based on these findings, the authors highlighted the importance of promoting oral language and phonological skills in preschool particularly for students who are at-risk. The link between children's oral language skills, including vocabulary, and later reading fluency and comprehension was further supported by findings from a research synthesis conducted by the NELP (NELP, 2008).

Since early language and literacy skills predict later achievement, gaps in what children know and are able to do continue as children progress through school. Biemiller and Slonim (2001) found that the lowest achieving students in their sample had 2000 fewer words by second grade compared to average students and the gap continued to exist through fifth grade. Based on these findings, Biemiller and Slonim (2001) emphasized the importance of increasing vocabulary acquisition during early grades through targeted instruction. In addition to oral language skills and vocabulary, the NELP identified early language and literacy skills in Pre-K and kindergarten that were predictive of reading development in primary grades to include phonological skills, and knowledge of letter names and sounds. In a comparison of studies that used samples involving Pre-K and kindergarteners, findings revealed that assessments administered prior to kindergarten were similarly predictive of later reading skills as assessments

administered after kindergarten entry (NELP, 2008). This finding was consistent with La Paro and Pianta (2000) and supports that teachers can identify students most in need of language and literacy instruction prior to kindergarten to provide effective instruction that may prevent the achievement gap from widening.

Subsequently, Claessens et al. (2009) used data from the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K) to evaluate the predictive power of children's academic and social/emotional skills at kindergarten entry for later reading and math achievement through fifth grade. Results indicated that math and reading skills at kindergarten entry were related to fifth grade math and reading achievement. Interestingly, social/emotional variables were not significant predictors of later achievement except for attention which was third behind math and reading (Claessens et al., 2009). These findings also support the importance of promoting academic skills prior to kindergarten entry. If students improve foundational language and pre-literacy skills prior to kindergarten, it may improve their achievement trajectory. Out of 13 disability categories for special education, more than half of children eligible are identified with a Specific Learning Disability which is suggested to be partly due to ineffective early literacy instruction (Goldstein, 2011). Language and literacy instruction prior to kindergarten entry has the potential to increase school readiness and improve the achievement trajectory for at-risk preschoolers. The next section describes efforts to improve school readiness for at-risk children prior kindergarten.

Evidence to Support Early Language and Literacy Instruction

Government-funded early childhood programs were intended to improve school readiness and mediate effects of environmental risk factors (Barnett et al., 2005). One of

the most noteworthy examples of the profound effects of an early childhood initiative on outcomes for at-risk children was the Carolina Abecedarian Project. This project began in the late 1970s and targeted pregnant mothers who presented with an array of risk factors including poverty, health status, and intellectual disability (Ramey, Campbell, & Ramey, 1999). Results indicated significantly higher reading and math scores for two preschool treatment groups after five years in the study (Ramey et al., 1999). An early adolescent follow-up of participants at age twelve, found that the preschool treatment group made greater achievement gains compared to other conditions (Campell & Ramey, 1994) which lasted into adulthood (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002). This project along with the Perry preschool project, initiated in the 1960s, demonstrated the benefit of investing resources into early childhood programs for at-risk families. Longitudinal findings from the Perry Preschool Project suggested that high quality early childhood education improved long-term educational and social outcomes for participants (Weikart, 1998). These seminal projects demonstrated how critical preschool years are for at-risk children to improve their achievement trajectories.

Other studies of early childhood programs have documented academic and social gains for participants (Barnet et al., 2005) despite variations in program quality (Connor & Morrison, 2006; Peck & Bell, 2014). Results from the Head Start Impact Study found that three and four-year-olds who had access to Head Start programs demonstrated improved school readiness in kindergarten and first grade despite varied quality ratings according to the Early Childhood Environment Rating Scale (ECERS; Peck & Bell, 2014). Connor and Morrison (2006) examined preschoolers' language and literacy experiences and the relationship to students' vocabulary and emergent literacy

development. Observational data indicated variability in quality and quantity of language and literacy instruction across programs and classrooms with some classrooms spending up to 90 minutes on language and literacy instruction or play and some spending as little as four minutes (Connor & Morrison, 2006).

It has become a priority to identify quality features of early childhood programs that positively impact student social and academic outcomes. Recent studies have demonstrated improved short-term outcomes for young children who attended quality childcare prior to kindergarten (Cote et al., 2013) and long-term improvements in cognitive, academic, and language outcomes were obtained in relation to the degree of quality on classroom observational measures (Vandell et al., 2010). In addition, children with disabilities who attended quality school-based Pre-K programs demonstrated improved kindergarten literacy readiness (Phillips & Meloy, 2012). Classroom quality has been categorized by structural program features and contextual or process quality (Raspa, McWilliam, Ridley, 2001). Structural quality features include class size, staff education level, length of day, and location of setting. Process quality features include classroom management, teacher interactions with students, and allocation of instructional time (Raspa et al., 2001).

A series of studies involving a large sample of Pre-K students across multiple states examined structural program features and classroom quality in relation to student social and academic outcomes (Burchinal et al., 2008; Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Clifford et al., 2005; Pianta et al., 2005; Early et al., 2006; Howes et al., 2008). However, it should be noted that students who were eligible for special education were not included in the sample. Pianta et al. (2005) found that many Pre-K programs

had high levels of structural quality such as length of day, teacher qualifications, and class size but that quality of instructional support was generally low. Researchers who examined effects of structural features of Pre-K program quality found modest improvements in academic and social/emotional readiness outcomes (Clifford et al., 2005; Early et al., 2006) which was consistent with previous findings (Gilliam & Zigler, 2001).

Howes et al. (2008) studied aspects of process quality in Pre-K classrooms as they related to student outcomes on measures of academic and social development. Process quality refers to what teachers are actually doing in the classroom. Two observational measures captured classroom process quality in terms of quality teacher-child interactions and instructional engagement. Specific to language and literacy skills, Howes et al. (2008) found that children demonstrated more growth in classrooms where teachers provided more opportunities for engagement in conversations with adults, naming letters, and participation in phonemic awareness activities. Burchinal et al. (2008) extended this work to examine if effects on literacy skills persisted through the end of kindergarten. Their findings indicated that quality of teachers' instruction in Pre-K predicted language and reading skills at the end of kindergarten. Their findings were attributed to "the extent to which teachers interacted positively with students and promoted the use of language in the classroom and provided informative feedback" (Burchinal et al., 2008, p. 150). In a subset of low-income students who attended Pre-K programs in the sample, Burchinal et al. (2010) also found improved social and academic skills for students in classrooms with high quality teacher-student interactions and instructional engagement. Findings taken together from these studies of Pre-K programs across multiple states suggest that children

receive benefit from attending Pre-K programs but benefits are enhanced and long-lasting when children attend programs that rate higher on measures of classroom quality related to teacher instruction or process quality. These findings are particularly important for at-risk students to increase school readiness and promote a more successful achievement trajectory. Therefore, it is critical for early childhood teachers to implement effective instruction to promote OTR for all students, especially for at-risk students.

Frequent Opportunity to Respond

Student engagement is broadly defined in the literature to include the child's interaction with materials and people in their environment, attention, active responding, and academic tasks (Fredricks, Blumenfeld, & Alison, 2004; McWilliam, Scarborough, & Kim, 2010). Student engagement is recommended to measure program quality and to make decisions about programming (Kishida & Kemp, 2006). Opportunity to respond (OTR) is one aspect of student engagement that is measurable and associated with higher rates of student task engagement (Haydon, Mancil, & Van Loan, 2009; Sutherland & Wehby, 2001a). OTR is a teacher initiated behavior that elicits a student response. Greenwood, Delquadri, and Hall (1984) defined OTR as "the interaction between: (a) teacher formulated instructional antecedent stimuli, and (b) their success in establishing the academic responding desired or implied by the materials" (p. 64). Invited responses can include verbal, gestural, or written responses from students (Simonsen, Myers, & DeLuca, 2010). Researchers have also characterized OTR as a variation of four variables to include (a) teacher instructional talk, (b) prompts, (c) wait time for response, and (d) praise for correct responding (Sutherland, Adler, & Gunter, 2003; Stichter et al., 2009).

Early studies identified frequent OTR as an effective instructional practice associated with increased student achievement (Christenson, Ysseldyke, & Thurlow, 1989) and frequent OTR was identified as an evidence-based classroom management practice associated with improved student outcomes (Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). More specifically, increased OTR was associated with improved achievement and behavior for students in general education (Simonsen et al., 2008), special education (Sutherland & Wehby, 2001a), and students who were at-risk (Conroy, Sutherland, Vo, Carr, & Ogston, 2014). Increasing rates of OTR was also associated with improved reading achievement (Burns, 2007; Skinner, Smith, & McLean, 1994). Benefits of increased OTR include increased engagement, more opportunities for students to practice skills, and immediate feedback for teachers to monitor student understanding (Sutherland & Wehby, 2001b). Increased OTR was also related to higher rates of praise and improved teacher-student interactions which are variables associated with positive student outcomes (Sutherland, Wehby, & Yoder, 2002).

The Council for Exceptional Children (CEC) provided guidelines for teacher to elicit opportunities for students to respond frequently during instruction and for practice of new skills (Sutherland & Wehby, 2001b). Despite evidence of frequent OTR as an effective instructional practice and recommendations by CEC, teachers do not elicit OTR at sufficient levels (Sutherland & Wehby, 2001b; Whitney, Cooper, & Lingo, 2015). More specifically, students receive fewer OTR in low income schools (Greenwood et al., 1984), and in classrooms with students with behavioral problems (Scott, Alter, & Hirn, 2011). In addition, teachers provide fewer OTR to students with communication needs (Pufpaff, 2008), and to students who are at-risk for school failure (Stichter et al., 2009).

Therefore, children who need the most repetition are offered less opportunities to practice their skills.

Considering the stability of language and literacy performance over time (NELP, 2008) and risk factors associated with children who lack readiness skills upon school entry (Hart & Risely, 2003), it is imperative teachers use effective instructional practices in Pre-K classrooms during language and literacy instruction. OTR was identified as an effective instructional practice associated with improved student outcomes (Christenson et al., 1989; Simonson et al., 2008; Wehby, 2001a). The quantity and quality of OTR in Pre-K classrooms has potential to increase student engagement and ultimately improve academic achievement in later grades (Greenwood, 1999).

One way to improve quality of early childhood language and literacy classrooms is to train teachers to increase the opportunities for their students to respond. Teacher training on its own does not always result in changing teacher behavior (Fixen, Naoom, Blasé, Friedman, & Wallace, 2005). Snyder, Hemmeter, and McLaughlin (2011) described the evolution of Pre-K teacher training moving from isolated workshops to more comprehensive models. Emerging models of teacher training are consistent with recommendations based on results from a national sample of teachers which suggested teacher training, sometimes referred to as professional development, was more effective when it was (a) focused on academic content, (b) intensive and sustained over time, and (c) integrated in authentic contexts (Garet, Porter, Desimone, Birman, & Yoon, 2001). In addition, evidence suggests that training must contain follow-up to change teacher behaviors (Snyder et al., 2011). Follow-up can include a series of training sessions (Cusumano, Armstrong, Cohen, & Todd, 2006; Jackson et al, 2006; Powell, Diamond,

Burchinal, & Koeler, 2010; Wasik, Bond, & Hindman, 2006), coaching (Cabell et al., 2011; Girolametto et al., 2012; Powell et al., 2010), consultation (Mashburn, Downer, Hamre, Justice, and Pianta, 2012), and performance feedback (Mashburn et al., 2008; Simonsen et al., 2010; Wasik et al., 2006). While studies have demonstrated impact on both teacher and student outcomes using training models that included these types of follow-up, additional training, coaching, and performance feedback rely on another trained professional to provide these supports and in the absence of that individual effects may not be sustained. Self-monitoring is an effective strategy to improve student performance. Similarly, teachers can be taught to self-monitor their use of effective instruction (Simonsen, MacSuga, Fallon, & Sugai, 2013), and to monitor how students respond to instruction.

Purpose of This Study

The purpose of the current investigation was to examine the impact of training teachers to increase their students' OTR during language and literacy instruction, and measure the students' growth in alphabet knowledge and oral language skills. Effective instruction was measured through rates of literacy related OTR and student responding was measured based on frequency of student responses. Oral language skills were measured based on weekly curriculum-based measures of vocabulary and alphabet knowledge was measured using a curriculum based measure of upper-case letters. This investigation extended research examining teacher use of literacy-specific OTR and impact on Pre-K students' academic development (e.g., Gettinger & Stoiber, 2014), but added to the existing literature on training teachers to self-monitor and evaluate their own performance of targeted skills. In addition, the teacher training in the current

investigation incorporated a mechanism for teachers to become aware of students who were low- or non-responders. There is a need for this type of awareness due to evidence that suggests at-risk students are offered fewer opportunities to practice their skills in the classroom (Pufpaff, 2008; Stickter et al., 2009) and are less engaged in school (US Department of Education, 2004).

Research Questions

The investigation was guided by the following research questions:

- Does individualized teacher training with self-monitoring increase OTR initiated by Pre-K teachers during whole-group instruction?
- Does training Pre-K teachers to increase OTR affect student responding in Pre-K classrooms?
- Does increased student OTR affect their language and pre-literacy skill levels?

CHAPTER II

LITERATURE REVIEW

The purpose of this literature review is to provide a summary of research relating to (a) frequent opportunity to respond (OTR) as an effective instructional practice in early childhood settings, and (b) teacher training that has impacted language and literacy outcomes for preschool-aged students. The chapter begins first with defining key terms associated with OTR. Second, the rationale for increasing OTR as an effective instructional practice is discussed. Third, the strategies studied to increase OTR in early childhood settings are summarized followed by studies of teacher training to increase teacher implementation of OTR strategies. Fourth, various teacher training follow-up methods are highlighted regarding their potential to improve and sustain effects of teacher training. Finally, the, rationale for the current investigation is described.

Frequent OTR as Effective Instruction

Effective instruction actively engages all students in the learning process and is critical to positively impacting student achievement (Christenson et al., 1989; Ladd & Dinella, 2009). Student engagement is broadly defined in the literature to include attention, active responding, and completing academic tasks (Fredricks et al., 2004; McWilliam et al., 2010). Opportunity to respond (OTR) is one aspect of student engagement that is measurable and associated with higher rates of student task engagement (Sutherland & Wehby, 2001a). OTR is a teacher initiated behavior such as questioning, prompting, or cuing that provokes a student response (Conroy, Sutherland, Snyder, & Marsch, 2008). Greenwood, Delquadri, and Hall (1984) defined OTR as "the interaction between: (a) teacher formulated instructional antecedent stimuli, and (b) their

success in establishing the academic responding desired or implied by the materials" (p. 64). Invited responses can include verbal, gestural, or written responses from students (Simonsen, Myers, & DeLuca, 2010). Researchers have also characterized OTR as a variation of four variables to include (a) teacher instructional talk, (b) prompts, (c) wait time for response, and (d) praise for correct responding (Sutherland, Adler, & Gunter, 2003; Stichter et al., 2009). This review focuses on invited responses and prompts initiated by teachers to provoke student responses.

Early researchers identified frequent OTR as one of ten effective instructional practices based on their review of the literature (Christenson et al., 1989) and frequent OTR was identified recently as an evidence-based classroom management practice associated with improved student outcomes (Simonsen, Fairbanks, Briesch, Myers, & Sugai, 2008). More specifically, increased OTR was associated with improved achievement and behavior for students in general education (Armendariz & Umbreit, 1999; Haydon, Mancil, & Van Loan, 2009; Simonsen et al., 2008), special education (George, 2010; Sutherland & Wehby, 2001a), and students who were at-risk (Conroy, Sutherland, Vo, Carr, & Ogston, 2014; Haydon et al., 2010). Increasing rates of OTR was also associated with improved reading achievement (Burns, 2007; Skinner & Shapiro, 1989; Skinner, Smith, & McLean, 1994). Benefits of increased OTR include increased engagement, more opportunities for students to practice skills, and immediate feedback for teachers to monitor student understanding (Sutherland & Wehby, 2001a). Increased OTR was also related to higher rates of praise and improved teacher-student interactions which are variables associated with positive student outcomes (Sutherland, Wehby, & Yoder, 2002). Strategies studied to increase OTR include increased presentation rate

(Carnine, 1976), choral responding (Haydon & Hunter, 2011), response cards (George, 2010; Lambert, Cartledge, Heward, & Lo, 2006), peer mediated strategies (Delquadri, Greenwood, Whorton, & Hall, 1986) and guided notes (Heward, 1994). The following section summarizes research related to OTR strategies studied in early childhood settings.

Strategies to Studied to Increase OTR

Strategies to increase OTR include increased presentation rate (Carnine, 1976), choral responding (Haydon, Marscicano, & Scott, 2013), response cards (Heward, 1994), and peer mediated methods (Delquadri et al., 1986). Guided notes (Heward, 1994) was also identified as a strategy to increase OTR, but has not been studied with young children and may not be developmentally appropriate in Pre-K and kindergarten classrooms. Table 1 displays the strategies and interventions studied to increase OTR with descriptions, population studied, and findings. Strategies are also described below.

Increased Presentation Rate. Carnine (1976) provided early evidence that low-achieving students benefit from fast instructional pacing with brief wait-time between prompts. Fast paced instruction involved the teacher presenting a new question or prompt within one to four seconds of student responses. Conversely, slow paced instruction involved a five second or longer pause after the students responded. Results suggested that faster pacing reduced off-task behavior, and increased accurate responding and participation. These findings were replicated by Tincani and Crozier (2008) with two first graders who attended a non-public setting for students with learning and behavioral needs. Carnine (1976) and Tincani and Crozier (2008) found positive effects of fast instructional pacing with first graders with and without disabilities. Effects of varied presentation rates were also studied with students in early childhood settings (Lamella & Tincani, 2012; Tincani, Ernsbarger, Harrison, & Heward, 2005).

Tincani et al. (2005) compared the effects of fast and slow instructional pacing with typically developing Pre-K students who were at risk of learning problems due to high rates of off-task behavior during language instruction. Fast paced instruction was measured by four or fewer seconds between student responses and the next OTR, and slow paced instruction involved five to 26-second wait time from student response to the next teacher prompt. The results indicated that fast-paced instruction increased OTR, response accuracy, and decreased off-task behavior for the targeted students. Lamella and Tincani (2012) replicated previous instructional pacing research (Carnine, 1976; Tincani et al., 2005) with two children diagnosed with autism during one-to-one instruction at an early childhood center and achieved similar findings. Their study provided additional evidence that fast instructional pacing also increases OTR and accuracy of responding for young children diagnosed with autism.

Choral Responding. Choral responding refers to the teacher issuing a question or prompt with the expectation that all students will respond in unison. Sainato, Strain, and Lyon's (1987) results suggested choral responding increased rate and quality of student responses and decreased behavior problems of students identified with developmental delay who received services in a special education preschool classroom. In a systematic review of published studies that compared choral and individual responding, Haydon, Marscicano, & Scott (2013) found that choral responding was more effective than individual responding for increasing OTR and decreasing disruptive behavior for students with disabilities. Five of the six studies reviewed involved early elementary aged students; one involved preschool aged students (Godfrey, Grisham-Brown, Schuster, & Hemmeter, 2003) and one included kindergarteners in their sample that extended to grade

five (Kamps, Dugan, Leonard, & Daoust, 1994). Additionally, only one study in the review reported data on accuracy of responses and noted small improvements in accuracy in favor of choral responding (Kamps et al., 1994).

Godfrey et al. (2003) used an alternating treatment design to compare the effects of choral responding, cue card responding, and traditional hand raising on active responding, on-task behavior, and inappropriate behavior of three and four year olds with attention concerns at a public preschool. Choral responding for this study involved the teacher reminding all students to respond to the question and then either expanded on students' correct responses or provided corrective feedback for incorrect responses. Data from the study indicated that students responded more frequently in the choral responding condition compared to hand-raising. However, data were not collected for accuracy of responses. Kamps et al. (1994) did report data on accuracy of responding and found improved accuracy in choral responding conditions, but included students in kindergarten through fifth grade were included in their sample.

Response Cards. Response cards is another strategy studied to increase OTR (Heward, 1994). Response cards involve pre-printed or write-on cards that students hold up to respond to teacher prompts or questions (Heward, 1996). Benefits of response cards include increased academic responding, decreased behavior problems, and increased achievement (Narayan, Heward, Gardner, Courson, & Omness, 1990). In addition, response cards allow teachers to monitor accuracy of responses and student understanding (Heward, 1996). Response cards may also engage learners who are reluctant to respond due to low self-efficacy or delayed language skills (Berrong, Schuster, Morse, & Collins, 2007; Skibo, Mims, & Spooner, 2011).

Randolf (2007) conducted a meta-analysis of 18 studies that compared the effects of response cards to traditional hand raising. The findings suggested students had 50% more OTR in the response card condition. In addition, students performed better on tests and quizzes and had fewer behavior problems in the response card groups. There were no significant differences found between pre-printed response cards and student written responses. Although the analysis included 18 studies, only two of them involved preschool-aged children (e.g., Godfrey et al., 2003) and an unpublished master's thesis. Studies conducted after the meta-analysis (Randolph, 2007) involved older students (e.g., Berrong, et al., 2007; George, 2010) with the exception of Wood, Mabry, Kretlow, Ya-yu, and Galloway (2009) which will be discussed below. Horn (2010) reviewed published literature on the effects of response cards on OTR, correct responses, and behavior for students with disabilities. Only six published studies were identified based on their criteria, but all supported the effectiveness of response cards on active student responding. Again, only one study involved preschool aged students (Godfrey et al., 2003).

Godfrey et al. (2003) used an alternating treatment design to compare the effects of choral responding, cue card responding, and traditional hand raising on active responding, on-task behavior, and inappropriate behavior of three and four year olds with attention concerns at a public preschool. For the response card condition, each student was issued a response board with up to four, pre-printed choices depending on the question and was provided with the same type of feedback as in other conditions. Data from the study indicated that students responded more frequently in the response card condition than all other conditions and most students responded more in choral

responding condition than during hand raising. This was the first published study to examine the effects of response cards with preschool aged students (Godfrey et al., 2003). However, data were not collected for accuracy of responses.

More recently, Wood et al. (2009) examined the effects of preprinted response cards on participation and behavior during instruction with four kindergarteners identified for their lack of participation and off-task behavior in a rural general education classroom. Participation was defined as responding to teacher questions, hand-raising, or holding up preprinted response card in response to teacher prompting or questioning. Wood et al. (2009) used a reversal design to demonstrate experimental control during hand-raising and response card phases. Results indicated increased participation and decreased off-task behavior for all four target students during the response card phases. When the response cards were removed, students' rate of participation and off-task behavior returned to previous levels. This study was one of few that studied the effects of response cards with children in early childhood settings. The study provided evidence suggesting response cards can be used with young children effectively. However, the authors reported lack of student achievement measures as a limitation and suggested future research measure the impact on academic gains.

Peer-Mediated Methods. Peer mediated methods increase student responding and are associated with improved academic achievement (Utely, Mortweet, & Greenwood, 1997). Peer mediated methods increase learning in heterogeneous classrooms by increasing academic engaged time and by providing more opportunities to practice skills. In addition, teachers can monitor student responses and students receive timely feedback from peers. Peer-mediated methods include but are not limited to Class-

wide peer tutoring, Peer Assisted Learning Strategies (PALS), reciprocal peer tutoring, and peer mediated instruction (Utely et al., 1997).

Class-wide peer tutoring (CWPT) was developed as part of the Juniper Gardens Children's project intended to improve outcomes for children who were at-risk due to poverty, language status, or disability in urban Kansas City (Delquadri et al., 1986). CWPT involved randomly or strategically pairing students into tutor-tutee dyads, and teachers provided students with specific procedures for peer tutoring sessions. All students engaged in peer tutor sessions simultaneously. Therefore, the program increased OTR as all students engaged in active responding while the teacher circulated to monitor student progress. Early studies of CWPT involved students in third through sixth grades and demonstrated positive effects on spelling, oral reading rate, and math facts (Delquadri et al., 1986). In addition, positive effects were found even when teachers implemented the program in part, however effects were likely deflated (Greenwood & Delquadri, 1995).

Similar to CWPT, Peer-Assisted Learning Strategies (PALS) is an evidence-based reading program that incorporates peer-tutoring to address diverse learning needs in general education classrooms (McMaster, Fuchs, Fuchs, & Compton, 2005). Kindergarten Peer Assisted Learning Strategies (K-PALS) extended the principals of PALS to supplement beginning reading instruction in general education kindergarten classrooms (Fuchs et al., 2001). K-PALS includes scripted lessons and prescribed methods for pairing higher- with lower-performing students. Experimental group studies determined the effectiveness of K-PALS on reading achievement for students with and without disabilities (Fuchs et al., 2001; Rafdal, McMaster, McConnell, Fuchs, & Fuchs,

2011), and English Language Learners (ELL; McMaster, Shu-Hsuan, Insoon, & Cao, 2008) in general education settings. However, analyses at the student level indicated some students with disabilities made little to no growth suggesting lack of responsiveness to the K-PALS intervention (Rafdal et al., 2001).

Although, packaged programs such as CWPT and K-PALS include peer-mediated strategies to increase OTR and ultimately student leaning, other studies have examined the effects of peer-mediated strategies to increase OTR. Kamps et al. (1994) compared traditional small group instruction to enhanced small group instruction with peer-to-peer responding with kindergarten through fifth grade students. Results indicated increased OTR, greater levels of student responding, and gains on weekly assessments during small group instruction when teachers implemented the instructional strategies.

Taken together a variety of strategies are available to teachers with evidence of effectiveness in early childhood settings. However, teachers may not implement OTR strategies frequently or consistently possibly due to lack of awareness or preparation (Kent, Wanzek, & Otaiba 2012). Therefore, teacher training is needed to increase teacher use of OTR strategies in early childhood settings.

Teacher Training

One way to improve quality of effective instructional practices within early childhood language and literacy environments is through teacher training sometimes referred to as professional development (PD; Buysse et al., 2009; Dickenson & Caswell, 2007). However, PD on its own does not always result in changing teacher behavior (Fixen et al., 2005), and poorly designed training can lead to teachers' unwillingness to embrace new ideas (Knight, 2007). Snyder et al. (2011) described the evolution of early childhood PD moving from isolated workshops to more comprehensive models.

Emerging models of early childhood professional development are consistent with recommendations based on results from a national sample of teachers which suggested PD was more effective when it was (a) focused on academic content, (b) intensive and sustained over time, and (c) integrated in authentic contexts (Garet et al., 2001). In addition, evidence suggests that training must contain follow-up to change teacher behaviors (Snyder et al., 2011). Follow-up can include a series of training sessions (e.g., Girolametto, Weitzman, & Greenberg, 2012; Wasik et al., 2006), coaching (e.g., Landry, Swank, Smith, Assel, & Gunnewig, 2006; Powell, Diamond, Burchinal, & Koehler, 2010), and performance feedback (e.g., Simonsen, Meyers, & DeLuca, 2010; Mashburn, Downer, Hamre, Justice, and Pianta, 2012). While studies have demonstrated impact on both teacher and student outcomes in early childhood settings using training models that included these types of follow-up, additional training, coaching, and performance feedback rely on another trained professional to provide these supports. One type of follow-up that requires minimal resources is when the teacher is taught to manage their own teaching behavior. Self-management strategies are not only beneficial for improving student behaviors (Briesch & Daniels, 2013), and but may also be effective for improving desirable instructional behaviors for teachers (Simonsen, MacSuga, Fallon, & Sugai, 2013).

The following sections describe how teachers have been trained to increase OTR in classroom settings. In addition, specific features of teacher training are highlighted to include type of training and follow-up (coaching, performance feedback, or self-management). However, it should be noted that there is some overlap. For example, the intervention implemented with teachers in the study conducted by Sutherland and Wehby

(2001) included both performance feedback from a consultant in addition to self-management strategies.

Training in OTR Strategies

A variety of strategies with evidence of effectiveness are available for teachers to increase OTR in early childhood settings as described in the previous section. However, evidence suggests teachers may not implement at sufficient levels (Sutherland & Wehby, 2001b), particularly in low income schools (Greenwood et al., 1984), in classrooms with students with behavioral problems (Scott et al., 2011), or with students with communication needs (Pufpaff, 2008). Therefore, teachers may require training to implement effective instructional practices such as providing frequent OTR.

Sainato and colleagues (1987) used a changing criterion design to investigate the effects of increased OTR on rate and quality of student responses of 10 preschool aged children with developmental delay in a special education preschool classroom. Teachers were trained to call on individual students, issue whole group prompts, and to model appropriate responses using the game "Simon Says" with choral responding and increased presentation rate. Teachers practiced procedures with other teacher participants using role-play during a series of professional development sessions. The results indicated that as teachers increased OTR during instruction, student responding and accuracy increased. In addition, problem behavior decreased. This study provided initial support that early childhood educators can be trained to implement effective instructional practices to increase OTR and impact student responding and on-task behavior in self-contained, preschool classrooms.

In a later study, Kamps et al. (1994) compared the effects of business as usual small group language instruction to small group instruction after teachers received training in effective instructional strategies to increase OTR. The sample included students in kindergarten through fifth grade who received their instruction in self-contained settings. Teachers received training in effective instructional strategies to include choral responding, student-to-student responding, and random responding. The training consisted of one hour discussion of strategies with handouts, demonstration of strategies with students, and feedback to teachers based on observations of initial small group sessions. Results indicated increased OTR, greater levels of student responding, and gains on weekly assessments during small group instruction when teachers implemented the instructional strategies. Increased responding was attributed to choral responding and student-to-student responding. In addition, increased rates of accurate responding were found during intervention phases. However, a few students did not make gains comparable to others. The authors suggested attendance and cognitive differences may have impacted gain for these students. Overall, effects were positive and provided evidence to suggest that teachers should be trained in strategies to increase student responding. However, further investigation is needed to determine how teachers can also meet the needs of low-responders such as those who did not make similar gains in this study.

Similarly, Dufrene and colleagues (2012) investigated the effects of teacher training to increase variables associated with OTR, specifically praise and effective instruction. Their findings suggested that teacher training alone is not enough to improve teacher practice and that teaching behaviors only improved when training was

individualized with performance feedback (Dufrene et al., 2012). This finding was consistent with recommendations that effective PD must include follow-up to impact teacher change (Garet et al., 2001; Snyder et al., 2011). Gettinger and Stoiber (2014) employed a multiple-baseline design across teachers to study the effects of increased print-referencing OTR during storybook reading for pre-school aged children during a summer program. Teachers received instruction in the concept of OTR and print-referencing strategies, and a sequence of specific books with scripted book reading guides to use during language and literacy instruction. Researchers conducted two, brief follow up sessions to highlight examples of the teachers' own used of print-referenced OTR during observed book reading session. Researchers observed teachers twice weekly using a frequency count for print-referenced OTR. Results indicated that teachers increased print-referenced OTR immediately following training. Student data were also collected for observed responses, print knowledge, and alphabet knowledge. Results indicated that when teachers increased print-referenced OTR, student responding increased and students achieved greater accuracy on probes of alphabet knowledge and concepts about print (Gettinger & Stoiber, 2014). The findings suggest that brief training with follow-up in print-related OTR can impact teacher behavior and student outcomes. The authors did not conduct a maintenance probe to examine lasting effects of the intervention on teacher behavior and student outcomes due to limited time during the summer program. Future researcher should examine lasting effects of the intervention over time.

Gettinger & Stoiber (2014) provided initial evidence that training in literacy-related OTR has positive impacts on both teachers and students. However, researchers

provided teachers in their study with books and scripted materials to use during the intervention which may limit generalizability of the findings to teachers and programs who used the specific literature with scripted guides. Future research should examine if teachers can be trained to implement literacy-related OTR with their existing curriculum materials.

Training with Coaching. Coaching refers to when a trained individual works along with teachers on-site to encourage and increase use of instructional practices in the classroom (Knight, 2007). Peers (other teachers) can also be trained to coach their colleagues. For example, Stichter, Lewis, Richter, Johnson, and Bradley (2006) compared two types of teacher training in four essential OTR features on students' academic and social behaviors for students in kindergarten through fifth grade across two elementary schools during literacy instruction. The four essential features were antecedent variables to include (a) amount of teacher instructional talk, (b) teacher initiated prompts, (c) wait-time, and (d) praise for correct responding (Stichter et al., 2006). Teachers received initial in-service to introduce the four OTR variables and subsequent trainings focused on one OTR variable every four weeks totaling 16 weeks. Eight teachers also received training in and implemented peer coaching using performance feedback. Student academic and social outcomes were measures using work samples to compare growth and pre- and post-literacy scores on district literacy assessments. The results indicated that most students improved in work product compared to baseline and growth corresponded with teacher change. Teacher implemented OTR increased more quickly for teachers who participated in peer coaching but slight improvements in student academic gains were found in favor of the in-service group. However, teachers selected students for data

collection and to target for intervention. Therefore, teacher bias may have influenced the outcomes. Despite limitations, the study provided additional evidence that teachers can implement a variety of strategies to increase student responding and improve student outcomes. Future studies are needed to determine if peer coaching is effective to increase teacher implementation of strategies with impact on student outcomes. The study demonstrated that OTR and praise statements are interdependent as increases in praise corresponded to increased OTR. Perhaps if teachers were also trained in other strategies to increase OTR, better results may have been achieved. The following study describes a multi-component teacher training that includes OTR strategies.

Conroy et al. (2014b) studied the effects of the Behavioral, Emotional, and Social Training: Competent Learners Achieving School Success (BEST in CLASS) which is an intervention package intended to prevent and respond to persistent behavior problems in young children who are at risk of emotional and behavioral disturbance (EBD) in early childhood settings. The intervention consisted of training teachers, and providing practice-based coaching and performance feedback to implement effective instructional practices to prevent problematic behavior. The training included seven modules, one of which focused specifically on OTR to increase student engagement. The other modules included instruction in rules and routines, behavior-specific praise, active supervision, teacher feedback, home-school communication, and linking to mastery. Among other effective teaching practices, OTR and target student engagement were observed and coded pre- and post-intervention. Results indicated teachers' use of OTR increased from baseline to strategy training completion. Impact on student outcomes included increased student engagement and decreased disruptive behaviors. Conroy et al. (2014b) provided

evidence to support the use of BEST in CLASS intervention to increase use of effective instructional practices, including OTR, in early childhood settings. The findings suggested that a series of teacher training modules, with coaching and performance feedback was effective for increasing effective instruction for students at risk for EBD in early childhood settings. However, the intervention studied did not measure impact on students' language and literacy outcomes as the emphasis was on student behavior. In addition, results of a follow-up conducted by Conroy et al. (2014a) indicated that rates of OTR returned to baseline levels once the intervention ended. The studies described above taken together provide mixed results for coaching as an effective follow-up strategy for PD to increase rates of OTR in classroom settings. This may be due to the different ways in which coaching was delivered and variation among individual coaches' training and skill.

Training with Performance Feedback. Teacher training with performance feedback has shown promise for increasing teachers' use of effective instructional practices in early childhood settings (Barton, Pribble, & Chen, 2013; Barton & Wolery, 2007; Casey & McWilliams, 2011; Fox, Hemmeter, Snyder, Binder, & Clarke, 2011). Performance feedback refers to verbal, written, or visual feedback related to an individual's observed implementation of an intervention to increase or improve future implementation (Casey & McWilliams, 2011). Specific to increasing OTR, Cavanaugh (2013) conducted a systematic review of experimental studies that examined the effects of performance feedback on teacher use of OTR and praise statements.

Cavanaugh (2013) reviewed 24 studies that examined rates of praise as the dependent variable but only three studies examined effects on OTR. Out of the three

studies that examined effects of performance feedback on OTR, one involved middle and high school teachers (Simonsen et al., 2010), one included three pre-service teachers across elementary, middle, and high school (Capizzi, Wehby, & Sandmel, 2010), and one involved 20 teachers in kindergarten through eighth grade classrooms (Sutherland & Wehby, 2001b). Simonsen et al. (2010) found that a series of teacher training modules alone did not impact teacher implemented OTR, but when performance feedback was provided teachers increased their use of OTRs. Teachers received daily performance feedback provided by the researchers during the performance feedback condition. The findings suggested that performance feedback may be an effective follow-up training strategy to increase teacher implemented OTR. Conversely, Capizzi and colleagues' (2010) findings for effects of performance feedback on OTR rate were mixed. The rate of OTR was variable but low across all three participants during baseline, and only two of the participants increased their rate of OTR during performance feedback conditions. Out of the two participants who showed improvement, one had a decreasing trend over the last three observation sessions. Their findings suggested that training with performance feedback may not impact teacher implementation of OTR strategies for all participants. Cavanaugh (2013) concluded that training to increase and maintain frequent OTR may require content specific instruction and or other training features with potential to reinforce teacher implementation.

Also included in Cavenaugh's (2013) review, Sutherland and Wehby (2001b) trained teachers who taught in self-contained classrooms for student diagnosed with EBD to provide their own performance feedback by audio recording segments of lessons, and graphing praise statements. Data were collected on rates of OTR but teachers did not self-

evaluate rates of OTR. Teachers increased their rate of praise and OTR during the intervention but did not maintain effects when the intervention was removed. Teachers in the study reported self-evaluation as an acceptable treatment that they believed benefited their students. However, lack of maintenance of effects suggest that further investigation is needed to determine the best way for teachers to evaluate their own performance. The next section summarizes studies of teacher training in self-management strategies intended to improve targeted teaching behaviors.

Teacher Training in Self-Management. Self-management involves self-recording of data, self- evaluation, and goal setting (Alberto & Troutman, 2013; Mace, Belfiore, & Hutchinson, 2001). Self-recording and self-evaluation are also referred to as self-monitoring which involve identifying a target behavior and providing systems to monitor that behavior (Alberto & Troutman, 2013). Self-management increases an individual's awareness of their own behavior so that desired behaviors can be targeted for improvement (Briesch & Daniels, 2013). Various forms of self-management strategies have been studied and have positively impacted targeted instructional behaviors with paraprofessionals who work with students with disabilities (Petscher & Bailey, 2006), a secondary special educator in a self-contained setting (Kalis, Vannest, & Parker, 2007), special educators who taught in self-contained classrooms for students with EBD (Sutherland & Wheby, 2001b), pre-service teachers in their practicum settings (Hagar et al., 2012; Keller, Brady, & Taylor, 2005; Lylo & Lee, 2013), and pre-school teachers who taught in Head Start classrooms (Wright, Ellis, & Baxter, 2012).

The ways in which teachers were taught to monitor their teaching behavior varied across studies to include teachers listening to audio after instruction (Keller et al., 2005;

Lylo & Lee, 2013), viewing their own video after instruction (Hagar, 2012; Wright et al., 2012), or using a hand-held tally-counter during instruction (Kalis et al., 2007; Simonsen et al., 2013). Keller et al. (2005) studied the effects of self-evaluation on three pre-service teachers' use of specific praise in self-contained classrooms with students who had developmental disabilities. The pre-service teachers made predictions, audio-recorded instruction, and counted the frequency of praise statements while listening to audio tapes. The results indicated an increase in praise statements from baseline to intervention and maintenance. However, there was variability in the data during intervention and maintenance phases with some points returning to baseline levels.

Hagar (2012) studied the effects of a video self-monitoring strategy to increase one pre-service teacher's use of specific praise and OTR and seven pre-service teachers' self-selected teaching practices. The self-monitoring procedures involved having the pre-service teachers video-tape themselves during 20-minutes of instruction, view the video, record the occurrence of the targeted behavior, and graph the results. The results indicated that one teacher increased rates of specific praise to criterion set by the researcher with the self-monitoring strategy and that OTR increased slightly but not to criterion. Pre-service teachers who self-selected targeted behaviors met criterion. However, these were case studies that did not employ experimental procedures to make causal statements about the self-monitoring strategy. The researcher reported that social validity was not measured but teachers reported benefits, such as the strategy helped them improve their teaching, and challenges such as time to set up, view, and record data from the video. Wright et al. (2012) also studied the effects of video self-evaluation on Head Start teachers' use of praise and behavior specific praise statements using a control group

experimental design. Results indicated that teachers who received training in praise statements increased praise statements and even higher rates of change were observed for teachers who self-evaluated their performance. Interestingly, teacher ratings of their praise statements were similar before and after viewing themselves on tape which suggests that teachers can accurately rate their performance after training (Wright et al., 2012).

Lylo and Lee (2013) used a multiple-probe design to study the effects of self-monitoring on completion of learning trials by three pre-service teachers during their special education field placements. A learning trial consisted of an antecedent prompt issued by the teacher, a response by the student, and teacher initiated feedback to the student's response. The researcher delivered individual 30 minute training sessions for each participant prior to intervention. The training involved identifying a completed learning trial and how to record the frequency of learning trials on a data sheet. During the training, participants practiced identifying and recording learning trials from baseline audio-tapes. Pre-service teachers audio-taped their lessons during baseline and intervention phases. During the intervention phase, teachers were instructed to listen to their audio-tapes later in the day and record the number of learning trials. Results indicated that all teachers increased their completion of learning trials and results were maintained when the intervention was faded. These findings provided evidence that self-monitoring is effective for increasing desirable teaching behaviors, but are limited to pre-service teachers during practicum placements in self-contained settings. Additional research is needed to determine if self-monitoring strategies are feasible for in-service teachers charged with instructing many more students during whole group instruction. In

addition, pre-service teachers' desire to please the researcher for successful completion of their teacher preparation program may have influenced their motivation to improve teaching behaviors during audio-taped lessons.

Kalis et al. (2007) studied the effects of self-monitoring on one teacher's use of behavior specific praise in a self-contained classroom with high school students diagnosed with emotional and behavioral disturbance (EBD). The teacher was trained to identify the target behavior and record the frequency of the behavior during instruction using a hand-held tally counter. The results indicated that the teacher increased rates of praise from baseline to intervention conditions. However, this study only involved one student and therefore the findings are limited to teachers in self-contained settings who instruct individual students.

Similarly, Simonsen et al. (2013) examined the effects of different self-monitoring strategies on teachers' rate of specific praise during teacher-directed instruction. Teachers were trained in each strategy to be implemented across alternating treatment conditions. The strategies included (a) teachers recorded a tally on a clipboard each time they provided specific praise, (b) counting specific praise statements using a tally counter, and (c) rating estimated rates of praise per minute. Teachers recorded their data daily. The results indicated that teachers increased rates of specific praise from baseline levels during self-monitoring conditions. Teachers rated the self-monitoring strategies as acceptable and expressed preference for using the tally counter. The findings suggested that simple self-monitoring strategies may be effective for increasing teachers' use of specific praise.

Conclusion and Rationale for Current Investigation

In summary, several strategies have been studied to increase OTR but relatively few involved Pre-K teachers and students. OTR strategies studied in early childhood settings included increased presentation rate (Gettinger & Stoiber, 2014; Lamella & Tincani, 2012; Tincani & Crozier, 2005), choral responding (Godfrey et al., 2003; Haydon et al., 2013; Sainato et al., 1987), and response cards (Godfrey et al., 2003; Wood et al., 2009). Peer mediated strategies as part of commercial intervention packages such as K-PALS also increased student academic responding or OTR and were effective for improving reading achievement (Fuchs et al., 2001; Rafdal et al., 2011), but they did not directly measure the type and frequency of OTR initiated by teachers or active student responding during instruction. Therefore, the effects cannot be attributed to increased OTR alone, but a packaged intervention that included a variety of empirically supported early literacy practices such as direct phonemic awareness instruction. It is important to identify 'active ingredients' in packaged interventions due to (a) low implementation fidelity of early childhood interventions absent of ongoing training (Kaiser & Hemmeter, 2013; Strain & Bovey, 2011); and (b) resources required to purchase commercial intervention packages and train teachers to implement them.

There is a need for additional research related to implementing OTR strategies that specifically target language and literacy development in early childhood settings. Increased OTR in early childhood settings will benefit all students, but is particularly important for young children who are at-risk or who have disabilities to prevent the perpetual cycle of low achievement. The perpetual cycle of low achievement refers to when students who have less well developed skills are provided with fewer opportunities to practice those skills. For example, Kent and colleagues (2012) found that

kindergarteners at-risk for reading difficulties spent on average only one minute engaged in print reading per scheduled reading block even when over one third of the block was spent on print-reading instruction. Therefore, at-risk students did not have opportunities to practice and apply the skills they were taught which may be due to lack of teacher preparation or awareness that this is occurring (Kent et al., 2012).

Evidence suggested that teachers can be trained in strategies to increase OTR during instruction (Conroy et al., 2014; Kamps et al., 1994) and to target early literacy skills (Gettinger & Stoiber, 2014). More specifically, teacher training that involved performance feedback (Simonsen et al., 2010), strategy instruction (Kamps et al., 1994; Sainato et al., 1987), and coaching (Conroy et al., 2014b) increased OTR. However, a recent review of experimental research found mixed effects for training with performance feedback on increasing OTR (Cavanaugh, 2013) and rates of OTR were not maintained after the intervention involving coaching (Conroy et al., 2014a). Training in OTR strategies with self-management as a method to follow up has potential to improve and maintain teacher practice overtime based on a series of studies that provided evidence of effectiveness on behavior specific praise (e.g., Kalis et al., 2007; Simonsen et al., 2013).

Based on evidence to support frequent OTR as an effective instructional practice, the importance of providing quality instruction in early childhood classrooms, and the relatively few studies that have been conducted with teachers and students in early childhood settings, future research should address teacher training to implement OTR strategies with early childhood educators. Even fewer studies have specifically examined effects of increased OTR on language and literacy outcomes (e.g., Gettinger & Stoiber, 2014). Strategies to ensure all students engage in language and literacy content during

early school experiences will provide students with repetition and opportunities to practice their skills. This is particularly important for young children with disabilities and who are at risk due to factors such as poverty. In addition, the ways in which teachers are trained are important to consider to obtain lasting effects on teaching behavior and to ultimately impact student outcomes. If teachers can be taught to identify effective instructional practices, monitor their own implementation, and become aware of how students are responding to their instruction, skills might be more likely to maintain over time.

The current investigation contributed to the field in a number of ways. First, the study added to the few studies that examined OTR strategies in early childhood settings. Second, the study was replicated one other study that specifically examined literacy-related OTR and measured literacy outcomes with preschool-aged students (e.g., Gettinger & Stoiber, 2014). However, the current investigation differed by training teachers in self-management strategies to monitor their own literacy-related OTR and measured maintenance effects over time after the intervention ended. In addition, teachers were trained to monitor student responding to ensure that all students had frequent opportunities to practice their skills, particularly students who were at-risk.

CHAPTER III

METHODOLOGY

This chapter describes research methods which include (a) setting and participants, (b) dependent variables and measures, (c) intervention procedures and independent variable, (d) experimental design, and (e) data analysis.

Method

Setting

The study took place in three schools in one rural school district. Two of the schools were primary elementary schools that included grades Pre-K through second grade. One of the schools was a traditional, public elementary school that included grades Pre-K through fifth grade. The Pre-K programs were considered half-day with students attending either from 9:15 until 11:45 in the morning or from 1:15 until 3:45 in the afternoon. Each classroom contained at least one lead teacher and one paraprofessional. All Pre-K teachers in the district implemented Houghton Mifflin's Pre-K literacy curriculum by Harcourt. The literacy curriculum was organized by ten themes, with each theme containing selected literature.

Demographic characteristics across schools in the district vary. Demographic characteristics of students in each participating classroom are summarized in Table 2. One of the schools was identified for Title I status. Schools were eligible for Title I status if 40% or greater of the student population were from families who were eligible for free and reduced meals (FARMS) due to low income. The overall percentage of students who were eligible to receive free and reduced meals across all schools in the district during the 2014-2015 school year was 31.1% (MSDE, 2015). However, a higher concentration of students who attend the district's Pre-K program were eligible for free and reduced meals

as family income was the primary criteria used in the district for Pre-K admittance (MSDE, 2003). Forty percent (n = 8) of students in Teacher One's class were FARMS eligible, 100% (n = 18) for Teacher Two, 50% (n = 10) for Teacher Three, and 60% (n =12) for Teacher Four. The overall percentage of students who received special education services in the district during the 2014-2015 school year was 12.5%. The percentage of students who received special education services in Pre-K was lower than the percentage for the district since many students are not identified until later in their schooling when learning expectations become more rigorous. Only 5% (n = 1) of students in Teacher One's class received special education services, 9.5% (n = 2) for Teacher Two, 20% (n = 4) for Teacher Three, and 15% (n = 3) for Teacher Four. All students were at least four years old but may have turned five years old during the school year.

<Insert Table 2>

Participants

After the district's Superintendent and each school-based administrator granted permission for the researcher to conduct the investigation, seven Pre-K teachers in the district were invited to participate in the study. Recruitment occurred at a district-wide professional development meeting. The researcher provided an overview of the study and expectations for participation. Four teachers from three different elementary schools agreed to participate. Teachers' years of experience ranged from three years to 29 years. See Table 3 for summary of teacher profiles. Teacher One was a Caucasian female with 29 years of teaching experience. Teacher One earned a Bachelor's degree in Early Childhood Education. Teacher Two was a Caucasian female with eight years of teaching experience. Teacher Two earned Bachelor's degree in Early Childhood Education and a

Master's degree in Reading. Teacher Three was a Caucasian female with six years of teaching experience. Teacher Three earned a Master's degree in Early Childhood Education. Teacher Four was a Caucasian female with three years of experience. Teacher Three held a Bachelor's degree in elementary education with a minor in special education.

<Insert Table 3>

Independent Variable

Teachers received training that included (a) the concept and importance of frequent OTR during literacy instruction, (b) strategies to increase OTR, (c) how to easily collect data and self-monitor their use of OTR, and (d) how to monitor student responding to OTR. The researcher trained each teacher individually during one, 45- to 60-minute meeting at a mutually convenient time for the teacher and researcher. Teachers were taught step-by-step procedures using the mnemonic ACCESS (see Table 4) to increase the likelihood that teachers would remember and implement the steps before, during, and after instruction. ACCESS was considered an appropriate mnemonic by the researcher because the ultimate goal was for all students have access to effective literacy instruction. The letters in ACCESS stand for awareness, choose as strategy to engage low- or non-responders, count literacy-related OTR during instruction, examine results, set goals for self and students, and start over. Each step is described below and displayed in Table 4.

<Insert Table 4>

Awareness. Each individual training began with the researcher reviewing the concept of OTR. In addition, teachers were presented with a brief overview of research to

support frequent OTR as an effective instructional practice as well as evidence to suggest that students who are at-risk may not have equal OTR compared to peers. The researcher presented graphed data of the teacher's OTR and frequency of student responding from baseline observations (see Appendix C for sample baseline graph). Teachers received individualized feedback on their use of literacy-related OTR from baseline observations. The researcher highlighted strategies that the teacher was already using to elicit OTR. It was anticipated that highlighting effective instruction that was already taking place may be positively reinforcing to the teacher which in turn could motivate increased use. Then the researcher and teacher discussed rate of student responding and any students who may be low- or non-responders. The purpose of this segment during the training was to generate awareness among teachers regarding (a) the importance of frequent literacy-related OTR, (b) their existing rate of OTR, and (c) how students were responding.

During the training, the researcher issued and reviewed a handout that listed a variety of strategies available to increase student responding such as increasing presentation rate (Carnine, 1976; Lamella & Tincani, 2012), choral responding (Godfrey et al., 2003; Haydon et al., 2013), response cards (Heward, 1994; Randolf, 2007), peer to peer responding (Delquadri et al., 1986) and targeted prompting for students most at risk (Horn, 2010).

Choose a Strategy to Engage Non-responders. Once teachers became aware of the importance of frequent OTR, their existing implementation, and which students may not be responding, they were prompted to choose from strategies available to intentionally engage non- or low-responders. Teachers were encouraged to write this step into their daily lesson plans.

Count OTR. Teachers were trained to use a simple tally-counter also referred to as a click-counter to count the number of literacy-related OTR during teacher-directed instruction. Teachers were provided with instructions to use the tally-counter during the same instructional segment that baseline data collection occurred. The tally-counter was intended to serve as both a tactile cue to remind the teacher to provide frequent OTR, and a means to easily count and monitor implementation.

Examine Results. Teachers were instructed to record their results from tally-counters daily and briefly reflect on how they perceived students responded when provided with increased literacy-related OTR. Teachers were provided with forms for recording and simple graphing of OTR.

Set Goals for Self and Individual Students. Teachers were instructed to set reasonable goals for increasing their use and/or type of literacy-related OTR during teacher-directed instruction after examining their results. In addition, this step was included to prompt teachers to also set goals and identify strategies to engage particular students who were non- or low- responders.

Start Over. Teachers were provided with an opportunity to ask questions of the researcher and the researcher was available for email, phone, or face to face consultation based on the needs of the teacher. The purpose of the Start Over phrase in the mnemonic was to emphasize the iterative nature of self-evaluation with the goal that teachers would become more aware of their OTR implementation and how students were responding. The hope was that teachers would begin each lesson with awareness and repeat each subsequent step in the mnemonic daily.

Dependent Variables and Measures

Four dependent variables were measured including (a) teachers' use of literacy-related OTR, (b) student responding during literacy instruction, (c) children's letter knowledge, and (d) vocabulary knowledge on weekly curriculum based assessments (CBM).

Teacher Use of OTR. Teachers video-taped their lesson during language and literacy instruction. Literacy instruction was defined as teacher directed instruction involving book reading, discussions about books or vocabulary, concepts about print, or letter/sound naming.

Observations occurred twice weekly during baseline and intervention conditions. Recorded observations were analyzed for length of instruction and the frequency of teachers' use of OTR in order to calculate OTR per minute. Literacy related OTR was defined as teacher prompts or questions intended to elicit student responses related to areas identified by the NELP (2008) as early predictors of later reading achievement.

Student Responding. The researcher observed students in the video-recorded lessons for their responses to teacher implemented OTR. Only students with signed parent permission were included in the video frame. Consistent with previous studies of this nature (e.g., Gettinger & Stoiber, 2014), child participants were seated in a cluster to be included in the video. In addition, the researcher and secondary coder were blind student characteristics. For example, the researcher did not know which students in the video received free and reduced meals or their special education status. Event recording was used to document student responses to teacher initiated OTR. Since the teacher was the primary unit of analysis for the multiple-baseline design, an event was counted if all targeted students in the video frame responded to the teacher initiated OTR. For example,

if the teacher initiated an individual OTR and that individual responded, and event was recorded. However, if the teacher initiated a whole group (choral response) and one or more students were observed not to respond, an event was not recorded.

Inter-observer Agreement

A graduate assistant was trained to identify literacy related OTR and coded at least 30% of all observations during baseline and intervention phases. The graduate assistant was a special education doctoral student with extensive experience with data collection an analysis. The training for the second observer involved explanation of OTR, discussion of examples and non-examples, and practice coding with videos that were not part of the study. Discussion of agreement and disagreement for coding took place until a goal of 85% agreement or better was achieved. Inter-observer agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements. Then, the quotient was multiplied by 100 to obtain a percentage. The graduate assistant was also trained to identify student responses and in event-recording procedures. The training involved practice with videos that were not part of the study. Discussion of agreement and disagreement for event recording will took place until the goal of 85% agreement or better was achieved. Inter-observer agreement was calculated for the rate of responding during at least 30% of observations in baseline and intervention phases using the inter-rater agreement calculations procedures described above.

During practice observations, the primary researcher and secondary coder reached 93% agreement for teacher initiated OTR and 87% agreement for student responding. During observations included in the investigation, the primary researcher and secondary

coder reached 91.5% agreement for teacher initiated OTR and 86% agreement for student responding.

Student Alphabet Knowledge Probes. A well-known, published review of emergent literacy skills indicated that alphabet knowledge was the best predictor of later reading success (NELP, 2008). A curriculum based measure of uppercase alphabet knowledge was administered weekly across baseline and intervention phases to measure alphabet knowledge. Alphabet knowledge probes were part of the naturally occurring routine in the Pre-K classrooms. Child participants were asked to name the 26 upper-case letters of the alphabet presented in random order. The purpose of the alphabet probe was to demonstrate weekly student performance overtime in response to literacy related OTR.

Vocabulary Knowledge. Oral language skills, including vocabulary, are important precursors to later reading comprehension (NELP, 2008). Previous studies involving vocabulary interventions have used standardized vocabulary measures to demonstrate the impact of instruction on student skills (Wasik, Bond, & Hindman, 2006) or researcher developed measures for target words from books or thematic units (Girolametto, Weitzman, & Greenberg, 2012). Standardized tools can provide valid and reliable scores to demonstrate impact on vocabulary growth and to indicate the impact of preschool instruction during a school year. However, these tools are not intended for continuous progress monitoring and are not sensitive enough to detect change from weekly instruction (Hoffman, Teale, & Paciga, 2013). The National Reading Panel (NRP, 2000) suggested that vocabulary assessments should align with the instructional context to make conclusions about the effects of instruction.

The Houghton Mifflin Pre-K literacy curriculum included vocabulary lists that corresponded to each unit. Consistent with researcher developed vocabulary probes from prior research (Coyne, McCoach, Loftus, Zipoli, & Kapp, 2009), student knowledge of target vocabulary was assessed weekly by having students individually define each word and use it in a sentence. Five words were selected from the curriculum list for weekly vocabulary probes. The examiner recorded responses verbatim to allow for inter-rater reliability for coding of responses. Students received one point if they told what the word meant and one point if they used it correctly in a sentence.

Materials

The materials used in this study included the ACCESS mnemonic cue card (Figure 1), handheld tally counter with lanyard, video recording devices each with 32 gigabyte memory cards, small pivoting tripods for recording devices, and data recording forms for teachers.

Design

A multiple-baseline design (MBD) across participants was used to evaluate the degree of change in teachers' implementation of literacy related opportunities to respond (OTR), the degree of change in students' responses, and the degree of change on students' language and literacy skills. MBD "demonstrates the effect of an intervention by showing that behavior changes when and only when the intervention is applied" (Kazdin, 2011, p. 145). This design is acceptable for making causal statements regarding the effects of an intervention based on What Works Clearinghouse (WWC) standards (Kratochwill et al., 2010) when three or more replications are demonstrated across participants or behaviors (Horner et al., 2005). Data collection occurred in baseline for all

participants and for all four dependent variables at the start of the study. Introduction of the intervention was staggered across participants to demonstrate experimental control. Random selection was used to determine the order in which to begin the intervention phase for each participant prior to the beginning of data collection. Baseline and intervention phases are described in greater detail below.

Pre-Baseline. After obtaining approval from the district superintendent and the university's institutional review board (IRB), the researcher provided an overview of the study to Pre-K teachers at a district-wide, professional development meeting. Teachers received an information sheet that outlined the expectations for their informed participation in the study (see Appendix A). The information sheet also contained the researcher's contact information for interested teachers to contact the researcher with further questions and/or to express interest in the study. The researcher was also available to meet or talk with interested teachers at the teacher's request.

Once teachers provided informed consent for their participation, the researcher scheduled individual meetings with each teacher to provide the teacher with video recording equipment and to provide training in using the equipment. Video recorded observations were scheduled two times per week during regular literacy instruction. Student language and literacy probes were scheduled one time per week for each probe. Teachers were trained in procedures to conduct alphabet knowledge and vocabulary probes. Data collection began in the fall of 2014 and continued four approximately 12 weeks for baseline and intervention phases. The 12 weeks excluded the week of Thanksgiving as students only attended school for two days that week. Maintenance data were collected approximately eight weeks from when the intervention ended.

Baseline. Video observations occurred for all participating teachers during baseline two times per week. Data were recorded for all dependent measures as described above. Guidelines for phase changes are described below. The researcher monitored video data by regularly collecting memory cards in order to make decisions about phase changes or to provide technical assistance to teachers for data collection methods.

Intervention. The independent variable (teacher training described above) was introduced in staggered fashion across teachers in random order once stability in baseline was achieved for Teacher One. Observations and data collection continued twice per week after the intervention was introduced. Teachers received individual feedback during their initial training regarding implementation in baseline, and teachers' self-monitoring data served as on-going performance feedback to themselves.

Data Decision Rules. Decisions for changing phases were based on OTR data for each teacher participant as the unit of analysis. Teacher participants remained in baseline until stable rates of OTR were obtained or if there was a decreasing trend. Teacher training began for Teacher One when there was stability in baseline over at least three data points. Once it was evident that the training was having an effect on teacher use of OTR for Teacher One over at least three data points, the training was introduced to Teacher Two while Teacher Three and Teacher Four remained in baseline. Once it was evident that the training was having an effect on the use of literacy related OTR for Teacher Two, the training was introduced to Teacher Three while Teacher Four remained in baseline. Once it was evident that the intervention was having an effect on Teacher Three, the training was introduced to Teacher Four.

Post-intervention. Two maintenance probes were conducted for each teacher participant eight weeks after the end of the intervention phase to measure lasting effects (if any) of the intervention on all dependent variables.

Analysis

Visual inspection is the primary method for formative and summative data analysis in single subject research (Kazdin, 2011). Data were analyzed from each phase for changes in level, trend, and variability. Change in level refers to a sudden increase or decrease in the dependent variable immediately following introduction of the intervention. Change in trend refers to the direction or predictability of the data for the dependent variable. For example, the dependent variable may increase consecutively over three data points. Variability refers to the lack of predictability in the data. Descriptive statistics were also used to calculate mean, standard deviation, and range and were reported for teacher initiated OTR, student responding, alphabet knowledge, and vocabulary knowledge. Changes in the rate of teacher use of OTR were analyzed to address the first research question. Effects of the intervention were demonstrated if the rate of literacy related OTR increased for each participant when the training was introduced while other participants who had not yet been trained remained at baseline levels. The second research question was addressed by analysis of change in mean rate of student responding. The third research question was addressed by analysis of change in the mean alphabet knowledge scores, and mean vocabulary knowledge scores. The researcher concluded that the intervention impacted student outcomes if student related dependent variables increased at the same time teacher OTRs increased.

Social Validity

A five point, Likert-Type scaled modified from the BEST in CLASS Teacher Acceptability Measure (Conroy et al., 2014) assessed the social validity of the intervention (see Table 4). Horner et al. (2005) proposed specific features of single subject research to document evidence-based practice which included the researcher's ability to establish social validity. Social validity refers to the social importance of the dependent variables, feasibility for independent variables to be implemented with fidelity in authentic contexts, and participants' acceptability of the independent variable (Horner et al., 2005). Participants' acceptability included their perceived ease of implementation, time intensiveness, satisfaction with training, usefulness of the intervention, benefit to students, and likelihood of continued implementation. The social validity questionnaire was uploaded to Surveymonkey.com and a link to the survey was emailed to teachers in attempt to provide anonymity.

CHAPTER IV

Results

The purpose of this study was to evaluate the effects of individualized teacher training in opportunity to respond (OTR) and self-monitoring strategies on a) rate of literacy-related (OTR) for four Pre-K teachers, b) rate of student responding, c) student alphabet knowledge, and d) student vocabulary skills. A multiple-baseline, single subject design was used to evaluate the degree of change in teachers' implementation of OTR, the degree of change in students' responses, and the degree of change on students' language and literacy skills. First, results are presented related to the research questions. Then, findings from a social validity measure are reported to address teacher acceptability, satisfaction, and feasibility of the intervention.

Teacher Initiated OTR

The first research question investigated whether individualized teacher training with self-monitoring increased literacy related OTR initiated by Pre-K teachers during whole-group instruction. Figure 1 shows the results for the four teacher participants' rates of OTR delivered during whole group instruction. Table 6 shows descriptive statistics which include include mean, standard deviation, and range for rate of OTR by teacher across baseline and intervention phases. Table 7 shows rate of OTR by teacher for each observation session. Teachers video-taped their whole group instructional sessions two times per week during baseline, intervention, and maintenance phases. Rate of OTR was calculated by dividing the total number of literacy related opportunities to respond during whole group instruction by the length of instruction. If the length of the video exceeded ten minutes, only the first ten minutes of instruction were coded. Eight weeks after the intervention concluded, teachers were asked to video-tape two additional whole-group

lessons. Maintenance probes are a feature that can be employed to a multiple-baseline design to determine if the effects of the intervention were maintained over time after the intervention is removed (Kazdin, 2011).

< Insert Figure 1 >

< Insert Table 6 >

<Insert Table 7>

Teacher One. Visual inspection of the data indicated a stable trend in rate of OTR for Teacher 1 during baseline with a slight decrease in level prior to the introduction of the intervention with rates of OTR at 1.90, 2.00, and 1.40. Based on the predictability in the low levels of OTR, sufficient baseline data were available to make phase change decisions and introduce the intervention between sessions three and four. Baseline data were sufficient for determining phase changes since effects of an intervention with a multiple-baseline design are demonstrated when baseline data change only when the intervention is introduced and not before for each participant (Kazdin, 2011).

Immediately following introduction of the intervention (teacher training), visual inspection of the data indicated an increase in level for rate of OTR. The rate of OTR increased from 1.40 opportunities to respond to 3.10 between sessions three and four. Visual inspection of the data throughout the intervention phase indicated some variability in the data with the rate of OTR ranging from 2.10 to 3.30. However, the level did not decrease to baseline levels during the intervention as there were no overlapping data between baseline and intervention phases for Teacher One. Visual inspection of the data during the maintenance phase indicated that the rates of OTR at 3.50 and 2.10 were similar to the rates during the intervention phase which ranged from 2.10 to 3.30.

Although the two maintenance probe rates differed in level (3.50 and 2.10), there were no overlapping data between maintenance and baseline phases. Therefore, rate of OTR did not return to baseline levels when the intervention was removed.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range for rate of OTR by teacher during the intervention phase and is shown in Table 1. During baseline, Teacher One initiated OTR at a mean rate of 1.77 (*SD* = .32) with a range of 1.40 to 2.00. Teacher One's rate of OTR delivered during whole group instruction increased to a mean of 3.42 (*SD* = .72.) with a range of 2.10 to 3.30.

Teacher One was missing data for session 15 and 16. The teacher cited absence due to illness and an interruption in the school schedule as reasons for the cancelled observations.

Teacher Two. Visual inspection of the data indicated that Teacher Two maintained a stable trend in rate of OTR during baseline with relatively low levels ranging from 1.00 to 2.60. Prior to the introduction of the intervention there was a slight increase in rate of OTR from 1.50 to 2.60. However based on the predictability in the low levels of OTR throughout the six baseline observations, sufficient baseline data were available to make phase change decisions and introduce the intervention between sessions six and seven. Immediately following introduction of the intervention (teacher training), visual inspection of the data indicated an increase in level for rate of OTR. The rate of OTR increased from 2.60 opportunities to respond to 4.20 between sessions six and seven. Visual inspection of the data throughout the intervention phase indicated a decreasing trend after the initial change in level from 4.20 to 2.70 OTR per minute, but the data appeared to stabilize during sessions at the end of the intervention phase and

there were no overlapping data between baseline and intervention phases for Teacher Two. Visual inspection of the data during the maintenance phase indicated that the rate of OTR (4.20 and 3.00) was similar to the rate during the intervention phase. Although the two maintenance probe rates differed in level (4.20 and 3.00), there were no overlapping data between maintenance and baseline phases. Therefore, rate of OTR did not return to baseline levels when the intervention was removed.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range for rate of OTR by teacher during the intervention phase and is shown in Table 1. During baseline, Teacher Two initiated OTR at a mean rate of 1.85 (*SD* = .57) with a range of 1.00 to 2.60. Teacher Two's rate of OTR delivered during whole group instruction increased to a mean of 3.90 (*SD* = .88) with a range of 2.70 to 5.80.

Teacher Two was missing data for session 14 and 15. The teacher cited interruptions in the school schedule as the reason for the cancelled observations.

Teacher Three. Visual inspection of the data indicated that Teacher Three maintained a stable trend in rate of OTR ranging from .80 to 2.00 during baseline with a slight increase from 1.10 to 1.40 OTR per minute prior to the introduction of the intervention. Based on the predictability in the low levels of OTR during the ten baseline observations, sufficient baseline data were available to make phase change decisions and introduce the intervention between sessions 10 and 11. Immediately following introduction of the intervention (teacher training), visual inspection of the data indicated an increase in level for rate of OTR. The rate of OTR increased from 1.40 opportunities to respond to 3.10 between sessions ten and 11. Visual inspection of the data throughout

the intervention phase indicated a stable trend ranging from 3.00 to 4.30 with no overlapping data between baseline and intervention phases. Visual inspection of the data during the maintenance phase indicated that the rates of OTR (3.20 and 2.70) were similar to the rate during the intervention phase. Although the two maintenance probe rates differed slightly in level (3.20 and 2.70), there were no overlapping data between maintenance and baseline phases. Therefore, rate of OTR did not return to baseline levels when the intervention was removed.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range for rate of OTR by teacher during the intervention phase and is shown in Table 1. During baseline, Teacher Three initiated OTR at a mean rate of 1.43 (*SD* = .39) with a range of .80 to 2.00. Teacher Three's rate of OTR delivered during whole group instruction increased to a mean of 3.40 (*SD* = .47) with a range of 3.00 to 4.30.

Teacher Three was missing observational data for session 16. The teacher cited absence due to illness as the reason for the cancelled observation.

Teacher Four. Visual inspection of the data indicated that Teacher Four maintained a stable trend in rate of OTR during baseline prior to the introduction of the intervention. Based on the predictability in the low levels of OTR ranging from 1.40 to 2.70 per minute, sufficient baseline data were available to make phase change decisions and introduce the intervention between sessions 14 and 15. Immediately following introduction of the intervention (teacher training), visual inspection of the data indicated an increase in level for rate of OTR. The rate of OTR increased from 1.60 opportunities to respond to 3.10 between sessions 14 and 15. There were no overlapping data between

baseline and intervention phases. However, there were only three observations during the intervention phase for Teacher Four due to missing data and the conclusion of the intervention. Visual inspection of the data during the maintenance phase indicated that the rate of OTR (3.30 and 3.10) was similar to the rate during the intervention phase. There were no overlapping data between maintenance and baseline phases. Therefore, rate of OTR did not return to baseline levels when the intervention was removed.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range for rate of OTR by teacher during the baseline and intervention phases and is shown in Table 1. During baseline, Teacher Four initiated OTR at a mean rate of 1.78 (*SD* = .48) with a range of 1.40 to 2.70. Teacher Four's rate of OTR delivered during whole group instruction increased to a mean of 3.33 (*SD* = .40) with a range of 3.10 to 3.80.

Teacher Four was missing data for sessions one, two, and 18. Sessions one and two were missing because Teacher Four was late to enroll as a participant in the study. Teacher Four cited an interruption in the school schedule as the reason for the cancelled observation during session 18.

Summary. In summary, visual inspection of the data reported in narrative above and shown in Figure 1 indicated low levels of OTR during baseline for all four teachers. The mean rate of OTR was greater for each participant in the intervention phase compared to baseline (See Table 6). Experimental control was demonstrated when the dependent variable (rate of OTR) increased only when the intervention was introduced for each teacher. For example, when the intervention was introduced to Teacher One between sessions three and four, Teachers Two, Three, and Four's rate of OTR was

unaffected and remained at baseline levels. Immediately following introduction of the intervention (teacher training), all teacher participants increased their rates of literacy-related OTR delivered during whole group instruction which supported the first research hypothesis that teacher training with self-monitoring will increase teacher rates of OTR during whole group instruction. The increase was demonstrated by the change in level between baseline and intervention phases as reported in narrative above and shown in Figure 1. None of the teacher participants had overlapping data from baseline to intervention phases. In addition the results of two maintenance probes eight weeks later indicated that teachers maintained the rate of OTR during whole group instruction over time as results did not revert to baseline levels. However, visual inspection indicated that all participants' rate of OTR decreased in level from the first to second maintenance probe.

Student Responding

The second research question investigated whether training Pre-K teachers to increase OTR with self-monitoring strategies affected student responding in Pre-K classrooms. Rate of student responding was calculated by dividing the frequency of student responses by the length of each observation. Figure 2 displays student response per minute during baseline and intervention phases by teacher. Table 8 shows descriptive statistics which included mean, standard deviation, and range for student responding by teacher. Table 9 shows rate of responding by observation session.

< Insert Figure 2 >

< Insert Table 8 >

<Insert Table 9>

Teacher One. Visual inspection of the data indicated a stable trend in baseline with low levels of student responding with rates of responding at .80, .90, and .70 per minute. The teacher was the unit of analysis and therefore phase change decisions were not based on student data. However, there was an immediate change in level for student responding once the intervention was introduced with Teacher One. Student responding increased from .70 responses per minute to 1.20 responses per minute between sessions three and four and then to 3.60 responses per minute during session five. Visual inspection of the data during the intervention phase indicated variability in the data with rate of responding ranging from .50 to 3.60. For example, student responding was 3.60 per minute for sessions five and six, .50 per minute during session seven, and 2.80 per minute during session eight. In addition, data returned to below baseline levels during session seven. Visual inspection of the data during the maintenance phase indicated that the rate of student responding (3.30 and 1.70) was similar to the rate during the intervention phase. Although the two maintenance probe rates differed in level (3.30 and 1.70), there were no overlapping data between maintenance and baseline phases. Therefore, rate of OTR did not return to baseline levels over time.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range of student responding by teacher during baseline and intervention phases. Descriptive Statistics are shown in Table 8. During baseline, student responding for Teacher One was a mean rate of .80 (*SD* = .10) with a range of .70 to .90. Teacher One's rate of student responding during whole group instruction increased to a mean of 2.25 (*SD* = .98) with a range of .50 to 3.60.

Teacher One was missing student responding data for session 15 and 16. The teacher cited absence due to illness and an interruption in the school schedule as reasons for the cancelled observations.

Teacher Two. Visual inspection of data in baseline for Teacher Two indicated a relatively stable trend at low levels of responding ranging from .80 to 1.40. Student responding increased from 1.40 to 2.70 per minute immediately following introduction of the intervention. Data were variable throughout the intervention phase ranging from 1.10 to 3.90 with a sharp decreasing trend at the end of the intervention phase from 3.90 to 2.20 OTR per minute. There were also overlapping data between baseline and intervention phases during three intervention sessions. For example, data returned at or below baseline levels of 1.40 during sessions 10, 11, and 13. Visual inspection of the data during the maintenance phase indicated that the rate of student responding (2.40 and 1.70) was similar to the rate during the intervention phase. Although the two maintenance probe rates differed in level (2.40 and 1.70), there were no overlapping data between maintenance and baseline phases. Therefore, rate of OTR did not return to baseline levels over time.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range of student responding by teacher during baseline and intervention phases. Descriptive Statistics are shown in Table 8. Teacher Two student responding was at a mean rate of 1.05 (*SD* = .23) with a range of .80 to 1.40 during baseline. During the intervention phase, mean rate of student responding increased to 2.15 (*SD* = 87) with a range of 1.10 to 3.90.

Teacher Two was missing data for sessions 14 and 15. The teacher cited interruptions in the school schedule as the reason for the cancelled observations.

Teacher Three. Visual inspection of the data indicated a stable trend at low levels of student responding ranging from .50 to 1.60 during baseline for Teacher Three. There was a slight decrease in student responding immediately following the intervention (between sessions 10 and 11) from 1.10 to .70. However, there was a sharp increase during the second observation in the intervention phase (session 12) from .70 to 3.40. Data were variable throughout the intervention phase ranging from .70 to 3.40 with a decreasing trend at the end of the intervention phase from 1.70 to 1.30. There were overlapping data between baseline and intervention phases for three data points. For example, student responding was at or below baseline levels of 1.60 during sessions 11, 13, and 18. Rates of student responding were 2.30 and 1.20 during the maintenance phase. The two maintenance probe rates of student responding differed in level (2.30 and 1.20) and one probe returned to baseline levels.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range of student responding by teacher during baseline and intervention phases. Descriptive Statistics are shown in Table 8. During baseline, Teacher Three's student responding was at a mean rate of .94 (*SD* = .32) with a range of .50 to 1.60. During the intervention phase, Teacher Three's rate of student responding during whole group instruction increased to a mean of 1.80 (*SD* = .86) with a range of .70 to 3.40.

Teacher Three was missing student responding data for session 16. The teacher cited absence due to illness as the reason for the cancelled observation.

Teacher Four. Visual inspection of the data indicated a stable trend with low levels of student responding for Teacher Four during baseline ranging from .20 to 1.60. Immediately following introduction of the intervention, there was a slight increase in student responding from .40 to 1.10 between sessions 14 and 15. However, there were overlapping data between phases for two of the three intervention sessions. Data was at or below baseline levels of 1.60 for sessions 15 and 17. Data during the maintenance phase for rate of student responding was 2.10 and 1.60. Rate of student responding returned to baseline levels (1.60) during one of the maintenance probe sessions.

SPSS Descriptive Statistics was also used to calculate the mean, standard deviation, and range of student responding by teacher during baseline and intervention phases. Descriptive Statistics are shown in Table 8. Teacher Four student responding was at a mean rate of .57 (*SD* = .37) with a range of .20 to 1.60 during baseline and increased to a mean of 1.67 (*SD* = .90) with a range of 1.10 to 2.70.

Teacher Four was missing data for sessions one, two, and 18. Sessions one and two were missing because Teacher Four was late to enroll as a participant in the study. Teacher Four cited an interruption in the school schedule as the reason for the cancelled observation during session 18.

Summary. In summary as reported in the narrative above and shown in Figure 2, visual inspection of the data indicated a stable trend at relatively low levels of student responding for all four teacher participants during baseline. Immediately following introduction of the intervention (teacher training), visual inspection of the data indicated that all teachers except for Teacher Three demonstrated increased rate of student responding and data were variable for Teacher Four. Therefore the effects of the

intervention were demonstrated with three replications. Teacher Three eventually demonstrated an increase in level during the second observation in the intervention phase. The immediate increase in student responding after the intervention was introduced may support the second research hypothesis that teacher training in OTR strategies with self-monitoring affects student responding during whole group instruction. While there was a change in level for all teacher participants during the intervention phase, there was variability in the data as reported in the narrative for each teacher. In addition, all teacher participants demonstrated a decreasing trend in the data toward the end of data collection which may predict student responding would return to baseline levels if sessions continued beyond the 18 sessions. The results of maintenance probes indicated similar rates of student responding eight weeks after the intervention for two of the teachers. However, Teachers Three and Four returned to baseline levels during at least one of the maintenance probe sessions. In addition, visual inspection of the data indicated a decrease in level from the first to the second maintenance probe for student responding across all four participants.

Student Language and Literacy Outcomes

The third research question investigated whether increased OTR affects students' language and pre-literacy skill levels. Data were collected and graphed separately for alphabet knowledge and vocabulary skills and are shown in Figures 3 and 4. Table 10 shows mean alphabet knowledge by teacher and Table 11 shows mean vocabulary knowledge by teacher.

<Insert Figure 3>

<Insert Table 10>

Alphabet Knowledge. Students were administered weekly alphabet knowledge assessments to achieve a possible score of 26 for upper case alphabet knowledge. Figure 3 displays mean upper case letter knowledge scores by teacher during baseline and intervention phases. Table 10 shows mean upper case letter knowledge by teacher for each week during the study.

Teacher One. During baseline, a trend was not established since alphabet knowledge was only measured on two occasions. A minimum of three data points are required to establish a trend (Kazdin, 2011). The lack of trend was not problematic for making phase changes since the teacher was the unit of analysis for the study. Visual inspection of the data indicated a slight increase in level for mean alphabet knowledge from 17.64 to 19.10 between baseline and intervention phases. During the intervention phase a stable trend with a slight increase was demonstrated. For example, mean alphabet knowledge increased from 18.33 to 18. 73 to 20.22 across weeks four, five, and six. Alphabet knowledge data were not collected during week seven due to teacher absence and interruptions to the school schedule. Mean alphabet knowledge was 22.70 during the maintenance probe again indicating a subtle increase over time.

Teacher Two. During baseline, visual inspection of the data indicated a stable increasing trend for mean student alphabet knowledge ranging from 12.90 to 14.89 for students in Teacher Two's class. There was a slight increase in mean alphabet knowledge from 14.70 to 15.67 between baseline and intervention phases. Visual inspection of the data throughout the intervention phase indicated a stable and gradual increasing trend ranging from 15.67 to 17.14. There were no overlapping data between baseline and intervention phases. Mean alphabet knowledge was 17.12 during the maintenance probe

which was similar to the mean alphabet probe during week nine. However, two students were absent on the date of the maintenance assessment.

Teacher Three. Visual inspection of the data indicated an increasing trend of 11.15, 11.83, 15.00, 15.27 and 15.15 across weeks one, two, three, four and five with a slight decrease prior to the introduction of the intervention from 15.15 to 13.91. The decrease was the result of missing student data due to absences for students who were higher achieving on the alphabet probe. Therefore, those students' scores were not computed in the mean for the week. There was an increase in level (13.91 to 18.50) for mean alphabet knowledge immediately following introduction of the intervention. However, this data are misleading as the higher achieving students who were absent during week seven were included in the data during week eight. The data were stable and appeared to plateau during the intervention phase. Again, student absences and ceiling effect impacted the mean alphabet knowledge scores shown in Figure 3.

Teacher Four. Visual inspection of the data indicated a stable increasing trend during the baseline phase ranging from 7.69 to 10.08. Only one alphabet assessment was administered during the intervention phase and therefore a trend was not established. Visual inspection of the data between baseline and intervention phases indicated no change in level for mean alphabet knowledge. Mean alphabet knowledge increased from 10.08 to 10.18 from baseline to intervention.

Summary. In summary, student mean alphabet knowledge increased gradually throughout both baseline and intervention phases for the duration of the study for all four teachers. Although the students appeared to increase in their alphabet knowledge over time, increases were not associated with the introduction of the intervention and therefore

the results do not support the third research question. The increasing trend was more likely due to maturation than effects of the intervention. In addition, some students knew all 26 letters when data collection began or shortly after. Therefore, these students would not be able to demonstrate growth over time due to ceiling effect which impacted the mean alphabet scores over time.

Student Vocabulary Knowledge. Students received weekly curriculum based vocabulary assessments. Students were presented with five words associated with the curriculum unit and were asked to tell what the word means and to use it in a sentence. One point was given for each correct response with a possible total of ten points. Figure 4 displays weekly vocabulary data for baseline and intervention phases. Table 11 shows mean student vocabulary knowledge by teacher.

<Insert Figure 4>

<Insert Table 11>

Teacher One. During baseline, a trend was not established for vocabulary knowledge with a mean score of 3.50. A minimum of three data points are required to establish a trend (Kazdin, 2011). There was an immediate decrease in students' mean vocabulary knowledge from 3.80 to 1.78 following introduction of the intervention. Visual inspection of the data indicated a stable, lateral trend for the first three data points (3.40, 3.44, and 3.18) in the intervention phase then a peek to 4.89 during week six. The data returned to baseline levels during the last two weeks of the intervention. During the maintenance assessment, mean vocabulary score was 3.11. Vocabulary data were not collected during week seven due to teacher absence and interruptions in the school schedule.

Teacher Two. Visual inspection of the data indicated variability in the data during baseline for students' vocabulary knowledge in Teacher Two's class. There was a decrease from 3.80 to 1.78 between baseline and intervention phases. Visual inspection of the data indicated an increasing trend throughout the intervention phase. However, there were overlapping data for three data points. Data were at or below baseline levels (4.22) during weeks five, six, and seven. During the maintenance assessment, mean vocabulary score was 2.86.Vocabulary data were not collected during week nine.

Teacher Three. Visual inspection of the data indicated a stable and slightly increasing trend during baseline for vocabulary knowledge of students in Teacher Three's class ranging from 1.09 to 2.45. Vocabulary data were only collected during one week in the intervention phase with a mean score of 2.33. Therefore, no trend was established. No change in level was observed between baseline and intervention phases. Vocabulary data were not collected during weeks seven and nine for students in Teacher Three's class. During the maintenance assessment, mean vocabulary score was 1.69.

Teacher Four. Visual inspection of the data indicated variability during baseline for vocabulary knowledge of students in Teacher Four's class with scores ranging from 1.83 to 4.83. Vocabulary data were only collected one time during the intervention phase with a mean of 2.10. Therefore, no trend was established during the intervention phase. Visual inspection indicated a decrease in level from baseline to intervention (2.92 to 2.10). During the maintenance assessment, mean vocabulary score was 2.67. Vocabulary data were not collected during weeks seven and nine for students in Teacher Four's class.

Summary. In summary based on variability in the data across baseline and intervention phases and decreases in level from baseline to intervention phases, results do

not support the third research question. For three of the teachers, mean vocabulary performance decreased when the intervention was introduced. Rationale for this finding is discussed in chapter five.

Social Validity

The researcher emailed each teacher a link to Surveymonkey.com to complete the social validity questionnaire (see Table 5). All four teachers completed the survey anonymously. Tables 12 and 13 show the results of the social validity survey. The purpose of the social validity questionnaire was to measure teachers' perceived ease of implementation, time intensiveness, satisfaction with training, usefulness of the intervention, benefit to students, and likelihood of continued implementation. Regarding ease of implementation, one teacher reported minimal difficulty, two teachers reported moderate difficulty, and one teacher rated the intervention as somewhat difficult to implement. Three teachers rated the intervention as minimally disruptive and one teacher rated the intervention somewhat disruptive. Regarding time intensiveness, two teachers indicated that the intervention was reasonably time intensive and two teachers reported that the intervention was somewhat time intensive. All four teachers indicated that they were mostly comfortable with the amount of training they received in gaining competence to implement the ACCESS cycle. Regarding usefulness of the intervention, all four teachers rated the ACCESS cycle as moderately useful for improving their instruction. Ratings for usefulness of strategies were mixed. One teacher rated the strategies as very useful, one teacher rated the strategies as somewhat useful, one rated the strategies as moderately useful, and lastly one teacher rated the strategies as minimally useful. Regarding benefit to students, three teachers felt their students

benefited from the study and one teacher indicated that the statement was partially true. Similarly, three teachers indicated that it is important to increase OTR during language and literacy activities to improve student outcomes, and one teacher felt the statement was partially true. Regarding implementation, three of the teachers indicated that they provided more opportunities for all students to respond during whole group instruction and one teacher expressed that it was partially true that she provided more opportunities for student to respond as a result of the study.

Results were mixed for teacher awareness of student responding. One teacher reported that it was very true that she increased awareness as a result of the study, one teacher expressed that it was mostly true that she increased awareness, one teacher expressed that the statement was partially true, and one teacher rated the statement as minimally true. Regarding likelihood of future implementation, two teachers indicated that they were very likely to continue to use the OTR strategies during their instruction and two teachers expressed that they were moderately likely to use the strategies in the future. Similarly, two teachers reported that they were most likely to continue using the ACCESS cycle during lesson planning and instruction and two of the teachers indicated moderate likelihood. Implications for these findings are discussed in Chapter Five.

<Insert Table 13>

CHAPTER V

DISCUSSION

Providing frequent opportunities to respond (OTR) is an evidence based classroom management practice (Simonsen et al., 2008) associated with increased academic achievement (Burns, 2007; Skinner et al., 1994), but teachers do not always implement OTR at sufficient levels (Sutherland & Wehby, 2001). Previous studies have examined the effects of training teachers in different OTR strategies on academic and behavioral outcomes (Conroy et al., 2014), but relatively few studies have examined the effects in early childhood general education settings (e.g., Gettinger & Stoiber, 2014). The purpose of the current investigation was to examine the impact of training teachers in OTR and self-management strategies to increase their students' OTR during language and literacy instruction, and to measure the impact on students' language and literacy growth. A multiple-baseline design across four Pre-K teachers was used to evaluate the degree of change in teachers' OTR, students' responding, and students' language and literacy skills. This chapter discusses the implications of the findings, directions for future research, limitations of the current study, and conclusions.

Teacher Initiated OTR

The first research question investigated whether individualized teacher training with self-monitoring increased OTR initiated by Pre-K teachers during whole-group instruction. Consistent with multiple-baseline design, the intervention was delivered to each teacher at different points in time once a stable baseline was achieved for each teacher participant. All teacher participants demonstrated relatively low rates of OTR prior to introduction of the intervention which was consistent with previous literature

(Stichter et al., 2009). During training, teachers were presented with their graphed baseline rates of OTR. Teachers also viewed brief video clips of their instruction to identify examples and non-examples of literacy related OTR during their own instruction. Two teachers (Teachers Two and Three) anecdotally expressed during the training that they were previously unaware that they provided some students with more opportunities to respond than others.

The results of the current investigation indicated that each teacher increased their rate of OTR after training. Experimental control was demonstrated over the dependent variable (rate of teacher initiated OTR) over four replications since each teacher remained at baseline levels until the intervention was introduced. For example when the intervention was introduced with Teacher One, only Teacher One increased in rate of OTR between sessions three and four while Teachers Two, Three, and Four remained at baseline levels. The results suggested that the training with self-monitoring was effective for increasing OTR during whole group instruction and supported the first research question. Figure 1 illustrates the change in level that occurred between baseline and intervention phases for each participant. There were no overlapping data between baseline and intervention phases for all participants which supported that teacher training positively affected OTR during whole group instruction. Teachers also maintained higher rates of OTR several weeks later as demonstrated by the observations in the maintenance phase. The results of the maintenance probes suggested that brief teacher training in the strategies was enough to impact teacher change over time. However although rate of OTR did not return to baseline levels, there was a decrease in the rate of OTR during the second maintenance probe for each participant. It was unclear why all participants

demonstrated higher rates of OTR during the first maintenance observation, but decreased during the second observation. The results might suggest that teachers would eventually return to baseline levels over time which was demonstrated in prior studies involving OTR as the dependent variable (Conroy et al., 2014a; Sutherland & Wehby, 2001b). Additional maintenance observations were necessary to determine if teachers continued to implement OTR at higher than baseline levels.

Student Responding

The second research question investigated whether training teachers in OTR and self-monitoring strategies affected student responding. All teachers demonstrated low levels of student responding prior to the intervention. All teachers except for Teacher Three increased their rate of student responding immediately following the intervention. Although, Teacher Three demonstrated an increase in level for student responding during the second observation during the intervention phase and mean student responding was higher for intervention sessions than baseline. The results were questionable for Teacher Four. Teacher four had the lowest levels of student responding during baseline and returned to baseline levels during the intervention phase for two of three data points. In addition, student responding returned to baseline levels during one of the maintenance observations. Based on viewing the video-taped lessons, it appeared that Teacher Four experienced more behavior problems, negative interactions with students, and interruptions to instruction from itinerant teachers. Teacher Four also had the fewest years of experience compared to the other teacher participants. Taken together, it is possible that these other variables impacted student responding in Teacher Four's class. The results suggested that the teacher training in OTR and self-monitoring strategies

affected student responding with at least three replications by conservatively not counting Teacher Four as a replication for effects on student responding. However, the findings should be viewed with caution due to the variability in the data for student responding across all teachers. In addition a decreasing trend was observed for student responding at the end of the intervention phases across teachers. A possible explanation for this finding is that students initially increased their responding due to the novelty of the teacher implementing new strategies. Another possible reason might be that teachers reverted back to previous strategies. Although the data were not recorded for the type of strategy for the current investigation, video observations revealed that the teachers used a variety of strategies to elicit student responding. Future investigations should examine how different children respond to different OTR strategies. For example, Godfrey et al. (2003) compared the effects of choral responding, cue card responding, and traditional hand raising on on-task behavior for children with identified behavior problems and found that students responded more frequently during the choral responding and response card conditions. However based on video-taped lessons in the current investigation, non- and low-responders were observed not responding to when the OTR involved choral responding. Teacher Two frequently modeled the desired response or provided cues such as "everyone tell me…" prior to eliciting a choral response from the students which appeared to increase student responding. Conversely, the expectation for student responding was not always clear for Teacher Four. For example, sometimes when she posed a question she expected all students to respond and other times she reprimanded students for responding without raising their hands. Based on viewing the video-taped observations, most students appeared to respond when individually called on by the

teacher. In a study involving 11 preschool teachers and 63 children enrolled in a childcare center, McWilliam et al. (2010) found that children demonstrated increased engagement when targeted by the teacher individually.

The ACCESS training should be modified to better target students who are low- or non-responders during whole group instruction. Teachers should also be trained to establish clear expectations for student responding and to incorporate verbal or visual cues with the OTR strategies. Perhaps if the researcher provided booster sessions during the intervention phase that allowed teachers to view student responding during the video, it would help sustain their awareness of who was not responding. Lastly, student responding decreased in level from the first to the second maintenance probe for all participants. This finding may have been a function of the decreased OTR during the second maintenance observation (see Figures 1 and 2). For example, if students were provided with fewer opportunities to respond, it would be expected that they would demonstrate lower levels of responding. Although it was encouraging that teachers increased their rate of OTR, it is more important that the increase rate positively affects student responding.

Language and Literacy Outcomes

It is critical for early childhood educators to provide young children with foundations for learning to read such as alphabet knowledge and oral language skills including vocabulary (Goldstein, 2011). The third research question investigated whether increased OTR affected students' language and pre-literacy skill levels. Two curriculum based measures were administered weekly to document student progress in alphabet knowledge and vocabulary skills over time.

According to the NELP (2008), alphabet knowledge was the strongest predictor of later reading achievement for young children. Students in the current investigation received weekly upper case alphabet probes to measure their alphabet knowledge. Results of weekly probes indicated that students gradually increased their alphabet knowledge over time. Based on the gradual progression, the increase can not be clearly attributed to the intervention. In addition, examination of individual student data revealed that some students in each class already knew all of the 26 upper case letters. Therefore, it would not be possible to demonstrate progress over time for these students on this measure due to a ceiling effect. Further confounding the results, student absences influenced mean alphabet knowledge scores. For example if a student was absent on the day of the CBM, that student's score was not computed in the mean. Therefore, the mean was influenced by whether a high achieving or lower achieving student was included in the data for that week.

The second CBM involved students answering questions related to target vocabulary associated with the curricular theme for the week's unit. Results were variable over time for students in each teacher's class. No predictable trend in data was established over time. Of greater concern, a decrease in mean vocabulary scores was noted immediately following the intervention. A possible explanation was the lack of standardization in the measure and that the difficulty of the vocabulary words differed from week to week. In addition, research suggests that explicit instruction that targets specific vocabulary is needed to positively influence vocabulary outcomes for at-risk students (Justice, 2006). The lack of findings on this vocabulary measure might suggest that teachers need additional training in direct instruction that targets curricular

vocabulary in order to improve student vocabulary outcomes of the curriculum based measure.

Threats to Internal Validity

Results should be viewed with caution for a variety of reasons. While attempts were made to minimize threats to internal validity, it is important to discuss potential threats such as reactivity, contamination, maturation, testing, and instrumentation.

Reactivity. Teachers were aware of what the researcher was looking for during observations that occurred after they were trained in OTR strategies. Although one of the premises behind the intervention was teacher awareness of their rate of OTR and student responding, teachers' awareness that they were being observed for their rate of OTR may have influenced the outcomes. The presence of the video camera in the classroom may have impacted teacher performance during observation sessions. It is possible that teachers returned to baseline levels of OTR during lessons that were not recorded.

Contamination. Five teacher participants from four different schools initially agreed to participate in the study. Only four were selected to participate since two of the teachers taught at the same school. The original sample included four teachers from four different schools to prevent possible contamination. However, one teacher withdrew from the study before baseline data collection began due to personal reasons. Therefore, it was necessary to enroll a fourth participant who happened to teach at the same school as another participant in order to demonstrate four replications of the intervention's effects. The researcher discussed the importance of maintaining experimental control to demonstrate true effects of the intervention with each teacher separately and Teachers Three and Four agreed not to discuss the study with each other or with other participants.

It is still possible that Teachers Three and Four discussed the study and the intervention. It is also possible that teachers who taught at different schools collaborated with one another about the intervention at county-wide professional development meetings. While collaboration was possible, each teacher's rate of OTR did not increase until they received training. This is demonstrated in Figure 1 where the first dotted line represents introduction of the intervention.

Maturation. Although mean alphabet knowledge increased over time for student participants in each teacher's class, the slight increasing trend over time suggested that the increase was more likely due to maturation than to the effects of the intervention. Maturation refers to change in the dependent variable that is not in response to manipulation (Christ, 2007). In order to attribute the change to the intervention, there would need to be a sudden increase in level or change in trend immediately following the intervention. These findings were not surprising considering that students were exposed to language and literacy instruction with introduction to two to three new letters each week and that once students learned new letters they were unlikely to unlearn them. This was not the case for teacher initiated OTR and for student responding. Maturation effects were ruled out for rate of OTR and student responding because of the sudden increase in level immediately following the intervention.

Testing. In addition to maturation, it was possible that testing influenced alphabet knowledge for student participants. Testing as a threat to internal validity refers to the influence of repeated administration of an assessment on the dependent variable due to additional practice over time (Christ, 2007). It was possible that student growth in alphabet knowledge was influenced by repeated exposure to the letters during weekly

probes. Again, since the increase in mean alphabet knowledge was gradual over time, experimental control was not demonstrated.

Limitations

Participants in the current investigation consisted of a sample of convenience. The researcher worked previously in the district and therefore had a preexisting relationship with the Superintendent and many of the school-based administrators. The results of the current investigation are limited to Pre-K teachers in a rural district who were willing to participate in the study. In addition to the one teacher who withdrew from the study, there were two other teachers who chose not to participate. Both teachers who chose not to participate were first year teachers. One might expect that first year teachers would benefit more from individualized teacher training with self-monitoring strategies to increase students' language and literacy skills. It is possible that teachers who were willing to participate were more motivated to try new ideas and implement interventions. Results may vary for participants who were less experienced and less willing to participate. For example, a teacher who was targeted for intervention by his or her administrator for classroom management skills or low levels of student engagement might respond differently to the intervention or may require more training and support than what were offered during this intervention.

The Social Validity Questionnaire was distributed via Surveymonkey.com to increase the likelihood that teachers would rate the intervention honestly and would not feel pressure to please the researcher. Unfortunately, this survey format prevented the researcher from asking probing questions to gain deeper understanding of the teachers' perceptions about the intervention. For example, the researcher should investigate which

components of the intervention were perceived to be disruptive to teachers' daily instructional routine to determine if it was the data collection procedures or parts of the intervention itself that the teacher found disruptive. Structured interviews with participants might reveal such information. In addition, it was interesting that all teachers reported a high level of comfort with the amount of training they received to gain competence with the strategies and intervention, but some teachers still reported that they were not completely comfortable with implementing the ACCESS cycle. Again, structured interviews are necessary to find out which parts of the ACCESS cycle teachers found most challenging. Although the survey only provided limited information about the teachers' perceived acceptability of the intervention, results may inform future investigation of the ACCESS intervention. If teachers are more involved in the research process, they may find the intervention or strategies more relevant to improving student outcomes (Alber & Nelson, 2002).

Implications of the Current Investigation

This study demonstrated that brief teacher training in OTR and self-management strategies was associated with an increase in teachers' rate of literacy related OTR during whole group instruction. Despite limitations, the current investigation has implications for practice and future investigations.

The results of this study have implications for professional development for practicing teachers. Brief teacher training in effective instructional practices and self-management strategies were a cost-effective means to improve teacher practice and did not require extensive time commitment from teachers. Most of the teachers perceived the intervention as minimally time intensive and all of the teachers reported comfort with the

amount of training they received. Struggling teachers may benefit from the individualized support and strategies to monitor their teaching behaviors. Teachers had the opportunity to view their graphed baseline OTR. Results may have been stronger in maintenance if teachers were also trained to graph their data to visualize their increased rate of OTR. Although the training was provided individually to teachers in the current investigation, the training could be provided during a one hour faculty meeting as part of a professional development series on effective instruction. Further research should investigate whether the training will impact teacher practice when delivered to a group of teachers versus individual training. The results were less clear for student responding. However, the overall mean student responding was greater during the intervention phase for each teacher. This finding might suggest that teachers who participated in the training became more skilled at using strategies to increase their students' responding.

It was disappointing that the findings for student responding were less clear and impact on student language and literacy outcomes was not demonstrated. Several threats to internal validity limited conclusions about the impact of the intervention particularly related to student outcomes. Students demonstrated increased alphabet knowledge throughout the study which was not surprising considering the students were all exposed to daily instruction with two to three new letters introduced each week. It is also likely that students were exposed to shared book reading experiences and/or educational media outside of school which could have influenced students' scores on the alphabet knowledge CBM. Additional research is needed to strengthen the findings for student responding and to demonstrate growth in language and pre-literacy skills. Additional investigation using a randomized group design with a larger sample of teachers may be

demonstrate a difference on language and literacy outcomes between classrooms where teachers were trained in OTR and self-management strategies and teachers who participated in traditional PD. In addition, data collection occurred for a relatively short period of time with a small sample of teachers. The findings would be strengthened by a study that involved more participants and longer study duration to demonstrate impact on student outcomes.

Conclusion

Despite limitations, the findings of the present study indicated that Pre-K teachers can increase their rate of literacy related OTR when provided with brief training in OTR and self-monitoring strategies. The changes in teachers' literacy related OTR also potentially increased student responding to language and literacy prompts during whole group instruction. However, variability in student responding data are reason to be cautious and might suggest the need to provide teachers with periodic support following the training. Although the challenges associated with demonstrating impact on language and pre-literacy outcomes associated change in teacher practices are well documented (Dickinson, 2011), the lack of impact demonstrated on student language and pre-literacy outcomes may have been in part a function of the research design since phase changes were based on changes in teacher behavior. Increasing OTR for all students, particularly those who display risk factors, affords students to practice their language skills and reinforce comprehension skills. Teachers who are skilled in eliciting student responding may accelerate language and literacy development for students who are at-risk and prevent later reading deficits for these students. It is critical for teachers to implement

effective instructional practices that promote early language and literacy development for all students to prevent later reading problems.

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Table 1

Strategies Studied to Increase OTR in Early Childhood Classrooms

Strategy	Study	Description	Participants and Setting	Findings
Increased Presentation Rate	Tincani & Crozier (2007)	Used an alternating treatments design to compare slow- and fast-instructional pacing	Four typically developing pre-kindergarteners identified by their teacher for their rates of off-task behavior; at an urban elementary charter school summer school program	Fast-paced instruction increased OTR, active responding, and correct responding; Variable effects were found for off-task behavior in favor of decrease during fast-paced instruction
	Lamella & Tincani (2012)	Used an alternating treatment design to compare brief and extended wait time between response prompts during one-to-one instruction	Two five year old male students diagnosed with Autism and language delays; attended an early intervention center	Brief response latency increased OTR, student participation and correct responding; marginal improvements in behavior were found during brief wait-time phases
Choral Responding	Sainato, Strain, & Lyon (1987)	A changing criterion design with criterion applied to OTR on the rate and quality of student responses before and after teacher training in a choral responding procedure using a game "Simon Says"	10 preschool-aged children with developmental delay who attended an urban, special education preschool; Three were targeted for intervention based on high levels of off-task and problem behaviors and low engagement	All three students increased on-task behaviors and accurate responding after teacher training and teachers increased OTR using choral responding procedures.
	Godfrey, Grisham-	Used an alternating	Five children ages three and	Students responded most frequently and

	Brown, Shuster, & Hemmeter, 2003)	treatment design to compare effects of choral responding, cue card responding, and hand-raising	four years old who were selected due to problems attending during instruction at a rural public preschool	increased on-task behavior in response card condition but more frequently during choral responding than hand raising for four out of five students; Problem behavior was highest in choral responding condition
Response Cards	Godfrey et al. (2003)	Used an alternating treatment design to compare effects of choral responding, cue card responding, and hand-raising	Five children ages three and four years old who were selected due to problems attending during instruction at a rural public preschool	Students responded most frequently and increased on-task behavior in response card condition but more frequently during choral responding than hand raising; Fewer occurrences of problem behavior were documented in response card condition than other conditions
	Wood et al. (2009)	Used a reversal design to compare pre-printed response cards to traditional responding	Four kindergarteners identified for lack of participation and off-task behavior in rural general education classroom	All four students increased rate of participation and reduced occurrence of off-task behavior; participation and off-task behavior returned to baseline levels when response cards were removed
Peer Mediated Strategies	Kamps et al. (1994)	Compared the effects of business as usual small group instruction to	24 tudents ages five through 12 with developmental disabilities in	Results indicated students increased OTR, academic responding, improved test

	enhanced small group instruction (teachers were trained in strategies to increase OTR, including peer-to-peer responding	self-contained special education classes in a public elementary school	scores, and decreased behavior problems after teachers received training

Table 2

Summary of Student Characteristics by Teacher

Characteristics	Teacher 1	Teacher 2	Teacher 3	Teacher 4
FARMS	40%	100%	50%	60%
IEP	5%	10.5%	20%	15%
ESOL	5%	21%	5%	15%

Table 3

Summary of Teacher Profiles

Participants	Years of Experience	Race	Education
Teacher 1	29	Caucasian	Bachelor's degree Early Childhood
Teacher 2	8	Caucasian	Bachelor's Early Childhood/ Master's in Reading
Teacher 3	6	Caucasian	Bachelor's in Early Childhood
Teacher 4	3	Caucasian	Bachelor's in Elementary Education with Special Education minor

Table 4

ACCESS Mnemonic

A	Awareness (of Self and Student Responding)
C	Choose a strategy to engage low- or non-responders
C	Collect Data
E	Examine Results
S	Set Goals for Self and Low- or Non-responders
S	Start Over

Table 5

Social Validity Survey Questions

How comfortable were you with implementing the ACCESS cycle?
How time intensive was it for you to implement the ACCESS cycle in your planning and as part of your whole group instruction?
How comfortable were you with the amount of training you received in gaining competence to implement the ACCESS cycle?
How difficult was it for you to implement the ACCESS cycle?
How disruptive was it to your routine to implement the ACCESS cycle?
How useful was the ACCESS cycle to improving your instruction?
How useful were the OTR strategies during your whole group instruction?
How likely are you to continue to implement the OTR strategies during your instruction?
How likely are you to continue to implement the ACCESS cycle during lesson planning and instruction?
How true is the following statement? As a result of this project, I provide more opportunities for all students to respond during whole group instruction.
How true is the following statement? As a result of this project, I provide more opportunities for all students to respond during other instructional activities (ex., small group, centers).
As a result of this project, I increased my awareness of student responding during whole group instruction.
How true is the following statement? As a result of this project, I increased student responding to language and literacy prompts.
How true is the following statement? I think increasing all students' opportunities to respond during language and literacy activities is important to increase student language and literacy outcomes.
How true is the following statement? I think my students benefited from my participation in this study?

Table 6

Descriptive Statistics for Opportunities to Respond by Teacher

	Baseline M(SD)	*Baseline Range*	*Intervention M (SD)*	*Intervention Range*
Teacher One	1.77 (.32)	1.40 – 2.00	3.42 (.72)	2.10 – 3.30
Teacher Two	1.85 (.57)	1.00 – 2.60	3.90 (.88)	2.70 – 5.80
Teacher Three	1.43 (.39)	.80 – 2.00	3.40 (.47)	3.00 – 4.30
Teacher Four	1.78 (.48)	1.40 – 2.70	3.33 (.40)	3.10 – 3.80

Table 7

Rate of Opportunity to Respond per Minute by Teacher and Observation Session

	Teacher			
Session	Teacher One	Teacher Two	Teacher Three	Teacher Four
1	1.90	2.10	1.70	
2	2.00	1.70	1.30	
3	1.40	1.00	2.00	1.60
4	3.10	2.20	1.30	1.40
5	4.30	1.50	1.60	1.50
6	4.10	2.60	2.00	1.40
7	2.10	4.20	1.10	2.70
8	3.20	5.80	0.80	1.50
9	2.50	4.00	1.10	1.40
10	3.60	3.60	1.40	2.60
11	3.60	3.30	3.10	1.40
12	4.20	4.10	4.30	2.30
13	4.30	2.70	3.20	1.90
14	2.60		3.20	1.60
15			3.80	3.10
16		4.70		3.80
17	3.70	3.30	3.00	3.10
18	3.10	3.30	3.20	
M1	3.50	4.20	3.20	3.30
M2	2.10	3.00	2.70	3.10

Note. Shaded area indicates baseline rates of OTR.

Table 8

Descriptive Statistics for Student Responding

	Baseline M (SD)	*Baseline Range*	*Intervention M (SD)*	*Intervention Range*
Teacher One	.80 (.10)	.70 - .90	2.25 (.98)	.50 – 3.60
Teacher Two	1.05 (.23)	.80 – 1.40	2.15 (.87)	1.10 – 3.90
Teacher Three	.94 (.32)	.50 – 1.60	1.80 (.86)	.70 – 3.40
Teacher Four	.57 (.37)	.20 – 1.60	1.67 (.90)	1.10 – 2.70

Table 9

Rate of Student Responding per Minute by Teacher and Observation Session

	Teacher			
Session	Teacher One	Teacher Two	Teacher Three	Teacher Four
1	0.80	1.10	1.60	
2	0.90	1.20	0.70	
3	0.70	1.00	0.90	0.60
4	1.20	0.80	0.60	0.20
5	3.60	0.80	0.90	0.90
6	3.60	1.40	1.20	0.40
7	0.50	2.70	1.00	0.30
8	2.80	1.60	0.50	0.60
9	2.20	2.20	0.90	0.90
10	2.40	1.20	1.10	1.60
11	3.00	1.40	0.70	0.20
12	3.00	2.30	3.40	0.40
13	2.20	1.10	1.30	0.30
14	1.10		2.10	0.40
15			2.10	1.10
16		3.90		2.70
17	2.30	2.90	1.70	1.20
18	1.30	2.20	1.30	
M1	3.30	2.40	2.30	2.10
M2	1.70	1.70	1.20	1.60

Note. Shaded area indicates baseline rates of student responding.

Table 10

Mean Student Alphabet Knowledge by Teacher

	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9
Teacher 1	17.33	17.64	19.10	18.33	18.73	20.22	NA	19.64	20.40
Teacher 2	12.90	13.50	14.89	14.70	15.67	19.00	16.12	16.43	17.14
Teacher 3	11.15	11.83	15.00	15.27	15.15	13.91	18.50	17.38	17.38
Teacher 4		7.69	8.83	8.00	10.83	9.66	8.82	10.08	10.18

Note. Shaded area indicates mean alphabet knowledge during baseline phase.

Table 11

Mean Student Vocabulary Knowledge by Teacher

	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9
Teacher 1	3.50	4.09	3.40	3.44	3.18	4.89	NA	3.00	3.40
Teacher 2	4.10	3.30	4.22	3.80	1.78	1.87	3.00	4.50	NA
Teacher 3	1.33	1.09	1.25	2.45	1.76	2.33	NA	2.33	NA
Teacher 4	NA	3.23	1.83	2.92	3.00	3.83	3.75	2.92	2.10

Note. Shaded area indicates mean vocabulary knowledge during baseline phase.

Table 12

Results of Social Validity Questionnaire Part One

Question	Very	Mostly or Somewhat	Moderately	Minimally	Not at all
	n (%)	*n (%)*	*n (%)*	*n (%)*	*n (%)*
How difficult was it for you to implement the ACCESS cycle?	0	1 (25%)	2 (50%)	1 (25%)	0
How disruptive was it to your routine to implement the ACCESS cycle?	0	1 (25%)	0	3 (75%)	0
How comfortable were you with the amount of training you received in gaining competence to implement the ACCESS cycle?	0	4 (100%)	0	0	0
How useful was the ACCESS cycle to improving your instruction?	0	0	4 (100%)	0	0
How useful were the OTR strategies during your whole group instruction?	1 (25%)	1 (25%)	1 (25%)	1 (25%)	0
How likely are you to continue to implement the OTR strategies during your instruction?	2 (50%)	0	2 (50%)	0	0
How likely are you to continue to implement the	0	2 (50%)	2 (50%)	0	0

ACCESS cycle during lesson planning and instruction?

Note: Numbers indicate the number of teachers who responded in the category out of four

Table 13

Results of Social Validity Questionnaire Part Two

Question	Very	Mostly	Partially	Minimally	Not at all
	n (%)	*n (%)*	*n (%)*	*n (%)*	*n (%)*
As a result of this study, I provide more opportunities for all students to respond during whole group instruction.	1 (25%)	2 (50%)	1 (25%)	0	0
As a result of this study, I provide more opportunities for all students to respond during other instructional activities (ex., small group)	1 (25%)	1 (25%)	2 (50%)	0	0
As a result of this study, I increased my awareness of student responding during whole group instruction.	1 (25%)	1 (25%)	1 (25%)	1 (25%)	0
As a result of this study, I increased student responding to language and literacy prompts.	1 (25%)	1 (25%)	2 (25%)	0	0
I think increasing all students' opportunities to respond during language and literacy activities is important to increase student language and literacy outcomes.	2 (50%)	1 (25%)	1 (25%)	0	0
I think my students benefited from my participation in this study.	2 (50%)	1 (25%)	1 (25%)		

Note: Teachers were asked to rate the truthfulness of each statement. Numbers indicate the number of teachers who responded in the category out of four.

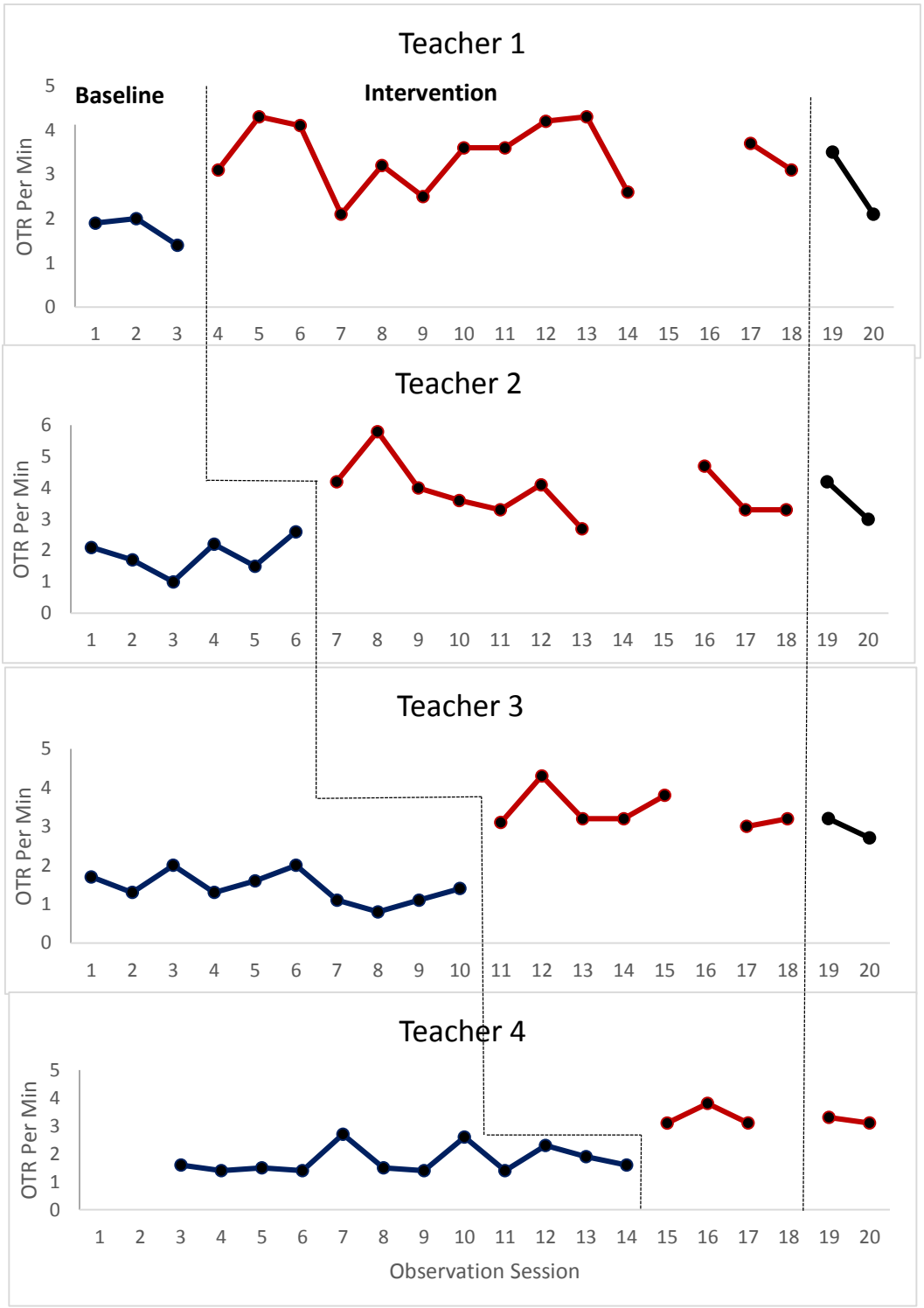


Figure 1. Average Opportunity to Respond per Minute by Teacher for Baseline, Intervention, and Maintenance Phases.

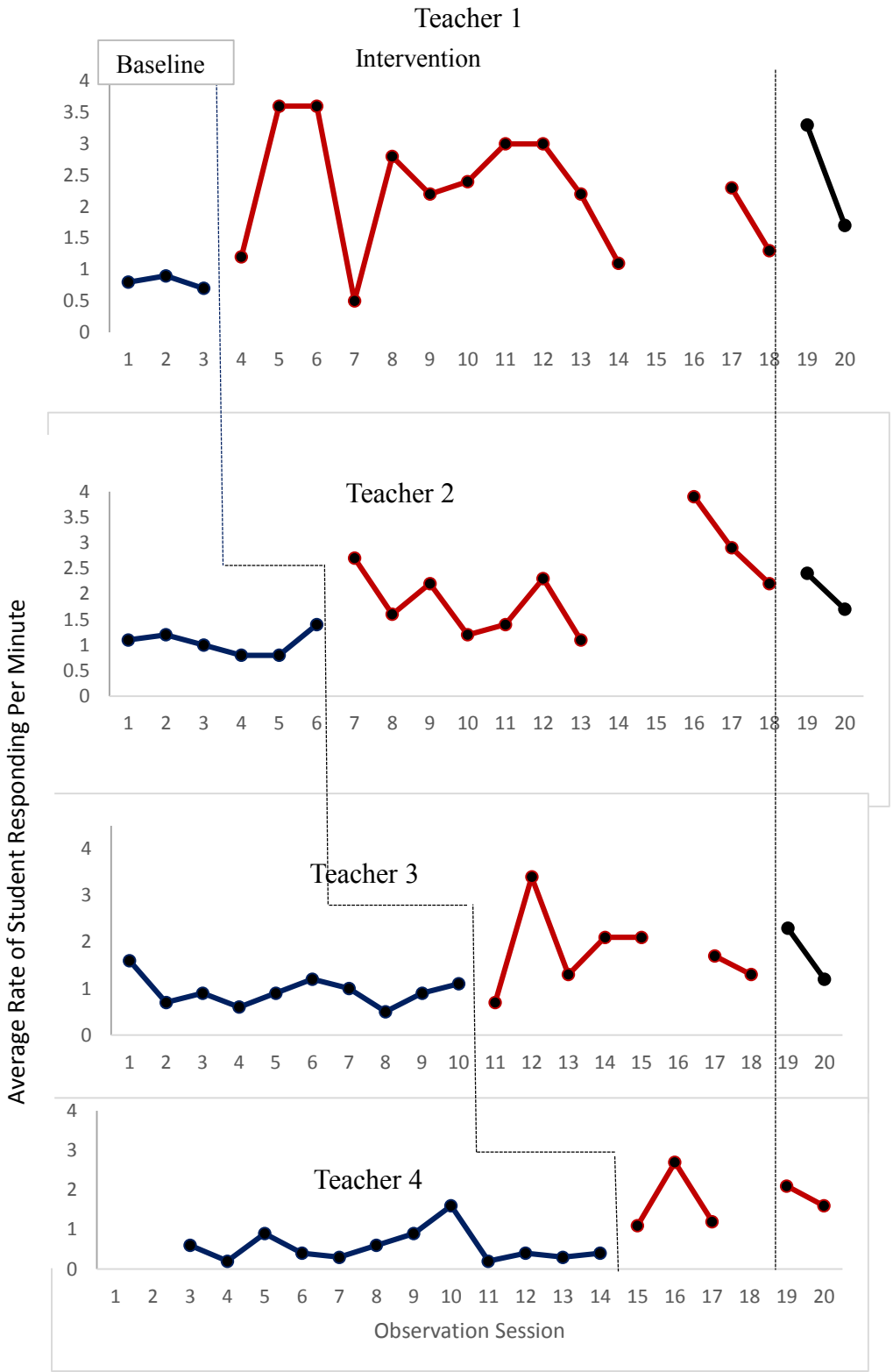


Figure 2. Average Student Responding per Minute by Teacher for Baseline, Intervention, and Maintenance Phases.

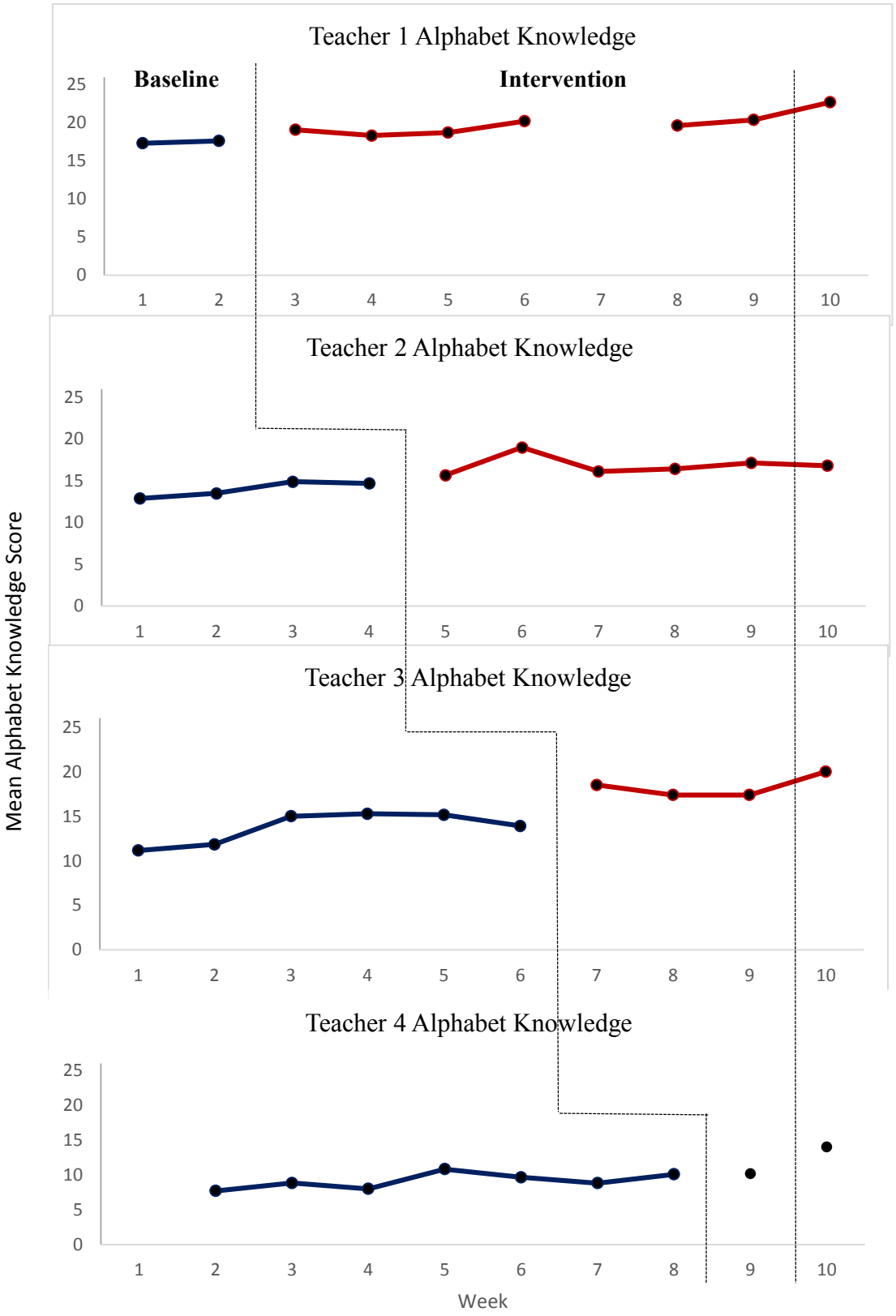


Figure 3. Mean Student Alphabet Knowledge by Teacher's Class During Baseline, Intervention and Maintenance Phases.

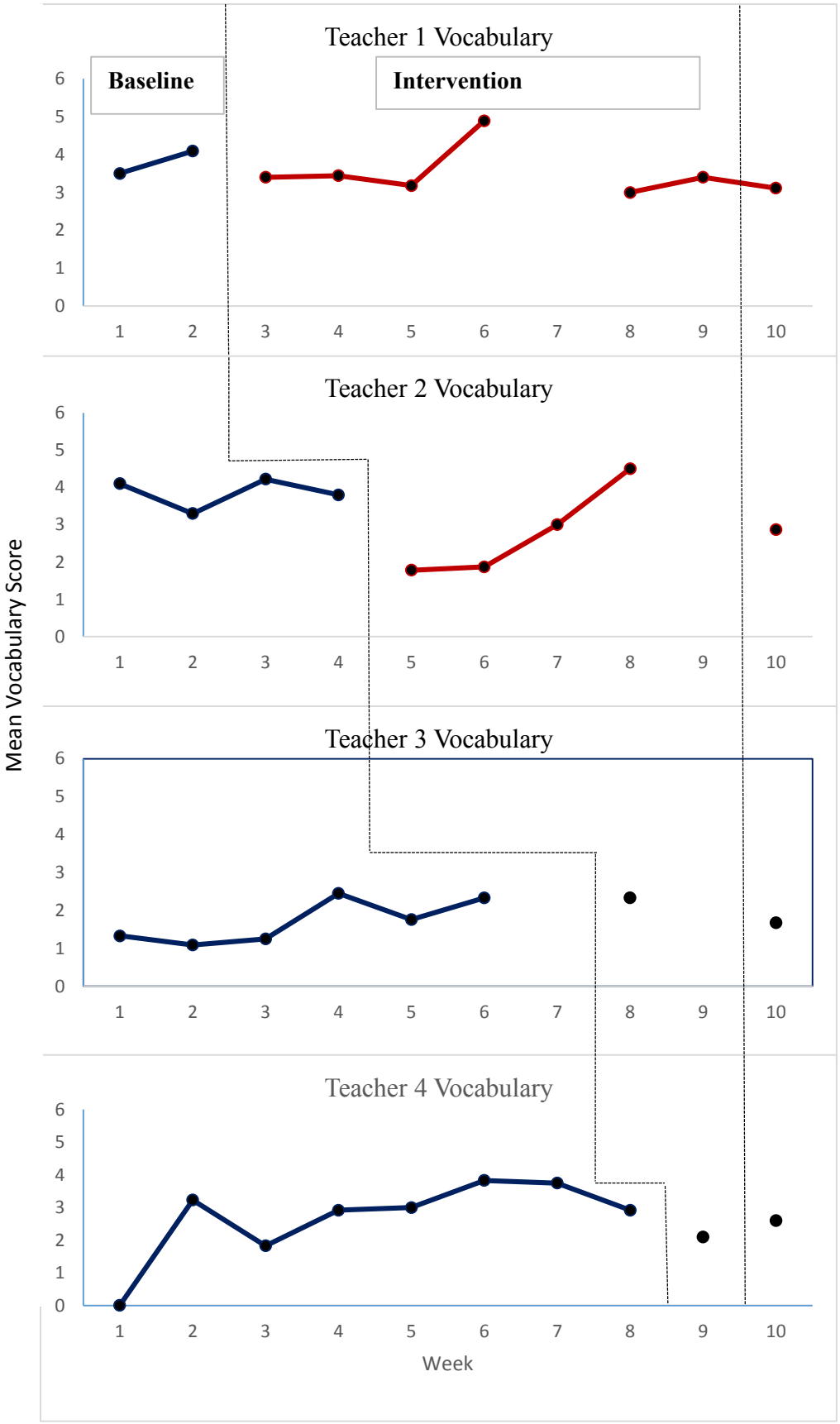


Figure 4. Mean Student Vocabulary Knowledge by Teacher's Class During Baseline,

Intervention, and Maintenance Phases.

Appendix A

Johns Hopkins University
Homewood Institutional Review Board (HIRB)

Informed Consent Form

Title:	The Effects of Training Pre-Kindergarten Teachers to use Self-Management Strategies to Increase At-Risk Students' Opportunities to Respond (OTR) to Literacy Prompts
Principal Investigator:	Laurie U. deBettencourt
Date:	9/24/2014

PURPOSE OF RESEARCH STUDY:

- The purpose of this research study is to examine the effects of teacher training in effective instruction on students' opportunities to respond to literacy prompts in the classroom.
- We anticipate that four to six teachers and up to 80 students will participate in this study.

PROCEDURES:

- You will distribute and collect an information and consent form to all students in the classroom to obtain parent consent for their child's participation. You will select 5-7 students from those whose parents provided written consent to administer weekly, language and literacy assessment that will take between one and five minutes to administer.
- You will be observed and video-taped during whole group language and literacy instruction to measure student opportunities to respond to teacher initiated literacy prompts. Video recording will occur for 10-20 minutes two times per week for approximately 15 weeks.
- You will receive a one-hour training in instructional strategies to increase opportunities for student responding during language and literacy instruction and you will monitor your own progress using the strategies. The training will take place in your classroom at a mutually convenient time for you and the researcher when the students are not present. Examples of such times are immediately before/after school or during your planning period. The researcher will provide periodic feedback and support as needed for successful implementation of the strategies which may

require up to 15 minutes of your time each week.

RISKS/DISCOMFORTS:

- The risks associated with participation in this study are no greater than those encountered in daily life [or during the performance of routine physical or psychological examinations or tests]. Procedures are in place to ensure your confidentiality. Video recordings will not be uploaded to the internet and will be stored with the researcher in a locked filing cabinet in researcher's office.

- Your individualized data will not be shared with the District or Principal or other administrators from your school. Participation in the research will not affect your employment status.

BENEFITS:

- You may benefit from training in effective instructional strategies to implement during language and literacy instruction. The strategies are designed to engage all learners and provide reinforcement of critical skills for early language and literacy development.

VOLUNTARY PARTICIPATION AND RIGHT TO WITHDRAW:

Your participation in this study is entirely voluntary: You choose whether you participate. If you decide not to participate, there are no penalties, and you will not lose any benefits to which you would otherwise be entitled.

If you choose to participate in the study, you can stop your participation at any time, without any penalty or loss of benefits. If you want to withdraw from the study, please contact the researcher at shooks2@jhu.edu or 443-262-5086.

If we learn any new information during the study that could affect whether you want to continue participating, we will discuss this information with you.

CIRCUMSTANCES THAT COULD LEAD US TO END YOUR PARTICIPATION:

Under certain circumstances we may decide to end your participation before you have completed the study. Specifically, we may stop your participation if circumstances such as prolonged absence prevent you from continuing in the study.

CONFIDENTIALITY:

- Any study records that identify you will be kept confidential to the extent possible by law. The records from your participation may be reviewed by people responsible for making sure that research is done properly, including members of the Johns Hopkins University Homewood Institutional Review Board and officials from government agencies such as the National Institutes of Health and the Office for Human Research Protections. (All of these people are required to keep your identity confidential.) Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

IF YOU HAVE QUESTIONS OR CONCERNS:

You can ask questions about this research study now or at any time during the study, by talking to the researcher(s) working with you or by calling Sara Hooks, Doctoral Student at 443-262-5086 or shooks2@jhu.edu, or the Principal Investigator Laurie deBettencourt debetten@jhu.edu.

- If you have questions about your rights as a research participant or feel that you have not been treated fairly, please call the Homewood Institutional Review Board at Johns Hopkins University at (410) 516-6580.

SIGNATURES

WHAT YOUR SIGNATURE MEANS:

Your signature below means that you understand the information in this consent form. Your signature also means that you agree to participate in the study.

By signing this consent form, you have not waived any legal rights you otherwise would have as a participant in a research study.

_____

Participant's Signature **Date**

_____

Signature of Person Obtaining Consent **Date**

(Investigator or HIRB Approved Designee)

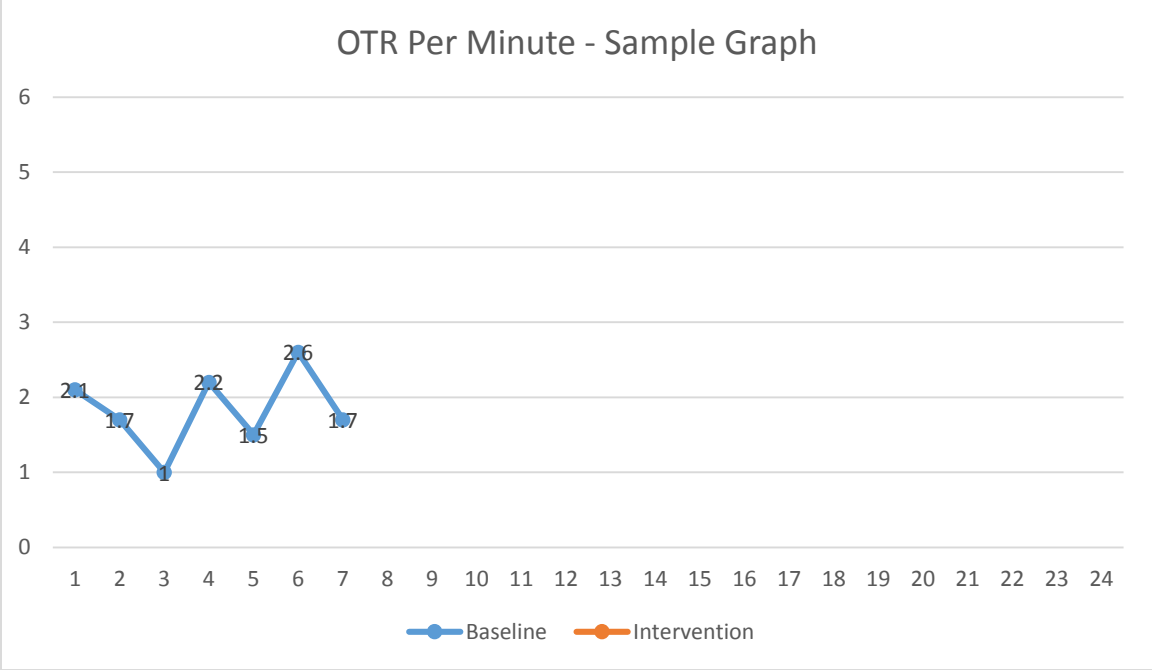
Appendix B

Teacher Training Fidelity Checklist

Training Component	Estimated Time
☐ Definitions of OTR and Literacy Related OTR was discussed	3 minutes
☐ The importance of OTR as an effective instructional practice during language and literacy instruction was presented	2 minutes
☐ Teachers are presented with cue card containing mnemonic ACCESS and the mnemonic is discussed	2 minutes
☐ Teachers will receive their baseline implementation data and student data in graphic display and it was explained by the researcher.	3 minutes
☐ Examples of when the teacher issued a literacy related OTR were demonstrated from baseline implementation	5 minutes
☐ Strategies were presented with examples	10 minutes
☐ Teacher had the opportunity to ask questions	5 minutes
☐ Goals were established to increase OTR in future lessons with guidance from the researcher to include in lesson planning	5 minutes
☐ Training to self-monitor and record literacy related OTR using the click-counter with practice occurred	5 minutes

Self-Recording Directions

1. Using the ACCESS mnemonic, set goals for rate of OTR and plan for engaging (low/non-responders)
2. Time your language and literacy instruction (should be at least 10 minutes)
3. Use the clicker to monitor each time you issue a literacy related OTR
4. After the lesson, calculate the rate of OTR by dividing the total number of OTR by the length of time for the session. For example, if you counted 25 OTR and the lesson was 20 minutes long your calculation would be 25/20 = 1.25.
5. Record the rate on the graph. Using the example above you would write 1.25.



CURRICULUM VITAE
Sara D. Hooks

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EDUCATION

Ed.D. Education	Johns Hopkins University, May, 2015	Special
M. Ed. Education	University of Maryland, May 2009	Special
B.S.	University of Maryland, May, 2001	Education
A.A. Studies	Anne Arundel Community College, May, 1998	General

PROFESSIONAL EXPERIENCE

Johns Hopkins University Associate,	2011-present	Doctoral Fellow, Faculty Department of Special Education
Judy Center Partnerships Program	2009-2011	Early Intervention Specialist, Infants and Toddlers
Kent Island Public Schools Chairperson (PK-2)	2004-2009	Special Education
Kent Island Public Schools (Case	2002-2004	Special Education Teacher Manager (6^{th}-8^{th})

Kent Island Public Schools 2001-2002 Special Education Teacher (6^{th}-8^{th})

PEER –REVIEWED MANUSCRIPTS IN PROGRESS

Hooks, S. D., Fraser, D., & Nagro, S. (under review). *Beyond classroom management 101: Proactive strategies to increase student achievement and decrease problematic behavior.* (Submitted to *Teaching Exceptional Children).*

Hooks, S. D. (in progress). *The effects of training pre-kindergarten teachers to use self-management strategies to increase at-risk students' opportunities to respond to literacy prompts*. (Dissertation).

Hooks, S. D. (in progress). *Strategies to increase students' opportunities to respond and interact in early childhood settings*. (*Submitting to Young Exceptional Children*).

Hooks, S., True, J.M., Fraser, D., & Kennedy, M. (in progress). *Evidence-based special education content delivery in teacher preparation.* (Submitting to *Computers in Education*).

Nagro, S., **Hooks, S.,** & Fraser, D. (in progress). *Teachers in the driver's seat: Using teacher input to design school-wide professional development.*

True, J.M., Nagro, S., **Hooks, S**., Larsen, K., & Fraser, D. (in progress). *Predictors of effective collaborative teacher preparation.* (Submitting to *Teacher Education and Special Education*).

PRESENTATIONS

Hooks, S. D., Fraser, D., & Nagro, S. (2014, Nov). *A decade of practice: Are special educators using research-based tertiary interventions.* Paper presented at the Teacher Education Division for the Council for Exceptional Children Conference, Indianapolis, IN.

True, J., Nagro, S., **Hooks, S.,** Larson, K., & Fraser, D. (2014, Nov). *Does instructor-pair collaboration improve special education teacher preparation?* Paper presented at the Teacher Education Division for the Council for Exceptional Children Conference, Indianapolis, IN.

Hooks, S. D. (2014, Apr). *All children can engage in school from the start (ACCESS)*. Poster presented at the Council for Exceptional Children Conference, Philadelphia, PA.

True, J., Nagro, S., **Hooks**, S., Larson, K., & Fraser, D. (2014, Apr). *Does instructor-pair collaboration improve special education teacher preparation*. Poster session presented at the Council for Exceptional Children Conference, Philadelphia, PA.

Nagro, S., **Hooks**, S. D., & Fraser, D. F. (2013, Nov). *Using teacher input to provide school-wide professional development with proactive strategies*. Paper presented at the Teacher Education Division for the Council for Exceptional Children Conference, Fort Lauderdale, FL.

Hooks, S.D. (2013, Apr). *A comparison of school readiness and 3^{rd} grade reading achievement among student in general education and special education who*

received early intervention services. Paper presented at the Council for Exceptional Children Conference, San Antonio, TX.

Carran, D. T., J. D., Nunn, J. & **Hooks, S. D.**, & Brigham, F. J. (2013, Feb*). Uses of a Statewide Longitudinal Data System to Evaluate and Inform Programs, Policies, and Resource Allocations.* Paper presented at the 26th Annual Management Information Systems Conference, Washington, DC.

PROFESSIONAL WORKSHOPS

Hooks, S. D. (2014). *All students can engage in school from the start (ACCESS): Professional development series.* Presented to early childhood teachers, Queen Anne's County Public Schools, Centreville, MD.

Hooks, S. D., Fraser, D., & Nagro, S. (2013). *Proactive teaching strategies to promote student engagement and learning session 2: Visual and motor strategies.* Presented to general and special education teachers, Baltimore City Public Schools, Baltimore, MD.

Hooks, S. D., Fraser, D., & Nagro, S. (2013). *Proactive teaching strategies to promote student engagement and learning session 1: Whole group strategies.* Presented to general and special education teachers, Baltimore City Public Schools, Baltimore, MD.

Hooks, S.D. (2011). *The transition process, extended IFSP option, and family involvement: Part B to C.* Presented to local IEP teams in Queen Anne's County, MD.

Hooks, S. D. (2010). *Differentiated instruction.* Presented to general and special educators, Queen Anne's County, MD.

Hooks, S. D. (2010). *Delivering accommodations to students with disabilities in inclusive settings.* Presented to paraprofessionals, Queen Anne's County, MD.

Hooks, S. D. (2010). *Maintaining confidentiality.* Presented to paraprofessionals, Queen Anne's County, MD.

GRANTS AWARDED

Hooks, S. D., (2013). Race to the Top: Early Learning Challenge. Sponsored by the Maryland State Department of Education. Amount: $3,000.

UNIVERSITY TEACHING AND INTERN SUPERVISION

Johns Hopkins University- Baltimore, MD 2012 - Present

Responsible for teaching graduate courses and supervising special education interns. Courses taught include:

- ED.871.501.91 Introduction to Children and Youth with Exceptionalities ONLINE
- ED 874.524.61 Spoken and Written Language: Methods for Students with Mild and Moderate Disabilities
- ED 871.501.61 Introduction to Children and Youth with Exceptionalities

- ED.871.513.61 ED Special Education Applied Behavioral Programming
- Teaching assistant for ED 877.810.61 Induction Internship in Severe Disabilities

Editorial Review Boards

Editorial Assistant *Teacher Education and Special Education* 2012 - Present

Student reviewer for *Teacher Education and Special Education* 2013 - Present

Special Issue Editor, *New Horizons for Learning online journal Volume X, Issue 2 Focus on Autism* Spring, 2012

PROFESSIONAL MEMBERSHIPS

American Education Research Association
Council for Exceptional Children

CERTIFICATIONS AND TRAININGS

- Advanced Professional Certificate in Special Education with Reading12 and Administrator I endorsements issued July, 2010 from Maryland State Department of Education
- Completion of Center on the Social and Emotional Foundations for Early Learning (CSEFEL) Training Modules 2010
- Completion of the Special Education Leadership Academy (SELA) through MSDE (9/2009)
- Completion of the TEACCH program for instructing students with Autism Spectrum Disorders at the University of North Carolina (8/2009).

Completion of the TEACCH Advanced Topic