Summer 2010

Parent Interventionists in Phonodialogic Emergent Reading with Preschool Children

Sabra B. Gear
Old Dominion University

Parent Interventionists in Phonodialogic Emergent Reading with Preschool Children

by

Sabra B. Gear
Bachelor of Arts, May 1997: Mary Baldwin College
Master of Science, August 2006: Old Dominion University

A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirement for the Degree of

Doctor of Philosophy

Special Education Concentration

OLD DOMINION UNIVERSITY
August 2010

Approved by:

Peggy P. Hester, PhD (Director)
Old Dominion University

Maureen A. Conroy, PhD (Member)
Virginia Commonwealth University

Andrea DeBruin-Parecki, PhD (Member)
Old Dominion University

John A. Nunnery, PhD (Member)
Old Dominion University

Sharon A. Raver-Lampman, PhD (Member)
Old Dominion University

Abstract

Parent Interventionists in Phonodialogic Emergent Reading with Preschool Children

Sabra B. Gear
Old Dominion University, 2010
Director: Peggy P. Hester, PhD

The purpose of this study was to examine an activity-based intervention, dialogic reading with embedded explicit phonological awareness strategies, applied as a preventive approach by parents in their home settings located within a culturally and ethnically diverse urban region. This study investigated the effects of training parents to employ a phonodialogic activity-based emergent reading intervention protocol to increase the phonological awareness skills of their 4- and 5-year old children. Helping young children learn phonological awareness skills are vitally important to the development of early reading (Anthony & Lonigan, 2004; Ziolkowski & Goldstein, 2008). This investigation provided an empirical examination of a critical area which has received little experimentation. Though there is ample empirical evidence on the contribution of phonological awareness to children's reading skills, there is virtually no research on the contribution of phonological awareness instruction on the early reading development of young children when it is embedded within the context of a dialogic reading activity with parents as interventionists. Accordingly, the theoretical underpinnings of this study, specifically phonological awareness, activity-based intervention, and dialogic reading are discussed in the literature review section. This dissertation describes methodology and the results of testing the hypothesis that parental phonodialogic reading strategies will have an observable positive treatment effect on preschool children's phonological awareness skills when baseline, intervention, and maintenance conditions are compared.

Dedication

This dissertation is dedicated to the memory of Kimberly Gail Hughes who shared both her promise and her mission with us. "There is a subtle difference between a mission and a promise. A mission is something you strive to accomplish—a promise is something you are compelled to keep. One is individual, the other is shared. When a mission and a promise are one in the same…that's when mountains are moved and races are won."

Hala Moddelmog

Acknowledgements

Extraordinary effort, encouragement, support, and patience from everyone involved have contributed immensely to the completion of this project. I offer my heartfelt gratitude to my committee chair and members, and my education colleagues for their expert guidance and invaluable feedback in this work.

I am honored to have garnered the support of my fabulously talented and dedicated research team, Nicole, Jonna, Michelle, Elizabeth, and Alison.

I extend my sincere appreciation to the preschool directors, teachers, and staff who welcomed me into their center. To each of the parents and their children who volunteered and offered their talents, time, and energy in research study participation, I will be eternally grateful for all you have taught me. My wish for you is that you hold fast to your dreams in life and let your worries slip through your hands like sand on the beach.

Finally, I acknowledge the wellspring of faith, hope, and charity given from my family and friends that has sustained me throughout my doctoral program. A tear and a smile rise up from my heart when I reflect on your love and support. I promise all that you have given will never be squandered. I will pay it forward as long as I shall live. Thank you all very much.

Table of Contents

List of Tables

List of Figures

CHAPTER 1

Statement of the Problem

"It is not a small or unworthy task to learn *'what the book says.'* " (Thorndike, 1917)

Introduction

Reading proficiency is a national priority. Since the passage of *The No Child Left Behind Act of 2001* (NCLB; P. L. 107 – 110), there has been a major emphasis on student reading programs (Nunnery & Ross, 2007; Ross, et al., 2004), kindergarten through third grade, to ensure that every student achieve in reading at or above grade level, by the end of the third grade year. Effective instructional methods and materials to prevent reading failure and to remediate reading problems are essential activities in support of this national mandate. Identifying the role that phonological awareness plays in learning to read is "probably the most significant advance in the scientific study of reading and related skills" (Pogorzelski & Wheldall, 2005, p.1). Phonological awareness has been demonstrated to have a clear and consistent relationship with later conventional literacy skills and is a strong predictive variable in literacy development (National Institute for Literacy, 2008). Many researchers have demonstrated that children as young as 3- to 5-years-old can begin to learn the process of developing phonological awareness, including rhyming and alliteration, blending, and segmentation (Burgess & Lonigan, 1998; Gillion, 2005; Lonigan, Burgess, Anthony, & Barker, 1998; Lundberg, Frost, & Peterson, 1988; Rvachew, Ohberg, Grawburg, & Heyding, 2003). Further, an additional intent of NCLB 2001 is to improve student reading achievement by strengthening the coordination among family literacy programs, early literacy programs, and schools.

Among the children identified at highest risk for developing later reading difficulties are children from low socioeconomic backgrounds (Foster & Miller, 2007; McLoyd, 1998; Neuman, 2007; Neuman & Celano, 2001; Neuman & Roskos, 2005). Children whose early language awareness and literacy socialization needs have not been met in their home environment often enter school behind their peers in key aspects of cognition, including phonological and print awareness, oral language, and vocabulary (Hart & Risley, 1992, 1995; Justice, Bowles, Pence, Khara, & Skibbe, 2009; Marvin & Mirenda, 1993; Marvin & Wright, 1997). When a child's early language and literacy skills are compromised, parental support and educational interventions are crucial to overcome these challenges. Parental involvement in the education of young children, who are either at-risk or have been identified with a disability, is considered a necessary component in the delivery of effective and efficient intervention (Bailey et al., 2006; *Individuals with Disabilities Education Act* [IDEA], 2004). Understanding how parents and professionals work together to develop early reading interventions that serve to enhance the quality of parent-child relationships clearly merits further investigation (Guralnick, 2002).

Chapter Overview

This chapter will describe an activity-based intervention--dialogic reading with embedded explicit phonological awareness strategies--applied as a preventive approach that was conducted by parents in their home settings located within a culturally and ethnically diverse urban region. Specifically, this study investigated the effects of a phonodialogic activity-based emergent reading intervention on phonological awareness skills. Helping young children learn phonological awareness skills, such as the ability to identify alliteration and rhyme, and the ability to blend and segment onset and rime, are vitally supportive of emergent reading development (Anthony & Lonigan, 2004; Ziolkowski & Goldstein, 2008). Though there is ample empirical evidence on the contribution of phonological awareness to children's reading skills, there is virtually no research on the contribution of phonological awareness instruction on the emergent reading development of young children when it is embedded within the context of a dialogic reading activity with parents as interventionists. Accordingly, the topography of the theoretical underpinnings of this study will be reviewed. Specifically the relationship between early language development and the role of phonological awareness in emergent reading, the role of dialogic parent-child reading activity as a context for learning and readiness for school, and the importance of a parent's ability to use prevention intervention strategies with his/her child to prompt and scaffold the child's language, emergent reading development, and phonological awareness will be presented. This will be followed by the significance of the proposed study and the research questions to be addressed.

Child development and school readiness. The majority of young children with typical development begin formal education prepared to learn; however, others rate low on school readiness skills, such as cognitive abilities and social behaviors (Konold & Pianta, 2005). These school readiness skills are similar to those (e.g., cognitive, affective, and behavior abilities) required for building positive teacher-pupil relationships and continued school success into the middle school years (Gable, Hester, Hester, Hendrickson, & Sze, 2005) and beyond.

During the preschool years, some children show signs of serious delays in the age-expectant growth of cognitive, social-emotional, and behavior skills regarded as valuable for school readiness. In a nationally representative study of 242,865 children in public pre-kindergarten programs from six randomly-selected states, Barbarin et al. (2006) found the children showed lower early language skills when compared to their math and social competencies at entry to pre-kindergarten. Young children differ not only in their growth-rate trajectories, but also in their patterns of development (Catts, Bridges, Little, & Tomblin, 2008; Clay, 1977; Mann & Foy, 2007).

Children with atypical development patterns may experience difficulties in a number of domains, such as language and communication, perceptual and motor abilities, social-emotional behavior, and cognition. Difficulties in those areas have been identified as precursors of speech and language impairments (SLI; Foster & Miller, 2007; Snow, Burns, & Griffin, 1998; Snowling, Adams, Bishop, & Stothard, 2001), learning disabilities (LD; Coleman, Buyssee, & Neitzel, 2006), emotional disabilities (ED; Hester, Baltodano, Gable, Tonelson, & Hendrickson, 2003), and mild intellectual disabilities (ID; Borkowski et al., 2004) in older children. Taken together, this cluster of disability categories are usually referred to as mild disabilities, when contrasted with more significant disabilities, such as autism, multiple disabilities, traumatic brain injury, and severe and profound intellectual disabilities.

For several decades, researchers have suggested there is considerable overlap among specific characteristics (e.g., language, academic achievement, emotional adjustment, intelligence and adaptive behavior) that serve to identify children with mild disabilities, also known as high incidence disabilities (Hallahan & Kauffman, 1977;

Neisworth & Greer, 1975; Ysseldyke, Algozzine, Shinn, & McGue, 1982). Of these characteristics, low academic achievement has been presumed to overlap to a greater extent among these high incidence disability categories, yet controversy exists over whether cross-categorical instruction represents a scientifically validated practice for these children in school (for a review, see Caffrey & Fuchs, 2007). Even children with similar characteristics, such as low academic achievement or language delay, will more than likely have diverse learning needs requiring an individualized instructional approach.

Historically, early childhood special education (ECSE) and early childhood education (ECE) have both embraced the perspective of individual differences that is sensitive and responsive to a child's unique rate of growth and pattern of change (Bricker & Gumerlock, 1988; Carta, 1995). Educators in both professions have worked toward developmentally appropriate practices (i.e., DAP) to improve children's overall school readiness, of which emergent reading is a primary component. While DAP and ECSE practices have a number of salient differences, the most obvious being the law (IDEA, 2004; P. L. 108 - 446) mandating the individualization process for children with disabilities, many of the practical distinctions are a matter of emphasis rather than premise. On one hand, ECSE emphasizes positive outcomes, the role of families, and professional collaboration (Raver, 1999, 2005, 2009). On the other hand, DAP emphasizes an integrated curriculum with engaging activities offering children a rich array of teacher-supported choices (Charlesworth, 1998; Copple & Bredekamp, 2008). Weaving together these two sets of practices, DAP and ECSE, can provide a more complete perspective of the cognitive, social-emotional, and behavior needs of young children with diverse abilities, helping educators design and deliver individualized and developmentally appropriate emergent reading interventions (c.f., Novick, 1993).

As an example, Carta (1995) identified 11 common practices between ECSE and DAP that can be used to develop, deliver, and evaluate intervention programs for individual children by a number of early childhood professionals and caregivers. These common practices can be employed across a variety of settings, such as early childhood education, childcare programs, and in the home. They are as follows: (a) providing programs to meet specific needs of children and families through parent and caregiver involvement, (b) assessing children using naturalistic, multidimensional methods (e.g., activity-based, curriculum-based, ecobehavioral, direct observation and recording), and linking assessment to instruction, (c) facilitating active engagement across materials, activities, and settings using systematic instruction, (d) developing social competence by enhancing opportunities for social interactions, (e) developing cultural competence by providing multicultural experiences, (f) considering the full range of evidence-based strategies to help children meet the achievement standards, (g) embedding assessment and instruction within activities and routines, (h) maximizing opportunities for incidental, or child-initiated learning, (i) modifying the environment to promote prosocial behaviors, (j) arranging environmental prompts to help children learn behavioral sequences, and (k) employing cooperative learning and peer-assisted learning strategies. Effective interventions for enhancing the emergent reading skills of individual children can be developed by matching each child to each task and providing a beneficial balance of learning challenges, raised expectations, combined with supportive learning environments, and scaffolding instructional strategies.

Reading as a language process. Reading is an elaborate language process and is not an easily learned task. Reading requires the ability to decode written language and activate reasoning to construct linguistic meaning (Perfetti, 1984; Stanovich, 1994; Thorndike, 1917; Walcutt, 1967). Furthermore, proficient reading results from the assimilation of a core of language knowledge and the application of a set of related skills through which further educational and lifelong experiences evolve. As an adult in the United States, reading opens doors to educational, social, vocational, and economic opportunities, and contributes to mental and physical health (Lyon, 2002). Within these broad constructs reside the bare necessities to follow road signs, understand contracts, and identify prescription labels, as well as enjoy the simple pleasures of reading newspapers, magazines, and books. Parents who do not read well face serious barriers trying to support their child's learning to read, which can permeate through a family cycle of illiteracy. Family literacy programs have attempted to stem the tide of illiteracy, but there are several critical factors that influence their effectiveness (e.g., participation, curriculum, staffing/administration, and funding) (DeBruin-Parecki, 2009; DeBruin-Parecki & Krol-Sinclair, 2003; DeBruin-Parecki & Paris, 1997; Rodriguez, Hines, & Montiel, 2009; Swick, 2009).

As a child in the United States, the development of a positive self-concept and high self-esteem is significantly related to being able to read proficiently (Lyon, 2002). A child who does not learn to comprehend meaning from text due to low reading ability will also be adversely affected in further informal and formal schooling (Manset-Williamson, St.John, Hu, & Gordon, 2002). Children and youth who continue to have low language or reading abilities throughout their school years are at higher risk for a wide range of long-term challenges, such as behavior problems (Kaiser, Hancock, Cai, Foster, & Hester, 2000; Lindsey & Dockrell, 2004), special education referrals, school failure, high school drop-out, adolescent pregnancy, juvenile delinquency, and poor mental and physical health (Altarac & Saroha, 2007; Perez-Johnson & Maynard, 2007).

Failure to learn to read is recognized by many researchers as a language-based problem (Ball & Blachman, 1991; Bishop, 2003; Bowyer-Crane et al., 2008; Bradley & Bryant, 1983; Fletcher et al., 1994; Gottardo, Siegel, & Stanovich, 1997; Gottardo, Stanovich, & Siegel, 1996; Hatcher, Hulme, & Ellis, 1994; Shankweiler et al., 1999; Share & Gur, 1999; Snowling & Hulme, 2006; Torgesen, 2000, 2002). These investigators focused on identifying deficits in areas of phonological processing, such as phonological awareness that help to explain the discrepancy between the ease with which most children are able to acquire spoken language and the frustration many of the same children encounter in learning to read. Fortunately, these early language and reading problems have been shown to be both identifiable, and to a considerable extent, responsive to early interventions (Hindson et al., 2005; Simos et al., 2002; Stanovich, Cunningham, & Cramer, 1984).

The role of phonological awareness in reading. Phonological awareness (sometimes called phonological sensitivity) is the ability to attend to and manipulate sequential units of sounds, such as syllables, onsets, rimes, and phonemes, within spoken language (National Institute for Literacy, 2008). It is widely agreed that children will struggle to decode text if they cannot detect and manipulate the distinctive sounds within spoken language (Gamse, Jacob, Horst, Boulay, & Unlu, 2008; Torgesen, 2000, 2002; Ehri, Dreyer, Flugman, & Gross, 2007). Furthermore, recent improvements in instruments and tools designed to measure phonological awareness in young children have helped to advance this body of literature (Marston, Pickert, Reschly, Heistad, Muyskens, & Tindal, 2007; McBride-Chang, Wagner, & Chang, 1997; Missall, McConnell, & Cadigan, 2006; Sodoro, Allinder, & Rankin-Erickson, 2002). Consequently, there is an increasing emphasis on the inclusion of phonological awareness training in programs designed to teach young children emergent reading skills, and helping them to become more proficient readers in elementary school (National Institute of Child Health and Human Development [NICHHD], 2000).

Currently, programs for early screening, accurate identification, and proper instruction can impact phonological awareness, among other early literacy skills, and have been used to help some children develop their school readiness skills (Howell, Partridge, Landrum, & Invernizzi, 2003-2004; Invernizzi, Justice, Landrum, & Booker, 2004; Invernizzi & Meier, 1999; Lennon & Slesinski, 1999; McIntosh, Graves, & Gersten, 2007; O'Connor, Fulmer, Harty, & Bell; Simmons et al., 2007; Whitehurst et al., 1994). Three landmark initiatives have spurred a decade of widespread public support for early reading assessment, instruction, and research. The Reading First (U.S. Department of Education, 2008) and Early Reading First (U.S. Department of Education, 2007) initiatives at the national level, and the standards-based initiative at the state level (Virginia Department of Education, 2007) are publicly funded efforts that address the critical issues surrounding reading.

Reading First has identified the five essential components of reading (e.g., phonemic awareness, phonics, fluency, vocabulary, comprehension) as suggested by the National Reading Panel (NICHHD, 2000) for inclusion in classroom assessment, instruction, and scientific research (Katz, Stone, Carlisle, Corey, & Zeng, 2008). School districts and states receive funding through Reading First toward meeting the goal of ensuring all children can read proficiently by the end of the third grade year.

Early Reading First, a national effort to also improve school success, serves children from low-income families by granting federal funds for early childhood programs that demonstrate they will enhance language and cognitive development. Standards-based initiatives in early childhood education at the state level aim to build a solid foundation for achievement for all children (Neuman & Roskos, 2005). These initiatives represent a broad movement to meet the early reading needs of all children; however, they tend to generally align preschool standards with the K – 12th grade curriculum, rather than to establish effective research-based interventions from a perspective of early childhood development that appreciates individual differences.

Activity-based intervention: dialogic reading. Oral language skills help to support emergent reading progress (Al Otaiba, Kosanovich-Grek, Torgesen, Hassler, & Wahl, 2005; Anthony & Lonigan, 2004; Cheung, 2007; Gray & McCutchen, 2006; Justice & Kaderavek, 2004). Promoting emergent reading progress, therefore, requires intervention which focuses on this core of interacting language and literacy skills, and is effective particularly for children who are most developmentally, socially, and economically at risk for later reading problems. Extensive literature supports an intervention used between adults and preschool children, known as dialogic reading (Arnold, Lonigan, Whitehurst, & Epstein, 1994; Blom-Hoffman, O'Neil-Pirozzi, & Cutting, 2006; Blom-Hoffman, O'Neil-Pirozzi, Volpe, Cutting, & Bissinger, 2006; Crain-Thoreson, & Dale 1999; Hargrave, & Senechal, 2000; Lachner, Zevenbergen, & Zevenbergen, 2008;

Lonigan & Whitehurst, 1998; Morgan & Meier, 2008; Whitehurst et al., 1988; Zevenbergen, Whitehurst, & Zevenbergen, 2003) a strategic method of structured interactive adult and child picture- or story-book reading.

Through the dialogic reading process, the child learns to act as the storyteller while the adult assumes the role of active listener (Whitehurst et al., 1994). Dialogic reading has been described as a way for teachers, parents, and other adults to evoke children's verbal responses to the story through open-ended questioning, elaborating, and prompting children to provide more sophisticated descriptions of story content. Children are encouraged to actively engage in the dialogic reading process through positive reinforcement from the adult in the form of positive feedback (e.g., praise), repetitions, and expansions of language.

While ample research suggests the dialogic reading process can improve young children's oral language skills, there is a paucity of empirical evidence that it increases phonological awareness, which vitally supports the emergent reading progress of children at risk for reading difficulties. Dialogic reading interventions between adults and children have been shown to improve the vocabulary and expressive language skills of children from middle- (Whitehurst et al., 1988) and lower socioeconomic (SES) backgrounds (Hargrave & Senechal, 2000; Whitehurst et al., 1994). Aram (2006) found children age 3- to 5-years-old from low-SES environments increased in their vocabulary, as well as their alphabet knowledge with an intervention that combined alphabet (e.g., print awareness) skill activities with teacher-pupil dialogic reading. Children's alphabet knowledge has been also positively related to parent-child dialogic reading (Lachner, Zevenbergen, & Zevenbergen, 2008), as have children's on-task verbalizations (Blom-Hoffman et al., 2006), and story telling skills (Zerbergen et al., 2003). Whitehurst et al. (1999) studied preschool children's early literacy skills, including letter knowledge and letter-sound correspondence, finding they increased significantly with a parent-child and teacher-pupil dialogic reading intervention concomitant with a phonemic awareness classroom curriculum. However, recent syntheses (Cutspec, 2004, 2006) and a meta-analysis (Mol, Bus, de Jong, & Smeets, 2008) of the extant literature on dialogic reading reveal the major foci have been on measuring changes in adult reading behavior, or changes in children's oral language development with no attention paid to changes in the child's phonological skills.

Parents as interventionists. Childhood learning patterns are clearly established in the early years. Environmental, social, and behavioral factors that impact learning provide a more pragmatic focus for early childhood intervention than biologically-based causes that are likely to have fewer remedial options. Although it is developmentally appropriate practice to follow a child's lead, parents do not need to wait for children to demonstrate a need to learn to read before they initiate language and literacy activities. Well-timed recommendations and sufficient support for parents offered proactively about how to begin helping their children develop early language and reading skills can help propel them toward catching up with their peers. Parents can learn to promote their children's early language and reading experiences in myriad ways that are supported by the literature.

From birth, parents can enhance the quality and quantity of parent-child verbal communications by actively listening, responding, imitating, repeating, extending, and expanding upon their children's uses of language (Brown-Gorton & Wolery, 1988;

Dodici, Draper, & Peterson, 2003; Hancock, Kaiser, & Delaney, 2002; Hart & Risley, 1992; Hemmeter & Kaiser, 1994; Hester, Kaiser, Alpert, & Whiteman, 1995; Rush, 1999). Parents, including fathers (Duursma, Pan, & Raikes, 2008), can tell stories and read picture books to their babies (Hardman & Jones, 1999; North & Allen, 2005) and young children (Arnold & Colburn, 2007; Britto, Brooks-Gunn, & Griffin, 2006; Fletcher, Perez, Hooper, & Claussen, 2005). Further, parents who participate in story sharing at a local library (Campbell, 2004) and family literacy groups (DeBruin-Parecki, 2009; DeBruin-Parecki & Krol-Sinclair, 2003; Jay & Rohl, 2005) and early literacy support programs (Waldbart, Meyers, & Meyers, 2006), read story books to their older children more often (Fielding-Barnsley & Purdie, 2003) and listen to their children read to them (Darling & Westberg, 2004). Parents can increase the amount and quality of their dialogue during interactive book reading (Arnold et al., 1994; Clingenpeel & Pianta, 2007; Crain-Thoreson & Dale, 1999; McNeill & Fowler, 1999). Parent-directed explicit instruction of their children's early language and literacy skills, such as rhyme (Bradley & Bryant, 1983), alliteration (Justice, Kaderavek, Bowles, & Grimm, 2005), and scaffolding of preschoolers phonological awareness skills (Skibbe, Behnke, & Justice, 2004), can influence their later reading abilities (Al Otaiba & Smart, 2003). Parents can also help their children through involvement in their school activities (Dearing, Kreider, Simpkins, & Weiss, 2006; DeCusati & Johnson, 2004; Faires, Nichols, & Rickelman, 2000). Parents can become more reflective and aware of their own literacy beliefs and behaviors, and how these influence their children's language and literacy development (Bingham, 2007; Crowe, 2000). Finally, parents can strengthen these early language and literacy experiences by increasing the number of demonstrations of warmth, affection, and nurturance for their children (Merlo, Bowman, & Barnett, 2007). Parents are the secret ingredient---able to balance high challenge and expectations, to kindle motivation, and to supply bountiful support, crafting the best recipe for their children's reading acquisition and attainment.

Apart from the evidence of the effectiveness and potential to positively influence children and their families, mounting a feasible, efficient, and cost-effective parent implemented intervention is not a simple task. Ongoing concerns in the field of family literacy revolve around the vital issues of securing sufficient funding and accountability, recruiting and retaining participants, monitoring progress and measuring outcomes, establishing the relevancy for children and families from culturally and ethnically diverse backgrounds, and identifying intervention goals and objectives (DeBruin-Parecki, 2009; Swick, 2009).

Concerns about the role of parents as interventionists in explicitly teaching their children early literacy skills stress the need for empirical investigations of detailed intervention methodologies developed and demonstrated to be beneficial to parents and children while targeting emergent reading skills. Since early language and literacy starts in the home environment where parents, across all cultural, ethnic, and socioeconomic backgrounds, want their children to be academically successful, parent implemented early intervention, targeting fundamental reading skills, has the potential to directly assist many parents in supporting their children to become proficient readers.

As a widening achievement gap in reading converges with evidence that parents can be supported as children's first teachers of early literacy skills, the children who have been identified as at risk for reading difficulties would likely benefit the most from parent implemented emergent reading intervention (Duursma et al., 2008; Faires et al., 2000; Fielding-Barnsley & Purdie, 2003; Jay & Rohl, 2005). Moreover, studies examining factors that contribute to the treatment integrity and social validity are needed to better understand how to support parents in helping their children (Briesch, Chafouleas, Lebel, & Blom-Hoffman, 2008). Activity-based interventions that are practical, enjoyable, and reinforcing to parents and children have a greater likelihood of implemented as prescribed with efficacious and sustainable results. Conversely, if children and parents find the intervention strategies to be stressful, tedious, or otherwise uncomfortable, they may not actively participate, the children may experience emotional or behavioral problems, thus making implementation more difficult and positive treatment effects unsustainable. Further, the potential for unwelcome or adverse effects need to be minimized through careful monitoring of treatment integrity, in addition to ongoing parent to trainer communication. These aspects of the research protocol while rarely examined or reported in studies have been recognized as crucial determinants in analyzing the efficacy in early intervention outcomes (Hester et al., 2003), and upholding ethical guidelines for professional practices (Council for Exceptional Children [CEC], 1983).

Developing interventions that meet the children's needs, and are responsive to the preferences and tendencies of parents requires careful consideration of family strengths. Family literacy researchers have used multiple methods and multiple informants to gather information about the language and literacy environment in home-based settings. As an example, Neuman, Koh, and Dwyer (2008) developed the *Child/Home Environmental Language and Literacy Observation* (CHELLO) an assessment system to determine the quality of home-based factors related to positive language and literacy outcomes. This instrument is theoretically based on Bronfenbrenner's (1979) ecological systems that stress the interconnectedness and hierarchical arrangement of four child supportive systems: micro-, meso-, exo-, and macro-system. The CHELLO provides a checklist to assess the literacy environment, a group/family observation form, and a caregiver provider interview.

Other less formal methods have been used, such as parent questionnaires and reports to gather information from parents about their children's emergent literacy abilities, interests, and home literacy practices (Boudreau, 2005). Parents' assessments of their children's early literacy skills has been found to be well-correlated with tests in kindergarten and other teacher assessments, suggesting that parents are a valuable source of information that can help to predict children's later reading achievement (Dickinson & DeTemple, 1998). Descriptive analyses of direct observations (Borrero, Vollmer, Borrero, & Bourret, 2005; Hemmeter & Kaiser, 1994; Hester et al., 1995) have also been employed to observe, detail, and measure environmental and behavior variables that can influence children's language and literacy development. Further, DeBruin-Parecki (2009) developed the *Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007) to simultaneously assess parent-child joint storybook reading behaviors. This method has a unique feature and use to inform parents how they can adapt their verbalizations (e.g., question, predict, connect) to best help their children's language and literacy development. A broad range of early literacy assessment approaches will offer flexibility to parents who express interest in teaching at home to uncover a good intervention fit for parents and their children. Information gathered from assessments can assist parent-trainers in making recommendations about intervention strategies that have been shown to be effective, and friendly to use.

Purpose of the Study

The purpose of this study was to examine the utility of an activity-based intervention, dialogic reading with embedded explicit phonological awareness strategies, applied as a preventive approach by parents in their home setting that is located within a culturally and ethnically diverse urban neighborhood. Specifically, this study investigated the effects of a phonodialogic activity-based emergent reading intervention on phonological awareness skills: a) rhyme identification, b) rhyme production, c) alliteration identification, d) blending onset-rime, and e) segmenting onset-rime. Though helping young children learn phonological awareness skill is vitally supportive of emergent reading development (Ziolkowski & Goldstein, 2008; Anthony & Lonigan, 2004), there is virtually no research on the contribution of phonological awareness instruction on the emergent reading development of young children when it is embedded within the context of a dialogic reading activity with parents as interventionists.

The hypothesis of this study reasoned that parental phonodialogic reading will have an observable positive treatment effect on preschool children's phonological awareness skills from baseline compared to intervention. The specific hypotheses examined follow:

(1) Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by rhyme identification (ending sound awareness) from baseline compared to intervention and maintenance.

(2) Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by rhyme production from baseline compared to intervention and maintenance.

(3) Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by alliteration identification (initial sound awareness) from baseline compared to intervention and maintenance.

(4) Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by blending onset and rime (beginning and ending) sounds from baseline compared to intervention and maintenance.

(5) Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by segmenting onset and rime (beginning and ending) sounds from baseline compared to intervention and maintenance.

(6) Parent interventionists will be able to demonstrate a high degree of treatment fidelity (content and process) by meeting a target goal of reading the books provided for this study at least four times per week using phonodialogic reading strategies during a nine-week study duration period.

(7) Parent interventionists will rate their satisfaction with the training intervention sessions to implement phonological awareness strategies with their children as positive and worthy of their time and effort.

CHAPTER 2

Literature Review

Introduction

The importance of teaching young children to develop specific phonological awareness skills that precede and directly relate to reading acquisition must not be underestimated. There has been general agreement among many researchers that young children's sensitivity to speech sounds enables the emergent reader to make necessary corresponding connections to the English alphabetic system (Fox & Routh, 1975; Kozminsky & Kozminsky, 1995; Leiberman, Shankweiler, Fisher, & Carter, 1974; Zifcak, 1981). An alternative explanation suggests the process of learning to read sensitizes the young reader to the relevant phonological units in spoken language (Ehri, 1989; Morais, Cary, Alegria, & Bertelson, 1979). Although reciprocity is apparent, an underlying causal connection between phonological awareness and reading has been widely assumed (Perfetti, Beck, & Bell, 1987; Pufpaff, 2009; Stanovich, 1993; Torgesen, Wagner, & Rashotte, 1994).

Beyond this basic assumption, several questions are posed to extend this search towards a better understanding of the process of instruction and acquisition of phonological awareness skill. Which phonological awareness skills are most predictive of early reading success for children of preschool age? How can a strong family-focused intervention be combined with an effective measurement system to sustain children's growth in phonological awareness skill development? To what extent have experimental studies resulted in parents instructing preschool children in these key early reading skills? What empirical evidence exists concerning the effectiveness of parents using dialogic reading strategies with children in preschool to help develop phonological awareness skills? A systematic review of the empirical literature will attempt to answer these questions, thus providing the theoretical and research basis for the methodology to be presented in the next chapter.

The studies in this review included children of preschool age, and either used an intervention where parents or caregivers read books with children, or measured dependent variables related to early literacy skills, particularly phonological awareness. Other factors for inclusion were studies that included young children with specific risk factors such as speech and language delays and socioeconomic disadvantage that are related to reading disabilities. The studies were peer-reviewed research articles mostly published from 1999 – 2009. Although there was a priority for studies published within the last ten years, earlier studies were selected if they pioneered an influential path of research, provided a distinct perspective from the extant literature, or were often cited as important to this field. An asterisk at the beginning of the reference listing denotes the studies that met these criteria.

Chapter Overview

The scope of this chapter includes three primary subsections: (a) phonological awareness research associated with early reading success for preschool children and presented via longitudinal and intervention studies, (b) activity-based intervention research as a theoretical foundation for supporting and monitoring young children's skill development in natural settings, and (c) dialogic reading research including experimental and correlation studies proposing this method of embedding explicit instructional strategies within interactive shared book reading activities. Each section will summarize a number of individual studies that have contributed to an understanding of the both the limitations within each area of research, and the core components that support the theoretical foundation for the proposed research. A brief summary will follow each of the three research area subsections, while a final chapter summary will provide a synthesis of this review of the empirical literature and a foundation for the methodological approach proposed in chapter three.

Phonological Awareness

Empirical evidence strongly suggests children who have ample opportunity to develop their oral language skills, and who are suitably instructed in the key areas of phonological awareness, letter identification, and letter-sound correspondence are well prepared for learning to read and becoming fluent readers (Burgess & Lonigan, 1998; Bus & van IJzendoorn, 1999). Studies presented in this subsection focusing on phonological awareness skills will illustrate the extent to which child outcomes have improved in this area for children who have reading disability risk factors related to socioeconomic disadvantage or speech and language delays. These key studies will also illuminate the developmental continuum of phonological awareness skills and its variable relation to emergent reading outcomes.

Bradley and Bryant (1983) conducted the first study in the literature which combined both longitudinal and intervention designs to examine the development of phonological awareness, spelling, and reading in 403 children between ages 4- and 5-years-old. The study was conducted in the United Kingdom. At the onset of the study, child participants were reported to be non-reading, which has been argued is a prerequisite to establishing a causal connection between phonological awareness and reading acquisition (Castles & Coltheart, 2004).

Longitudinal correlation data collected over four years was suggestive of a strong direct relation (r = .57) between sound categorization (i.e., phonological awareness) and reading. The intervention data from three different treatment conditions and one control condition were further suggestive of the following causal relations between phonological awareness and reading. There was no statistically significant difference on reading outcomes between the first group that received sound categorization training, and the second group that received sound categorization plus alphabet training. On the other hand, both groups one and two trained in sound categorization significantly outperformed group three that received word meaning categorization training, as well as group four that received no training.

Although promising on the surface, this original research by Bradley and Bryant (1983) has been first criticized as lacking specificity in its training and measurement of phonological awareness by focusing on alliteration and rhyme sensitivity, while ignoring phonemic sensitivity (Castles & Coltheart, 2004). Second, Castles and Coltheart further criticize the study for failing to establish a causal link. Because Bradley and Bryant did not include an alphabet only training condition, they failed to rule out that such training could conceivably offer equally beneficial effects on reading outcomes as group one (sound categorization training) and group two (sound categorization plus alphabet training).

Regarding the first item of criticism above, Anthony and Lonigan (2004) reanalyzed four large-scale studies with children ranging in ages from 2- to 7-years-old. One of the analyzed studies included data from Bryant, MacLean, Bradley, and Crossland

(1990) based upon similar measures to the original study by Bradley and Bryant (1983). Using statistical analyses, Anthony and Lonigan explained that young children's phonological sensitivity to words, syllables, rimes, onsets, and phonemes, represent the same underlying measurable ability. According to Anthony and Lonigan, this phonological ability can be measured in young children using a variety of tasks, such as detection, blending, segmenting, and elision across levels of linguistic complexity. These levels progressively range from shallow, such as word, syllable, rime, and onset, to the deeper level of phonemic awareness or sensitivity.

A final concern with the original study (Bradley & Bryant, 1983) is the dearth of descriptive information about the child participants. Other than the children's considerably low scores on measures of sound categorization, at least two standard deviations below the mean, no other information was provided to determine the existence or nature of risk factors for reading difficulty, such as diverse learning needs or socioeconomic disadvantage. Other studies, however, have begun to address these concerns about the role of socioeconomic disadvantage, developmental delay, and language delays in children's literacy development. These will be reviewed in the next section.

Socioeconomic disadvantage. Bowey (1995) examined the role of socioeconomic factors in children's early literacy skill development and first-grade reading achievement. Using multiple regression analyses, Bowey studied socioeconomic differences among 246 Australian preschool children, their language development, including phonological awareness, and their first-grade reading achievement. Not surprisingly, higher socioeconomic status based on the father's occupation predicted children's significantly higher phonological awareness scores, even after statistically controlling for differences in children's performance IQ and verbal ability scores. Further, children's phonological development measured at school entry strongly predicted their early reading achievement at the end of the first grade. Although this study was limited due to the inclusion of only a small number of participants living in poverty level conditions, Bowey's conclusions specific to phonological awareness growth were later confirmed by Lonigan, Burgess, Anthony, and Barker (1998).

Lonigan et al. (1998) compared 238 preschoolers (age range 25 – 70 months; 93% White) from middle- to upper-income families to 118 preschool children (age range 25 – 64 months; 82% African-American) from low-income families. By the age of three-years-old, children in the low-income group demonstrated substantially lower rates of phonological awareness development, than children in the middle- to upper-income group. This discrepancy remained even after controlling for group differences in receptive and expressive language scores. These results indicated that the impact of socioeconomic disadvantage upon children's phonological awareness skills may present as early as age three, yet there were no interventions provided to these children.

Gettinger and Stoiber (2007) addressed this lack of intervention research with a sample of 342 preschool children from Head Start classrooms in Milwaukee, Wisconsin, 90% of whom met the income guidelines for the U.S. federal poverty level and primarily included racial minorities. The intervention group (188 preschool students; 90% African American, 8% Hispanic, 2% White or other) received multi-tiered intervention in four early literacy skill areas: sound awareness, oral language, alphabet knowledge, and print awareness, while the control group (154 students; 92% African American, 7% Hispanic, 2% White or other) received the standard classroom instruction. The intervention group significantly outperformed the control group across all statistical language and literacy measures. It must be added that the intervention group's scores on alliteration ($\eta^2 = .22$) and rhyming ($\eta^2 = .13$), both measures of sound awareness, demonstrated the lowest intervention effect sizes compared to their highest performance on measures of alphabet knowledge ($\eta^2 = .44$) and receptive vocabulary ($\eta^2 = .45$). Although the authors of this study noted that sound awareness classroom activities appeared to play only a small role in the overall success of the intervention, the influence of unmeasured variables impacting young children's phonological skills, such as home language and literacy environments cannot be ruled out.

Helping to better prepare children for early reading instruction is a national and state priority (Gamse et al., 2008), yet programs designed to mitigate the adverse effects of socioeconomic disadvantage appear to have somewhat limited positive effects on phonological awareness skills of children who are most at risk for reading difficulties (Justice, Mashburn, Hamre, & Pianta, 2008). Some states have invested admirably in programs designed to respond to this critical need for enhancing children's early literacy skills with mixed results.

For example, Landry, Swank, Smith, Assel, and Gunnewig (2006) conducted a large-scale professional development study in Houston, Texas, randomly selecting 350 Head Start classrooms, including 750 teachers, 3,703 children in Year 1, and 2,025 children in Year 2. Children's listening comprehension and expressive vocabulary showed strong gains over the two-year study. Regrettably, two areas that did not show great progress were alphabet knowledge and phonological awareness. In fact, modest gains in these two language areas were found in only 50% of the sites studied, while larger gains in oral language comprehension were reported in 84% of the sites.

Landry et al. (2006) explained that some teachers may have perceived the explicit instructional phonological awareness activities as being more academic and less in alignment with their teaching philosophy of developmentally appropriate practices. Specific teaching activities intended to enhance children's phonological skills, for example, required systematic goal-setting and explicit instruction, which teachers found challenging to incorporate into their daily lesson activities. Conversely, teaching activities that were rendered more easily were those involving language-rich conversation and reading books to children.

Each of the next three studies looking at the impact of socioeconomic disadvantage (Justice, Chow, Capellini, Flanigan, & Colton, 2003; Molfese et al., 2006; Yeh, 2003) include somewhat smaller samples of children. Taken as a whole, the results strongly support the notion that children tend to learn what they are explicitly taught if given sufficient opportunity for repeated practice.

First, Justice et al. (2003) studied 18 children (ages ranged 48 – 60 months; 16 African-American, 2 Caucasian) from central Virginia. Children were included based upon both socioeconomic disadvantage and the presence of a developmental delay, most with atypical language development. Justice et al. found that children whose instruction included specific explicit emergent literacy strategies (e.g., name writing, alphabet recitation, and phonological awareness games) outperformed the comparison group. The comparison group experienced the same small group sessions as the intervention group, but activities varied including adult-child shared book reading to story retelling, drawing and discussing pictures and events. This relatively brief 12-week study highlights the importance of children's active engagement in explicit instruction, focusing on specific phonological and alphabetical skills such as rhyming, name writing, and letter naming. The phonological game activities consisted of rhyme detection, rhyme production, sentence or syllable segmentation, and initial sound identification (e.g., alliteration). No follow-up data were reported to determine if there were any potential long-term early reading benefits or outcomes for the participants in this study.

Secondly, some researchers (e.g., Nancollis, Lawrie, & Dodd, 2005; Yeh, 2003) have recommended that for young children, four- and five-years-old, phonemic awareness activities (e.g., phoneme segmentation, blending, deletion, and substitution) may be more effective than rhyming and alliteration in predicting higher reading achievement in second grade. Yeh (2003), for example, conducted a nine-week intervention study of 44 children (age range 4.7 – 5.6 years, $M = 5.1$; 41% Hispanic, 41% African-American, 11% Caucasian; 7% Asian) in four Boston Head Start classrooms. A phonological intervention approach emphasizing rhyming and alliteration was compared to the effects of emphasizing phoneme segmentation, blending, deletion, and substitution. Although, Yeh found that the segmentation group outperformed the rhyming group, the specific task of phoneme substitution was easier for these young children to perform. Therefore, it may be more developmentally appropriate to teach young children phonemic awareness through embedding explicit activities using blending and segmenting of onset and rime.

Lastly, research conclusions by Molfese et al. (2006) focus upon the importance of separately measuring and monitoring of children's phonological awareness skills (e.g., detection, segmentation, blending, substitution), even though these skills may tap a similar underlying sensitivity to speech sounds. Over a five-month period, Molfese et al. attempted to study the relation between phonological processing and letter knowledge development in preschool children (n = 57; M = 48.58 months) who were typically developing and from socioeconomic disadvantaged homes. Researchers used an overall composite measure for phonological processing in this sample of children that was enrolled in the same preschool program, and received a common curriculum. For one group of children (N = 27; M = 50.37 months), their gains in letter knowledge from fall to spring correlated significantly ($r = .35, p < .01$) with their scores on a composite measure of phonological processing. Conversely, a second group of children (N = 30, M = 46.97 months) was significantly different from the first in terms of younger age and lower cognitive measures, and their correlations between letter knowledge and phonological processing did not reach statistical significance. Due to study limitations in separating specific phonological skills from the overall composite measure, variations in children's performance of these skills was unable to be determined.

This study (Molfese et al., 2006) illustrates the need for refining the measurement of phonological processing skills, which may lead to better insights on providing interventions that can enable children's emergent reading skill development. The following five studies further illustrate the diversity of children's skill development, especially children included in small, clinical groupings for speech and language delays.

Speech and language delays. Two related studies (e.g., Gillon, 2005; Kirk & Gillon, 2007) followed the development of children's skills in speech production, phonological awareness, letter knowledge, early reading, and spelling over a three-year period. Across these two studies, children, ranging in age from three- to nine-years-old, with moderate to severe speech delays were provided with either speech therapy alone, or early intervention in speech combined with phonological awareness (e.g., rhyming, and blending and segmenting phonemes) and letter knowledge. Compared to a control group of their same age peers, who were typically developing and enrolled in the same type of early childhood education programs, children who received the combined intervention showed accelerated growth in phonological awareness, were reading at or above grade level, and demonstrated superior spelling performance in school. Children who received only speech therapy had improved speech production, but remained substantially delayed in their phonological awareness skills. Although there was not a group of children who were either delayed in speech or typically developing that received only the phonological awareness intervention, these results suggest there may be long-term benefits to young children's early reading skills when they are provided with effective intervention in phonological awareness.

Conclusions reported above concur with an earlier study by Wolfe, Presley, and Mesaris (2003). These researchers found that nine children with severe phonological delays improved speech articulation and sound identification following a short-term, six-week combined intervention in speech production with sound identification. Similarly, the following three studies lack longitudinal data, but they describe a variety of phonological skills that have been taught to young children with diverse learning needs with varying outcomes.

For example, O'Connor, Jenkins, Leicester, and Slocum (1993) investigated the effects of teaching three distinct phonological skills (blending, segmenting, and rhyming) to children with diverse learning needs prior to their development of a functional ability to read. The majority of child participants (*n* = 47; ages ranged 4 – 6 years) had significant language delays, but others had physical, behavioral, and intellectual disabilities. Despite finding that these young children were able to learn each distinct phonological skill they were taught at varying levels, training in one phonological skill did not generalize to improvements among other phonological skills. One exception was the group that received training in segmentation of sounds (initial sound, onset-rime sounds, and phonemes) also improved in the ability to blend continuous sounds (word, onset-rime, and phonemes). O'Conner et al. explained that blending sounds appeared to be an easier skill for children to learn than segmentation. On the other hand, Roth, Troia, Worthington, and Dow (2002) used only a rhyming intervention to teach eight children with either a receptive-expressive language disorder, or expressive phonological delay over a brief six- to eight week period. Roth et al. also discovered that significant improvements in children's rhyming ability did not lead to improvements in their ability to blend and segment sounds.

With the exception of O'Connor et al. (1993), the studies presented above in this section on speech-language delay involved relatively intensive one-to-one interventions provided to children at least three or four days per week for 10 – 45 minutes duration for each training session. Alternatively, Laing and Espeland (2005) provided a relatively low intensity, eight-week phonological awareness intervention delivered to a whole preschool class. Eleven child participants (ages ranged 3.6 – 5.6 years, *M* = 4.3) were divided into two groups: (a) Group 1 included six children with language impairment or expressive phonological impairment and, (b) Group 2 included five children with typical development. All children were taught explicit phonological awareness skills embedded into their classroom activities. Although the interventionists in this study were supervised Speech and Language Pathology students, Laing and Espeland designed the learning activities so that they could be implemented by preschool classroom teachers easily with their own students for 15 minutes twice a week. Results showed that children in Group 1 significantly improved their rhyme identification and rhyme production abilities over the duration of the short-term intervention. In comparison to Group 2, there were no longer any apparent differences in children with language impairments on the measures of phonological awareness post-intervention. The findings highlight the potential utility of a short-term intervention for children with significant language delays that can be easily implemented by embedding explicit phonological activities (e.g., rhyming, initial sound detection, letter identification, and letter-sound correspondence) into weekly instructional routines by a variety of interventionists.

Phonological Awareness Summary

The research to date demonstrates that phonological awareness is a component of phonological processing and it has typically been defined as the ability to identify and manipulate increasingly smaller units of sound segments that comprise words (Lonigan et al., 1998). Along a developmental continuum, children's improvement in the ability to use deeper levels of their phonological awareness skills (e.g., phonemic vs. syllable) tends to better predict their early reading achievement (Anthony & Lonigan, 2004; Pufpaff, 2009). Due to the developmental hierarchy of these emergent reading skills, younger children around four years of age may find shallower units (e.g., onset and rime) easier to identify and manipulate (Fox & Routh, 1975; O'Connor et al., 1993; Yeh, 2003). While there is considerable research in clinical and preschool settings with children at-risk for reading disabilities (e.g., socioeconomic disadvantage, developmental delays), only a single descriptive study (Skibbe, Behnke, & Justice, 2004) was available on adding explicit phonological activities to parent-child shared storybook reading for the duration of one week in the home setting. To further address this gap in the empirical literature, this review will present a group of studies describing a theoretical approach to providing family-focused interventions to children in naturalistic settings.

Activity-Based Intervention

Activity-based intervention is a naturalistic approach to teaching and serving the needs of young children and their families (Macy, 2007). Activity-based intervention can be useful in the delivery of family services supporting the child's social-emotional, behavioral, and language development within the parent-child dyad (Campbell, 2004; Campbell & Sawyer, 2007; Delaney & Kaiser, 2001; Hart, 2000; Raver, 2005).

According to Macy (2007), there are four components of activity-based intervention involving social, cognitive, and behavioral principles and designed to increase child engagement in meaningful activities to achieve developmental or educational goals. These four components are as follows: (a) developing functional or educational goals for children that are generalized across time, settings, events, and people, (b) implementing planned, routine, and spontaneous child-initiated activities to achieve their goals, (c) providing opportunities for children to receive timely feedback, and other reinforcement that supports the effectiveness of the intervention, and (d) providing a variety of learning opportunities for children to achieve their goals. Using the above four components as inclusion criteria with a priority toward family-focused, single-subject research interventions a small selection of three studies (Delaney & Kaiser, 2001; Hemmeter & Kaiser, 1994; Hester, Kaiser, Alpert, & Whiteman, 1995) is presented in this subsection on activity-based intervention.

Hemmeter and Kaiser (1994) used a hybrid model that merged the benefits of child language development using milieu teaching and strategies implemented by parents (Alpert & Kaiser, 1992; Laski, Charlop, & Schreibman, 1988) with the strategies of responsive interaction teaching, also implemented by parents (Tannock, Girolametto, & Siegel, 1992; Weistuch & Lewis, 1985). Milieu teaching is a naturalistic approach to fostering children's language development that incorporates behavioral principles, such as reinforcement and stimulus control over behaviors by including environmental stimuli (e.g., toys) as prompts for parent-child conversations (Hemmeter & Kaiser, 1994; Hester et al., 1995). This research represents one of the first studies to assess the effects of enhanced milieu language teaching strategies in children's language development when implemented by parents within parent-child interactions in which they are playing with toys and materials of interest to the child in the clinic and in the home setting.

Child participants in this study (Hemmeter & Kaiser, 1994) ranged in ages from two- to five-years and were identified with both receptive and expressive language delays. Parent participants included three mothers and one father. The intervention was conducted in play sessions in a training room in a university clinic setting, with generalization sessions conducted in play interaction settings in the home. Although the children were able to only participate in about 10 sessions of the fully implemented intervention due to the time required for parents to reach criterion levels across all language and communication strategies, two of the four children increased their language skills across environmental contexts (e.g., training setting to home setting). The other two children with the more severe language delays were less consistent in their language measures and use across environmental contexts.

Therefore, Hemmeter and Kaiser (1994) recommended that future studies develop intervention criterion for mastery based upon measures of child language skill development, rather than parent performance measures of strategy use. As parents are able to learn to effectively use the language intervention strategies, they can use these strategies to enhance child language in interactions at home, the car, the playground, and elsewhere (Hester et al., 2003).

In a similar study, Hester et al. (1995) investigated the effects of an apprenticeship model to train three research assistants to teach parents to use the four enhanced milieu language teaching strategies with their preschool- aged children. After the research assistants implemented the initial parent training with three parents with mentoring, generalization of mentor training was established with three additional parents. All six parents who were trained in enhanced milieu language teaching reached criterion level and generalized their training to their home setting with their children. Concurrent to the intervention, each child demonstrated modest improvements in the use of the targeted language skills and in their communications at home. This study provides further empirical evidence in support of activity-based interventions in naturalistic settings with parents as interventionists for their children's language development.

Finally, Delaney and Kaiser (2001) developed a parent-child activity-based intervention to blend communication and behavior support (BCBS) from the principles of enhanced milieu teaching as describe above. Even though long-term data were not provided, the aim of this multiple-probe across subjects design was to improve the quality of parent-child interaction patterns, especially in families with socioeconomic disadvantage, and to prevent learning and behavior difficulties. Unique to their model of enhancing the quality of the parent-child interaction is the focus on implementing the following four strategies: (a) balanced parent and child turn-taking, (b) providing meaningfully responsive feedback, (c) increased parental dialogue targeted to the child's level of language development, and (d) parental expansion and modeling of new forms of language embedded within the context of the child's activities.

As expected by Delaney and Kaiser (2001), the global parent-child communication and behavioral responsiveness improved. By taking fewer turns, parents increased the number of turns their children took in talking. Parents made fewer commands, increased their uses of praise, while decreasing their use of negative comments, and improved their appropriate responsiveness to their children's compliant and non-compliant behaviors. Parents also increased their expansions on child language, which generalized to their home setting. Child improvements in communication and behavior were somewhat more modest and variable, in part because the fully implemented language supports were only in place during the last few training sessions (see Hemmeter & Kaiser, 1994). Following implementation of the blended communication and behavior support intervention, parents reported they enjoyed the process, and were satisfied with their abilities to manage their children's behavior and provide support for their children's language problems.

Activity-Based Intervention Summary

Studies in activity-based intervention provide the theoretical foundation for an effective family-focused approach to teaching emergent reading skills that includes a rigorous measurement system based on behavioral principles (Hancock, Kaiser, & Delaney, 2002; Macy, 2007). Enhanced quality in parent-child interaction can help parents become interventionists in facilitating their children's language, communication, and behavior (Delaney & Kaiser, 2001; Hemmeter & Kaiser, 1994; Hester et al., 1995). Activity-based intervention has been instrumental in improving the generalization of children's language abilities significantly over and above a direct instruction approach (Losardo & Bricker, 1994). Moreover, activity-based interventions have been used to enhance the quality of the parent-child interaction though teaching parents to be more responsive to children's initial learning efforts, leading to increased in child engagement in everyday learning opportunities (Dunst et al., 2001). Thus, an activity-based intervention combined with dialogic reading strategies has the potential to teach parent interventionists to facilitate the development of their children's phonological awareness through everyday opportunities to read together.

Dialogic Reading

Dialogic reading is a means of scaffolding children's language and literacy skills through the interactive reading of picture or storybooks (Whitehurst et al., 1988; Whitehurst et al., 1994). It is an activity-based intervention that parents can use with the intention of teaching specific emergent reading skills to their children. In doing so, parents ask their children questions, provide positive and informative feedback, and modify their comments and questions in adjusting to the children's growth and in meeting their instructional goals. Whitehurst and colleagues (Arnold et al., 1994; Lonigan & Whitehurst, 1998; Whitehurst et al., 1994; Whitehurst et al., 1999; Zevenbergen et al.,

2003) have conducted a series of randomized trials demonstrating the effectiveness of this intervention on increasing the rate of children's language acquisition, increasing expressive vocabulary, and increasing narrative skills for children from lower-, middle- , and higher-income backgrounds. However, this line of research has not addressed using a dialogic reading approach to target children's phonological awareness skills.

According to Whitehurst et al. (1988), there are three general guidelines for organizing dialogic reading as an intervention. First, the parent uses questioning and related strategies to encourage the child to talk about the picture book, rather than limiting the child's use of language by narrating the book as the child listens. This first guideline is a necessity as the intention of this approach is to create a contextual dialogue with the child through which the parent scaffolds learning objectives. For example, asking 'wh-' type questions will usually evoke more complex child responses, than questions that can be answered with a 'yes' or 'no' or a single word response. Questions that begin with these words, for example 'where,' 'what,' 'when,' 'who,' 'why,' and 'how,' tend to request more information from the child, such as "What is happening to Ernie?"

Second, the parent uses positive and informative feedback to answer the child's responses. Within the feedback, the parent embeds imitation and modeling, language recasts and expansions, and elaborations that highlight the differences between what the children have said and how they can extend their understanding into words, phrases, and sentences. This second guideline is a necessity as it builds the quality of the parent-child interaction, which can be naturally reinforcing to both parent and child.

Third, the parent's criteria for mastery of the child's learning goals need to show progressive growth that is sensitive and tailored to the children's developing abilities. This third step is crucial as it provides a means for measuring and monitoring the child's progress and goal attainment. It also provides parents with the flexibility and information to become aware of subtle, but strategic adjustments they can make to better meet their children's needs and improve progress toward goals. Taken together, these three parameters provide the structure for parents to begin to think and instruct as an interventionist. In support of these guidelines are nine separate strategies (Whitehurst et al., 1988). Briesch et al. (2008) used the strategies to teach caregivers to implement dialogic reading with young children, ages three- to five-years-old, with high treatment fidelity across a six-week intervention period.

Although few intervention studies in dialogic reading have included treatment integrity data, teaching parents to implement a dialogic reading intervention with fidelity requires a systematic approach to improve their rates of success (Briesch et al., 2008). The uses of two acronyms encompass these nine strategies, which address the need for structure in implementing the intervention with integrity and may improve the rate of its success. The two acronyms that outline the nine strategies are listed as follows: (1) CROWD; completion prompts, recall prompts, open-ended prompts, wh- prompts, distancing prompts; (2) PEER; prompt the child to label objects in the book's pictures and to talk about the story, evaluate the child's verbalizations, expand upon the child's verbalizations, and repeat the child's verbalizations. Given the need to demonstrate discrete changes in target skills and assess the implementation of an intervention, research using single subject designs is indicated in establishing the efficacy and treatment fidelity of evidence-based practice early intervention (Horner et al., 2005;

Odom et al., 2005; Odom & Strain, 2002; Odom & Wolery, 2002; Wolery & Bailey, 2002).

Single subject study has been largely ignored as a useful method for investigating both the efficacy of dialogic reading and the fidelity with which adults implement the intervention and few studies exist in available literature bases (Hockenberger, Goldstein, & Hass, 1999; McNeill & Fowler, 1999; Ziolkowski & Goldstein, 2008). Using a multiple-baseline across subjects design, Hockenberger et al. (1999) taught seven mothers to use a commenting intervention during dialogic reading. After intervention training, all mothers exceeded the criterion for commenting on the story-related events to connect to their children's experiences. During the dialogic reading intervention, all of the children, some with developmental (cognitive and communication) disabilities and others with socioeconomic disadvantage, increased their total number of verbalizations. Children's concepts about print also showed pre- to post-intervention increases, but phonological awareness skills were not a measured variable in this study.

Similarly, McNeill and Fowler (1999) employed a multiple-baseline across subjects design to teach mothers language strategies (e.g., praise, expansion, open-ended questioning, pausing) that were embedded in a dialogic reading intervention. Three of five mothers maintained their use of the language strategies at criterion levels for nine weeks after all intervention training was completed. Although the five children responded variably, three of them demonstrated corresponding increases in the number of and the length of their conversations from their initial baseline levels through the dialogic reading intervention and maintenance conditions. Again, phonological awareness was not specifically addressed in this research.

Ziolkowski and Goldstein (2008) employed three speech-language pathology graduate students as interventionists to study the efficacy of an embedded explicit phonological awareness intervention within shared book reading for children in a preschool program, serving primarily families with socioeconomic disadvantage and children with developmental disabilities. Within this multiple-baseline across skills design, interventionists used two phonological awareness strategies, rhyming and alliteration, to increase children's skills in the identification of rhyme and alliteration, the production of rhymes, and their fluency in recognizing onset or beginning word sounds. This study represents an important contribution to the single-subject research literature in teaching children phonological awareness skills that contribute to emergent reading development.

Dialogic Reading Summary

The correlation and group design research base on dialogic reading is relatively extensive (Arnold et al., 1994; Lonigan & Whitehurst, 1998; Whitehurst et al., 1994; Whitehurst et al., 1999; Zevenbergen et al., 2003), but rarely used is single-subject experimentation (Hockenberger et al., 1999; McNeill & Fowler, 1999; Ziolkowski & Goldstein, 2008). Moreover, there have been many dialogic studies examining children's early language and literacy skills, such as concepts about print, letter knowledge, and verbalizations (Aram, 2006; Blom-Hoffman et al., 2006; Duursma et al., 2008; Hargrave, & Senechal, 2000; Justice et al., 2005). A largely neglected language domain to be addressed through dialogic reading is phonological awareness and no single subject studies to date have been found that teach parents to become interventionists in embedding explicit phonological strategies within an activity-based dialogic reading intervention.

Chapter Summary

In reviewing the currently available studies on phonological awareness, activity-based intervention and dialogic reading, it is apparent that no single subject studies have examined the specific contribution of parents employing dialogic reading for increasing phonological awareness skills of their preschool-aged children at risk for reading disabilities or reading difficulties due to either developmental delays or socioeconomic disadvantage. Thus far, studies of dialogic reading strategies applied either by parents, teachers, or research assistants have not thoroughly examined the degree to which these techniques could have an effect on the many skills involved in phonological awareness. It is important to establish whether dialogic reading can have an effect on key emergent reading skills, such as phonological awareness, because these early skills have been shown to have reciprocal causal effects on later reading acquisition and proficiency. Whether making simple changes to the intervention (e.g., adding explicit prompts for blending and segmenting onset, rime, and letter sounds) would result in substantial growth for children's phonological awareness development, appears to be worth examining because the strategies can be easily taught to parents and the dialogic reading activity is inherently parent and child friendly.

CHAPTER 3

Method

Chapter Overview and Research Questions

This chapter presents a method to investigate the effects of a phonodialogic, activity-based emergent reading intervention on phonological awareness skills. The procedures are a systematic replication of the study by Ziolkowski and Goldstein (2008), except that parents, instead of trainers, are the interventionists who were taught to employ and generalize the phonodialogic reading strategies in their home settings. Because previous research (Nancollis et al., 2005; Yeh, 2003) has suggested that specific phonological awareness skills, such as blending and segmenting onset-rime, are important predictors in children's later reading acquisition, this investigation also included measurement of those skills. The research questions posed in this study follow:

(1) Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by rhyme identification (ending sound awareness) from baseline compared to intervention and maintenance?

(2) Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by rhyme production from baseline compared to intervention and maintenance?

(3) Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by alliteration

identification (initial sound awareness) from baseline compared to intervention and maintenance?

(4) Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on their children's phonological awareness skills, as measured by blending onset and rime sounds from baseline compared to intervention and maintenance?

(5) Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by segmenting onset and rime sounds from baseline compared to intervention and maintenance?

(6) Do parent interventionists demonstrate a high degree of treatment fidelity (content and process) by meeting a target goal of reading the selected books provided for the study at least four times per week, using phonodialogic reading strategies during the nine-week activity-based study duration?

(7) Do parent interventionists rate their satisfaction with the training intervention sessions to implement phonological awareness strategies with their child participants as positive and worthy of their time and effort?

Participants and Inclusion Criteria

Six parent-child dyads from a local early child care center located in a culturally and ethnically diverse urban region were recruited as participants in the study. The twelve participants met the criteria for inclusion and participation in the study that are described below and listed in Table 1.

Table 1. Criteria for Study Inclusion and Participation

Participant Characteristics	Parent Interventionists	Child Participants
Age	At least 18 years of age	48 – 62 months
Sex	Female or Male	Female or Male
Hearing	No specific deficits	No significant deficits
Vision	No significant deficits	No significant deficits
Educational Level	No specific requirement	Final preschool year
Reading risk factor(s)	No specific requirement	1) Eligible for free or reduced lunch, and/or 2) Developmental delay in at least one domain
Informed Consent	Signed informed consent obtained	Verbal agreement to participate

Participant Characteristics

Child participants. Child participants included six children, ranging in ages from 51 – 62 months. All children were in their final preschool year prior to entering kindergarten. Based on the usual enrollment practice at the child care center, each child participant had been previously screened for normal hearing and vision. All child participants had at least one risk factor related to the development of reading disabilities (e.g., socioeconomic disadvantage, developmental delay), as evidenced by their developmental or educational history, or as measured by one or more of the study pre-intervention measures listed in the study procedures (see Table 3). Demographic information of the child participants is presented in Table 2.

Table 2. Child Participant Demographic Information

Child	Sex	Age in Months	Ethnicity	Free or Reduced Lunch	DD
1	F	51	WHC	No	Yes
2	M	53	BAW	Yes	Yes
3	F	62	BAW	No	Yes
4	M	60	WHC	No	Yes
5	M	54	WHC	No	Yes
6	M	52	BAA	Yes	No
M		55.33			
SD		4.55			
Range		51 - 62			

Note: Ethnicity classifications are based on the Commonwealth of Virginia information system used by the child care center for reporting child enrollments: WHC = White/Caucasian; BAW = Black and White; BAA = Black/African American; DD = History or current evidence of developmental delay in one or more domains (e.g., speech/language; motor; social-emotional; cognitive; or adaptive).

Teachers in the child care center helped to identify possible children for inclusion in the research project. Based on their recommendations, children and parents who met the designated criteria were selected as participants. Provided below is a brief description of each child participant's characteristics as they were observed during the pre-testing sessions and baseline phase.

Child 1 was a 51 month old, White/Caucasian female. She produced frequent speech articulation errors. She consistently glided for the /r/ sound with the /w/ sound, the /d/ sound for /g/, the /dr/ sound for /gr/, the /t/ sound for the /k/ sound (fronting). She understood the /k/ sound for the letter 'c' when she heard it. However, she could not produce the /k/ sound at the time the study was conducted. When asked to identify pictures, she quickly followed instructions and pointed to pictures readily. She was cooperative, and eager to participate in reading and testing sessions. When invited out of her preschool classroom to 'play word games' with the research assistants, she would skip to her seat at the table in the designated testing area.

Child 2 was a 53 month old, biracial (Black and White) male. He had a developmental history of epilepsy and seizures, attention deficit hyperactivity disorder, and a mild bilateral hearing loss. He was included in the child care center's free or reduced lunch program. According to his mother, he was prescribed medication to decrease seizure episodes, but he was unable to be prescribed medication to help manage his ADHD symptoms. Consequently, he was observed to have some difficulty following verbal directions, and difficulty remaining on task for more than a few minutes for reading and testing sessions. He required frequent redirection to tasks, usually three to four times during each two- or three-minute testing session. He required a consistent, high frequency reinforcement schedule to complete most storybook readings and testing tasks. He was friendly, talkative, and he demonstrated a high level of gross motor activity (e.g., jumping out of the seat, ducking under the table, jogging across the room). In pre-testing, he was unable to identify any standard consonant letter sounds and short vowel sounds, but he could identify a few rhyming and beginning word sounds.

Child 3 was a 62 month old, biracial (Black and White) female. She had a developmental history of a mild speech delay, according to her mother. However, her mother had been reading with her daughter on an almost daily basis, and at the time of the onset of the study, no speech delayed effects were observed. This child demonstrated a high level of cooperation, persisted with all reading and testing tasks, and ignored environmental (e.g., visual and noise) distractions. She missed few items on the pre-tests, and self-corrected most errors. She listened to and followed directions readily, quickly answering questions and pointing to pre-test items.

Child 4 was a 60 month old, White/Caucasian male. He had a developmental history of congenital ankyloglossia (i.e., tongue-tie or limited use of the tongue) and underwent corrective surgery (frenuloplasty) when he was 12 months of age. According to his mother, he was noticeably delayed in his speech development. She advocated for him to have this surgical procedure in part to help address his delayed speech development. At the onset of the study pre-test sessions, he cooperatively listened and pointed to pictures, but demonstrated a slightly slow verbal response (e.g., 4 – 5 second latency) to questions. In pre-testing, he was unable to identify any standard consonant letter sounds and short vowel sounds, but he could identify a few beginning word sounds and rhyming word sounds.

He exhibited a generally low gross motor activity level (e.g, resting his head on his left hand with the left elbow on the table; slightly slumping down in his seat), but he persisted with study tasks to completion.

Child 5 was a 54 month old, White/Caucasian male. He produced frequent speech articulation errors. He consistently produced the /f/ sound for the /th/ sound. He glided for the /r/ sound with the /w/ sound, and he produced an interdental lisp with the /s/ sound. In pre-testing, he correctly identified many standard consonant letter sounds and rhyming sounds, but he was unable to identify any short vowel sounds, any alternate consonant sounds, and he was unable to identify most beginning word sounds. In addition, he exhibited echolalia and tended to ignore, rather than answer, 'wh' questions. He was often distracted by environmental sights and sounds (e.g., turning around in his chair), but he redirected his attention to tasks upon request by an adult. He was highly conversational, frequently focusing on irrelevant details in picture prompts by talking about the pictures rather than answering questions. He required frequent redirection to task and repetitive questions (3 – 4 times) to complete tasks.

Child 6 was a 52 month old, Black/African American male. He was eligible for the child care center's free or reduced lunch program. He had no history of a speech, language, or other developmental delay, according to his mother. At the onset of study pre-testing, he was generally cooperative, listening to and following directions for reading and testing sessions. He usually ignored environmental distractions (e.g., visual and noise) and persisted with study tasks. However, he was somewhat slow to manually and verbally respond to questions (e.g., 3 – 5 second latency), and sometimes repeated words that the research assistant said before he answered questions or pointed to pictures.

In pre-testing, he was unable to identify any standard consonant letter sounds and short vowel sounds, but he could identify most beginning word sounds and rhyming word sounds.

Parent interventionists. Parent interventionists included six parents. At the onset of the study, they were required to be at least 18 years of age, and able and willing to provide signed informed consent. All parent interventionists also had either corrected vision or no significant deficits affecting their ability to read to their child participant. Additional parent interventionists' characteristics were assessed as part of the pre- and/or post-intervention measures and this information is provided in the Results section (see Table 13).

Settings and Materials

The study activities were primarily conducted across two types of settings—the child care center, and the respective homes of each participating parent-child dyad. Parent interventionist training sessions were conducted at the child care center in a room designated by center staff. Although parent interventionists were not limited to only reading to their child participants at home, the parent-child phonodialogic reading activities generally occurred in the home environment within their daily routines. These reading sessions occurred in a room in the home identified by parent interventionists as appropriate for the dialogic reading activity, primarily the living room area or the child participants' bedrooms.

Parent interventionists were provided with a new storybook each week for the nine weeks of the study with instructions for use in repeated dialogic reading sessions. The selection of ten storybooks were based on the following characteristics: (a) story follows conventional narrative patterns (e.g., setting; beginning, middle, ending events; character's internal state or behavior; consequential actions), (b) rhyming words appear on at least every other page, (c) pages are colorfully illustrated, (d) book length is between 16 – 32 pages, and (e) story content is developmentally-appropriate for preschool children. Storybooks also met these specific conditions: (a) they were not found in the child participants' preschool classrooms at the time of the study, and (b) they had not been previously read by parent interventionists to their child participants (Hargrave & Senechal, 2000; Ziolkowski & Goldstein, 2008). Storybook target words (e.g., target words were examples of rhyming, alliteration, blending and segmenting onset-rime) were clearly identified by underlining the words with a bright orange permanent marker (e.g., approximately ten per book) for easier identification by the parent interventionists.

Research Design

The study used a within-subjects multiple-baseline design (Baer, Wolf, & Risley, 1968) across two strategic sets of intervention conditions, which were counterbalanced and replicated across six children to investigate the efficacy of embedding explicit phonological awareness strategies in an activity-based intervention on children's rhyming, alliteration, blending, and segmenting skills. The intervention protocol was comprised of phonodialogic reading activities between parent-interventionists and their child participants. The duration of the study was for nine weeks, a time period that had been demonstrated as sufficient duration to evidence effects in dialogic reading (Briesch et al., 2008; McNeill & Fowler 1999), although not necessarily with parents as interventionists. The study also used five curriculum-based measurements to monitor the ongoing weekly progress of the intervention on the emergent reading skills of the child participants. In addition, embedded in this design were weekly generalization probes of parent-child phonodialogic reading activities in their home settings. The assessment schedule is presented in Table 5.

Procedures

Pre- and/or post-assessments. Each child participant's characteristics were evaluated individually pre- and post-intervention by speech-language pathology graduate students. An overview of the child participants' test scores from the pre-intervention measures is presented in Table 3. A comparison between pre- and post-test scores is provided in the Results section (see Table 12 and Table 13).

Table 3. Child Participant Pre-Intervention Test Scores

Child	MAVA-R $M = 100$ $SD = 15$	MAVA-E $M = 100$ $SD = 15$	ELSA-C Develop. Range ≥ 15	ELSA-PA Develop. Range = 14 – 19	ELSA-AP Develop. Range = 17 - 26	PALS-BSA Develop. Range = 5 – 8	PALS-RA Develop. Range = 5 – 7
1	96	110	26	12	25	8	9
2	< 55	99	3	0	0	2	7
3	110	111	25	18	13	10	10
4	91	83	10	8	5	3	4
5	69	81	6	9	25	0	3
6	106	100	9	7	3	9	10
M	87.83	97.33	13.17	9.00	11.83	5.33	7.17
SD	21.59	12.88	9.87	5.93	11.07	4.18	3.06
Range	< 55 - 110	81 – 111	3 – 26	0 – 18	0 – 25	0 – 10	3 – 10

Note: MAVA = *Montgomery Assessment of Vocabulary Acquisition* (Montgomery, 2008); R = Receptive Vocabulary; E = Expressive Vocabulary; ELSA = *Early Literacy Skills Assessment* (DeBruin-Parecki, 2005); C = Comprehension; PA = Phonological Awareness; AP = Alphabetic Principle (uppercase letter recognition); PALS-PreK = *Phonological Awareness Literacy Screening-Pre-kindergarten* (Invernizzi, Sullivan, Meier, & Swank, 2004); BSA = Beginning Sound Awareness; RA = Rhyme Awareness; Develop. Range = Developmental range associated with early reading success for the spring of the four-year-old pre-kindergarten year

Reliability and validity of pre- and post-test child assessments. The following standardized, developmental, norm-referenced, and criterion-referenced assessments were used in this study: the *Early Literacy Skills Assessment* (ELSA; DeBruin-Parecki, 2005); the *Montgomery Assessment of Vocabulary Acquisition* (MAVA; Montgomery, 2008); and the *Phonological Awareness Literacy Screening-PreK* (PALS-PreK; Invernizzi, Justice, Landrum, & Booker, 2004; Invernizzi, Sullivan, Meier, & Swank, 2004). The next section provides a description of each instrument, including the reliability and validity information available in the test developer's technical reports.

Early Literacy Skills Assessment. The ELSA was designed for use with children from three-years to five-years, 11-months of age, primarily as a screening tool and formative assessment to help plan for early literacy instruction (DeBruin-Parecki, 2005). The ELSA is an authentic, storybook reading assessment, individually administered by a trained examiner, who asks questions that are embedded within the story. Child responses to the examiner's questions are recorded as raw scores, which are compared to a range of developmental levels (e.g., early emergent, emergent, or competent emergent) of a child's literacy skills in comprehension, phonological awareness (e.g., rhyming, alliteration, and syllable awareness), alphabetic principle, and concepts about print.

The psychometric properties of the ELSA storybook, *Violet's Adventure*, used in this study were established by 81 teachers in 31 classrooms, including a total sample of 630 preschool children in Michigan, Maine, and Florida. Within the total pilot sample, children with special needs were disproportionately represented (23.7%); however, in the Florida pilot sample 40% of children were identified with special needs (DeBruin-Parecki, 2005).

For the most part, the validity and reliability of the ELSA as a screening tool is based on child-level data collected from the pilot study. However, the content validity of the ELSA was established by theoretical analyses and linkages of test items to the research literature across the four targeted domains, comprehension, phonological awareness, alphabetic principle, and concepts about print. Construct validity was determined using factor analyses (r = .44 - .84), with rhyming (r = .69 - .74) and phonemic awareness (r = .64) loading moderately high on one factor. However, segmentation (r = .37) and phonemic deletion (r = .34) were less strongly loaded on the same factor. Concurrent validity was established as moderately strong, when phonological awareness, alphabetic principle, and concepts about print data were correlated in total (r = .67) to the *Get Ready to Read!* screening tool (Whitehurst & Lonigan, 2001). Predictive validity was established by statistically significant increases in children's mean scores from age three- and four-years-old, to age four- and five-years-old across all of the ELSA domains, except comprehension. Reliability of the children's ELSA scores, as calculated by coefficient alpha in the fall (r = .77 - .88) and spring (r = .63 - .82), was reported as high to moderate to high across nearly all domain scales, except phonological awareness (r = .57). Phonological awareness scores were also examined at the sub-item level and found to have consistently higher coefficient alpha levels (r = .85 - .88). Overall, the ELSA offers a valid and reliable, storybook activity-based, screening measure of children's early literacy skill development.

Montgomery Assessment of Vocabulary Acquisition. The MAVA was designed to measure the receptive (listening) and expressive (speaking) vocabulary of children's development from ages three-years to 12-years, 11-months of age, and to be used as a predictor of early literacy skills (Montgomery, 2008). The MAVA is a standardized norm-referenced assessment, providing standard scores, percentile ranks, and age-equivalents. Norms established with randomly selected samples of children closely approximated the United States population demographics with respect to race/ethnicity, gender, geographic region, and socioeconomic status from the U.S. Census Bureau in 2007. Of the standardization samples, ten percent of students on the expressive section and 13% of students on the receptive section included children with diagnosed vocabulary deficits, who were receiving special education services.

Reliability evaluations of the MAVA have demonstrated high test-retest (receptive section, $r = .95$; expressive section, $r = .99$), and inter-rater reliability (both sections, $r > .99$). Validity evaluations included face validity, internal consistency, and concurrent and predictive validity measures. Montgomery (2008) determined the face validity of the MAVA from a review of the current literature involving children's vocabulary usage. Cronbach's Alpha was used to measure internal consistencies (receptive and expressive sections, $r > .90, p < .01$). Concurrent validity comparisons of the receptive section of the MAVA to the *Receptive One-Word Picture Vocabulary Test* (ROWPVT; Brownwell, 2000) were very high ($r = .94, p < .01$; $rho = .92, p < .01$). Likewise, concurrent validity comparisons of the expressive section of the MAVA to the *Expressive One-Word Picture Vocabulary Test* (EOWPVT; Brownwell, 2000) were very high ($r = .94, p < .01$; $rho = .92, p < .01$). Predictive validity for the MAVA was determined by measuring sensitivity, specificity, and the total correct number of children identified with language delays or disorders who received special education services (sensitivity), and children without language delays or disorders, who did not receive special education services (specificity). Using the conservative criterion of one and one-half standard deviation below the standard score of 77 as the cut-off level, predictive validity was high to very high (receptive section, sensitivity = 85%, $n = 39$, specificity = 100%, $n = 39$, total correct = 93%, $n = 78$; expressive section, sensitivity = 83%, $n = 40$, specificity = 100%, $n = 40$, total correct = 92%, $n = 80$). Although the MAVA is a relatively new assessment of children's receptive and expressive vocabulary, it was determined to be technically adequate for this study.

Phonological Awareness Literacy Screening-PreK. The PALS-PreK was designed as an emergent literacy screening tool and a curriculum guide to assess children of preschool age at four-years-old (Invernizzi, Sullivan, Meier, & Swank, 2004). The PALS-PreK measures the following discrete skills in this order of appearance on the test: Name Writing, Alphabet Knowledge (upper and lower case recognition, letter sounds), Beginning Sound Awareness, Print and Word Awareness, Rhyme Awareness, and Nursery Rhyme Awareness. The child's score obtained for each skill is compared to the developmental range that has been associated with success in emergent reading in the spring of the child's preschool year.

Invernizzi et al. (2004) determined the PALS-PreK to be technical adequate based on reliability and validity estimates from their fourth pilot study (2003 – 2004) conducted on this screening tool. For reliability, they calculated the average correlation of tasks within the instrument (i.e., internal consistency), and the degree to which independent scorers would rate tasks similarly (i.e., inter-rater reliability). Those estimates included the following: a) Name Writing, inter-rater reliability ($r = .99$, $n = 99$); b) Alphabet Knowledge of Upper Case and Lower Case letters, inter-rater reliability ($r = .99$, $n =$

138); c) Beginning Sound Awareness, inter-rater reliability ($r = .99$, $n = 126$), and internal consistency ($\alpha = .93$, $n = 126$); d) Rhyme Awareness, inter-rater reliability ($r = .99$, $n = 126$), and internal consistency ($\alpha = .83$; $n = 126$); e) Print and Word Awareness, internal consistency ($\alpha = .75$, $n = 125$); and f) Nursery Rhyme Awareness, inter-rater reliability ($r = .99$, $n = 99$), and internal consistency ($\alpha = .77$, $n = 99$). Reliability estimates were generally high, suggesting that use of this instrument by two different test examiners and scorers would likely yield similar results.

Invernizzi et al. (2004) addressed three primary types of validity: content, construct, and criterion-related validity (e.g, concurrent validity; predictive validity). The content of PALS-PreK represents the types of tasks considered by experts in the field to sample emergent literacy behaviors. Scores from the entire pilot sample produced a single factor analysis solution ($n = 138$; eigenvalue = 2.9), suggesting it measures the singular construct of emergent literacy. Criterion-related validity calculations provided data regarding how well the instrument correlates with other standardized tests of emergent literacy: a) the *Test of Awareness of Language Segments* (TALS; Sawyer, 1987) ($r = .41, p < .01, n = 87$), and the *Test of Early Reading Ability* (TERA-3; Read, Hresko, & Hammill, 2001) ($r = .67, p < .01, n = 73$). Finally, longitudinal correlation data ($r = .91, p < .01, n = 41$) from PALS-PreK scores from spring to PALS-Kindergarten scores in the fall suggested statistically significant high predictability of children's scores.

Parent interventionist pre- and/or post-assessments. Prior to intervention training and at the conclusion of the study, parent interventionists were asked to complete the *Early Literacy Parent Questionnaire* (Boudreau, 2005) that assesses their perceptions of their child participants' early literacy skills, and their practices and routines related to their child participants' home literacy experiences. Reliability coefficients (e.g., Cronbach's alpha) from the *Early Literacy Parent Questionnaire* on parents' responses about their children with language impairments' skills have been reported by Boudreau as follows: a) letter and sound knowledge, $\alpha = .83$, b) rhyming skills, $\alpha = .82$, c) orientation to books, $\alpha = .80$, d) writing, $\alpha = .78$, e) interactions around books, $\alpha = .71$, and f) response to print, $\alpha = .64$. On this informal questionnaire, the concurrent validity of parents' reports about their children's early literacy knowledge and skills on this informal parent questionnaire has been reported by Boudreau as moderately correlated with formal measures of early literacy ($r = .55 – .68$). In addition to the above informal parent questionnaire, a research assistant conducted the *Child/Home Environmental Language and Literacy Observation* (CHELLO; Neuman, Koh, & Dwyer, 2008), which includes both an observation checklist and a structured parent interview to assess the quality of literacy supports and the affective environment for learning literacy in home-based settings in high poverty communities. The interrater reliability coefficients for the CHELLO were reported by Neuman et al. as ranging from moderate to high (Cohen's kappa = .54 - .84). The range of internal consistency statistics, using Cronbach's alpha coefficients, was also reported as substantially high ($\alpha = .78 - .91$).

Research Study Phases

Research study phases included baseline, two counterbalanced intervention conditions (a rhyming condition-PETER, and an alliteration condition-PIPER), and maintenance of the first intervention condition while the second intervention condition was implemented. A stepwise procedure using a table of random numbers (Mitchell & Jolley, 2007) generated the following random order for the intervention conditions: a)

Dyad 1 = PIPER—PETER; b) Dyad 2 = PIPER—PETER; c) Dyad 3 = PETER—PIPER; d) Dyad 4 = PETER—PIPER; e) Dyad 5 = PETER—PIPER; f) Dyad 6 = PIPER—PETER. Then, the first parent interventionist who provided written consent to participate and whose child began the pre-testing process first was designated as Dyad 1. The second parent interventionist who provided written consent to participate and whose child was the second to begin the pre-testing process was designated as Dyad 2, and so forth. After the child participants' pre-test measures were collected, the baseline reading sessions commenced.

Baseline. The purpose of the baseline sessions was to establish basal measures of parent interventionist and child participant skills prior to the implementation of the phonodialogic reading intervention. The parent interventionists participated in shared book reading during the baseline condition with their children. To ensure uniformity of the baseline procedures across parent-child dyads, a baseline protocol was used. During the baseline condition, each parent interventionist was instructed to read the same baseline condition storybook. Parent interventionists were instructed to read the entire book with the child as they normally would at home. As the books used during the intervention phase, the baseline book provided opportunities for parent interventionists to use rhyming and alliteration strategies. The baseline book differed from the books used during the intervention phase; however, because it did not contain any of the highlighted or underlined letters or word prompts that were provided in the books during intervention. All baseline parent-child reading baseline sessions were video recorded and lasted approximately 15 minutes.

In addition to the parent-child baseline sessions at the center, parent interventionists and their child participants conducted similar reading baseline sessions in their home setting. Parent interventionists were asked to read as they normally would. Each parent-child baseline home reading session was also video recorded and lasted approximately 15 minutes.

Intervention. Subsequent to the baseline phase, intervention was implemented by each parent interventionist with his or her own child participant. A parent trainer, who was a doctoral student and author of this dissertation, individually taught each parent interventionist to implement the intervention strategies in sessions at the child care center. Parent interventionist training sessions were video recorded and ranged in duration from 16 to 32 minutes ($M = 21.62$, $SD = 4.97$) with initial sessions requiring slightly more time (for procedures, see Parent Training Protocol in Appendix E).

There were two intervention conditions, a rhyming condition and an alliteration condition. Each intervention condition was designed to instruct the parent interventionist to embed phonological awareness strategies within the dialogic reading activity in the context of the shared storybook reading with her or his child participant. The two intervention conditions were randomly presented across dyads by the parent interventionists. The intervention conditions and their components are listed in Table 4. The order of each intervention condition was counterbalanced, based on random assignment (Ziolkowski & Goldstein, 2008). According to the counterbalanced, random assignment schedule, each parent interventionist was individually taught by the parent trainer to implement both the rhyming condition and the alliteration condition. The child care center personnel, as well as the research study assistants, were blind to the order and the specific experimental conditions taught to parent interventionists.

The parent trainer followed a written protocol (refer to the Parent Training Protocol in Appendix E) to promote consistent content and procedural instruction for each parent-interventionist. In addition, an instructional strategies bookmark, combined with a self-checklist, was explained and provided for each parent-interventionist to encourage consistent treatment integrity in phonodialogic storybook reading sessions at home.

The two strategic intervention conditions were as follows:

1. Intervention condition: PETER. Each parent interventionist was provided with information about the important role of rhyming in phonological awareness. Each parent interventionist was introduced to PETER--the rhyming strategy--as follows: (a) P— prompt your child's picture labeling, and predicting about the story by asking your child what the story might be about, and what might happen in the story; (b) E—eavesdrop and evaluate your child's responses, asking your child to help you identify all the rhyming words. For example, point to the word 'trees' and say, "This is the word 'trees.' Trees rhymes with 'knees.'" Repeat the phrase, leaving off the last word 'knees.' Pause for at least three seconds to allow your child time to complete the rhyme. If your child does not respond in about three seconds, complete the 'knees' rhyme for your child; (c) T—talk about the tale, and relate the story events to your child's true life experiences; (d) E—expand and elaborate on your child's responses, eliciting more details about the story; and (e) R— reinforce your child's right responses with praise statements. Repeat the reading.
2. Intervention strategy: PIPER. Each parent interventionist was provided with

information about the important role of alliteration in phonological awareness. Each parent interventionist was introduced to PIPER-- the alliteration strategy-- as follows: (a) P—prompt your child's picture labeling, and predicting about the story by asking your child what the story might be about, and what might happen in the story; (b) I—identify initial letter sounds of words by asking your child to help you complete a sentence. For example, say "Beetle begins with the /b/ sound. 'B' makes the /b/ sound in the word_____." Pause for at least three seconds to allow your child time to complete the word or sound. If your child does not respond after three seconds, complete the word for your child and repeat the question again; (c) P—pose purposeful questions, such as 'who,' 'what,' 'when,' 'where,' 'why,' and 'how,' to prompt your child's responses; (d) E—expand and elaborate on your child's responses, eliciting more details about the story; (e) R—reinforce your child's right responses with praise statements. Repeat the reading.

The total PETER-PIPER program, including baseline and treatment across intervention conditions, was completed in nine weeks. Similar to Skibbe et al. (2004), parent interventionists were instructed to implement and self-video record the reading activities with their child participants at least four times throughout the week during baseline, and each intervention condition.

Maintenance. After the parent-child dyad progressed to their second skill set of phonodialogic reading strategy intervention, no further instruction was provided to the parent on the first skill set. However, the first skill set continued to be assessed for maintenance to determine whether it was used by the parent interventionists in combination with the second skill set of intervention strategies.

Table 4. Phonodialogic Intervention Conditions and Strategies

Strategies	Intervention Conditions	
	PETER(rhyming)	PIPER(alliteration)
Prompt picture labeling/story predicting	P	P
Eavesdrop/evaluate; ask child to identify rhyming words; complete sentence with rhyming words	E	
Identify initial sounds; ask the child to complete word or sentence with the initial sound of words		I
Talk about the tale by relating story events to child's experiences	T	
Pose purposeful 'wh' questions about the story events		P
Expand/elaborate on child responses, eliciting the child for more story details	E	E
Reinforce/praise correct responses	R	R

Measures

Standardized measures. Child participants' phonological awareness skills of rhyming, alliteration, blending and segmenting onset-rime were assessed using five curriculum-based measurement tests administered by graduate students. Speech-language pathology graduate students were employed as research assistants, who individually assessed them to detect changes from baseline to intervention and to monitor maintenance of treatment effects. The order of test administration (rhyming vs. alliteration) was varied across each child participant, as well as within each testing administration of each child. In order to minimize confusion on the part of the child participants, rhyming measures were presented consecutively, as were the measures of alliteration. The reliability of test administration was assessed though video- and audio recording on at least 25% of the testing sessions. A standardized checklist was used to promote accuracy of test administration procedures.

Rhyme identification. The child participant's ability to identify word sounds that rhyme was measured using the rhyming task from the *Individual Growth and Development Indicators* (Rhyming IGDI; Early Childhood Research Institute on Measuring Growth and Development [ECRI-MGD], 1998). Each child participant was individually tested by a graduate research assistant, using standardized procedures. In this task, each child participant was presented with a card with four, color pictures. The target rhyming word (e.g., house) was located at the top of the card, with three other pictures in a row (e.g., mouse, desk, rake) at the bottom of the card. On each picture card, one of the bottom pictures rhymed with the picture at the top of the card. The test examiner followed a set of standardized instructions by stating, "Point to the one [examiner sweeps finger across three pictures at bottom of card] that rhymes or sounds the same as ______ [examiner points to and says the name of the top picture]." For each test administration, the test examiner first demonstrated with the same two cards. Then, the test examiner conducted a brief practice with corrective feedback with four additional sample cards. The examiner proceeded to the test administration only if the child participant got two or more items correct on the sample cards. If the child participant did not get two or more correct, the examiner discontinued testing and noted the score as zero for that task. If the child participant responded correctly to at least two or more of the sample rhyming cards, testing continued for two minutes with randomly selected test items. The total number of correct test cards in a two-minute period represented the child participant's rhyming score. The rhyming measure was designed to be used to chart progress over time and to modify intervention plans to help improve progress (ECRI-MGD, 1998). The adequacy of test-retest reliability correlation of the IGDI rhyming has been demonstrated as .83 to .89 (Missell & McConnell, 2004).

Rhyme production. The child participant's ability to produce words that rhyme was measured using a standardized procedure in which each participant was presented with single syllable words in a randomized sequence without picture cards for prompts (Bryant, Bradley, MacLean, Crossland, 1989; Bryant et al., 1990; MacLean, Bryant, & Bradley, 1987; Ziolkowski & Goldstein, 2008). After the test examiner orally presented the stimulus word, the child participant was asked to say a word that has the same ending sound as the stimulus word. At the beginning of each testing session, the test examiner demonstrated the same two items for training with corrective feedback. For example, the test examiner stated, "We are going to play a rhyming word game. Tell me a word that sounds like 'pan.' If the child participant responded correctly, the text examiner stated, "That is correct, 'can' sounds like 'pan.' After the child participant was able to correctly demonstrate the task, the text examiner said, "Tell me a word that sounds like ___________" for the other rhyme production items drawn randomly from a card set of 40 words. For scoring purposes, each correctly produced rhyming word (real or nonsense word) was counted as one correct response to a test item. If the child participant was unable to respond correctly to one of the two practice items, the test was discontinued and the score was recorded as zero for that testing session. The total number of correct test card items in a two-minute period represented the rhyming production score.

Alliteration identification. The child participant's ability to identify the word sounds that have the same beginning sound was measured using the alliteration task from the *Individual Growth and Development Indicators* (Alliteration IGDI; ECRI-MGD, 1998). Each participant was individually tested, using a standardized procedure, by a graduate research assistant. Each child participant was presented with a card that had four, color pictures. The target alliteration word (e.g., door) was located at the top of the card with three other pictures in a row (e.g., plate, fish, and dice) at the bottom of the card. On each picture card, one of the bottom pictures started with the same sound as the picture at the top of the card. The test examiner used standardized instructions and stated, "Point to the one [examiner sweeps finger across three pictures at bottom of card] that starts with the same sound as ______ [examiner points to and says the name of the top picture]." For each test administration, the test examiner first demonstrated with the same two cards. Then, the test examiner conducted a brief practice, with corrective feedback, with four additional sample cards. The examiner proceeded to the test administration only if the child participant got two or more correct on the sample cards. If the child participant did not get two or more correct, the examiner discontinued testing and noted that the score was zero for that task. If the child participant got at least two or more of the sample alliteration cards correct, testing continued for two minutes with randomly selected test items. The total number of correct test cards in a two-minute period represented the alliteration score. The alliteration measure was designed to be used to chart progress over time and to modify intervention plans to help improve progress. Adequacy of the test-retest reliability correlation of the IGDI alliteration has been reported as .46 to .80 (Missell & McConnell, 2004).

Blending onset-rime. The child participant's ability to accurately form a word (e.g., /kat/) by blending the initial word sound, defined as the onset, (e.g., /k--/) with the ending word sound, defined as the rime, (e.g., /-at/) was measured using the first three out of four parts of the *Initial Sound Fluency* (ISF) task from the *Diagnostic Indicators of Basic Early Literacy Skills* (DIBELS; Good, Laimon, Kaminski, & Smith, 2007). This combined task was originally called *Onset Recognition Fluency* and required the child participant to orally produce a whole word and to segment the onset from the rime, given only the onset prompt, or a word prompt plus a picture stimulus of the target word. In this study, each participant was individually tested, using a standardized procedure, by a graduate research assistant. Each child participant was presented with four stimulus pictures. The test examiner named each of the pictures. Then, the examiner asked the child participant to orally identify the name of the picture that began with the onset sound produced orally by the test examiner. The child participant was also permitted to respond by pointing to the correct picture stimulus. For example, the examiner stated, "This is a sink, a cat, gloves, and a hat. Which picture begins with /s/?" When the child participant correctly responded by orally naming (e.g., said the word 'sink') or pointing to the correct picture stimulus (e.g., pointed to the picture of a 'sink'), the examiner calculated the amount of time that the child participant took to produce the correct word, or point to the correct picture stimulus, and converted the score to the number of correct words identified in 60 seconds (i.e. ISF blending rate per minute). When the child participant responded with an incorrect word or pointed to an incorrect picture, the examiner also calculated the amount of time the child participant took to incorrectly respond and circled the '0' on the response booklet. The complete ISF measure takes three minutes to administer and score, and has over 20 alternate forms to monitor progress over time. By repeating the ISF assessment four times, the estimated test-retest reliability correlation has been reported as .91 (Good & Kaminski, 1996; Good, Simmons, & Smith, 1998; Nunnally, 1978).

Segmenting onset-rime. The child participant's ability to accurately segment the sound of the onset (e.g., /k--/) from the sound of the rime (e.g., /-at/) was measured using the last part of the ISF task from the DIBELS (Good et al., 2007). This task required the child participant to orally produce only the onset sound for an orally presented word that matches one of the stimulus pictures. Using standardized procedures, each child participant was individually tested by a graduate research assistant. Each child participant was presented with four stimulus pictures. Then, the examiner asked the child participant to orally produce the beginning sound for a stimulus word that the examiner stated that matched one of the stimulus pictures. For example, the examiner stated, "Sink begins with the sound /s/. Listen, /s/ sink. What sound does cat begin with?" When the child participant stated the sound of the onset /k/ that matched the picture stimulus of the cat, the examiner calculated the amount of time that the child participant took to produce the correct onset sound and converted the score to the number of correct words in 60 seconds (e.g., ISF segmenting rate per minute). When the child participant responded with the incorrect onset sound, the examiner calculated the amount of time the child participant took to incorrectly respond and circled the '0' on the response booklet. The complete ISF measure takes three minutes to administer and score, and has over 20 alternate forms to monitor progress over time. By repeating the ISF assessment four times, the estimated test-retest reliability correlation has been reported as .91 (Good & Kaminski, 1996; Nunnally, 1978).

Behavioral observation measures. In addition to the standardized measures, assessment of parent interventionist usage of the intervention strategies and child participant responses to parent interventionist prompts were based on the coded data from the video recorded parent-child storybook reading sessions. Further, 25% of the video-records of the parent-child reading sessions in their home setting were selected at random and coded, using frequency counting measures of parent and child behaviors. The video-audio data collection sheet, with parental prompt codes and child response codes that were used to assess the frequencies of parent interventionists' and child participants' behaviors in this study, can be found in Appendix A. The parental prompt code for ending or rhyming sound follows as one example of an operational definition used in the study (see also Table 6). Parent interventionist prompts the child participant to complete a word, phase, or sentence with a rhyming sound by modeling an example of a rhyming word sound, or providing the opportunity for the child to fill in the blank with a rhyming word sound. For example, "I need a smart fellow to make all the sounds, who can bark like a dog and bay like the hounds."

Social Validity

Social validity was rated, using a *Parent Interventionist Satisfaction Survey* questionnaire (e.g., Ziolkowski & Goldstein, 2008), with 10 quantitative items measured on a five-point Likert scale (1 = strongly agree to 5 = strongly disagree). The parent interventionists were instructed to rate their satisfaction with their training, and with the user friendliness of the intervention to determine whether the activity-based phonodialogic reading intervention was experienced positively and was worth their time and effort to implement with their child participants. The questionnaire also provided an opportunity to parent interventionists to respond to three open-ended questions, regarding their specific likes and dislikes about the storybook reading intervention, and whether the parent interventionist experience changed the way they feel about reading with their children. Lastly, the questionnaire offered the option for parent interventionists to provide their demographic information (e.g., date of birth, ethnicity, highest level of school completed, profession or current job position) for study purposes only. A copy of the questionnaire used for surveying parent interventionist social validity can be found in Appendix B.

Table 5. Assessment Schedule

Measures	Participant	
	Parent	Child
Child/Home Environmental Language and Literacy Observation	Pre/Post	
Early Literacy Parent Questionnaire	Pre/Post	
Parent Interventionist Satisfaction Survey	Post	
Phonological Awareness Literacy Screening-PreK		Pre/Post
Montgomery Assessment of Vocabulary Acquisition		Pre/Post
Early Literacy Skills Assessment		Pre/Post
Adult/Child Interactive Reading Inventory	Weekly	Weekly
Individual Growth and Development Indicators – Rhyme Identification		Weekly
Rhyme Production		Weekly
Individual Growth and Development Indicators – Alliteration Identification		Weekly
Diagnostic Indicators of Basic Early Literacy Skills – Initial Segmentation [and Blending] *Fluency*		Weekly
Behavior Observations of Parent-Child Dyad Reading Sessions		Weekly

Treatment Fidelity

Treatment fidelity was measured through three forms of data collection sources providing the opportunity to use data triangulation in determining each parent interventionist's adherence to the intervention protocol.

Parent-child treatment fidelity. First, parent-child dyads were administered *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009; Rodriquez et al., 2009) on a weekly basis (see Table 3) as a simultaneous measure of parent-child interactive reading behaviors and progress monitoring of strategy implementation. This assessment tool has been reported to have a high overall reliability as calculated by an alpha coefficient of .80 (DeBruin-Parecki, 2007). Construct validity of the ACIRI was determined to be relevant to joint storybook reading behaviors, based on a review of the research and theoretical literature. In addition, DeBruin-Parecki reported excerpts from interviews with teachers, who piloted this tool and continued to use it afterward, that provide support for its consequential validity (e.g., positive implications for its use in teaching and learning). In the present study, information from this tool was used in providing positive feedback, and making suggestions to parent interventionists about improving the use of the intervention strategies during the parent-interventionist training sessions. Second, they were instructed to complete the intervention strategy checklist, immediately following each dialogic reading session with their child participants. The checklist was intended to be used as a self-report measure of how frequently the parent interventionist used the intervention strategies.

Third, each parent-child dyad was video recorded at least once per week during a phonodialogic reading session in the child care center and in the home setting. Sessions were recorded during the baseline, intervention, and maintenance conditions. Parent interventionists were also provided with video recording equipment to use at home in the form of the Flip video camera, which is small, easy to use, and relatively non-intrusive. Beginning with the baseline sessions, parent interventionists were instructed to self-record at least four dialogic reading sessions on a weekly basis and retain the recording until the next week's appointment. At that time, the parent trainer transferred the video data file to an external hard drive for secured storage. All parent-child data files, including video and audio records were securely stored in one location (e.g., external hard drive). Video and audio records were transcribed, coded, and graphed for analysis of the types and numbers of phonodialogic reading strategy prompts used by the parent interventionists during their parent-child reading sessions (e.g., Briesch et al., 2008; Hester et al., 1995). A detailed code for each parental prompt with specific examples was developed for use in graduate research assistant training and in the collection of the video and audio data for treatment fidelity. The definitions and detailed descriptions of parental behavior prompts with corresponding codes are presented in Table 6. The video audio data collection sheet with parental prompt codes and child response codes is provided in Appendix A.

Table 6. Parental Prompt Codes, Definitions, and Descriptions

CODE	DEFINITION	DESCRIPTION
DET	Details about the story	Parent prompts the child for any details about story narrative (e.g., words, descriptions of characters, plot, action, feelings, thoughts, and/or setting), or parent prompts child for details by pausing ($\geq$ 3 seconds) for the child to have an opportunity to respond. Examples, "Tell me the color of the icky sticky frog," and "Tell me what happened to the bird."
END	Ending/rhyming sound	Parent prompts the child to complete a word, phase, or sentence with a rhyming sound by modeling an example of a rhyming word sound, or providing the opportunity for the child to fill in the blank with a rhyming word sound. Example, "I need a smart fellow to make all the sounds, who can bark like a dog and bay like the <u>hounds</u>."
INI	Initial/beginning sound	Parent prompts the child to use a correct beginning sound to complete a word, phrase, or sentence. Parent models a beginning sound, and/or pauses to provide the opportunity for the child to fill in the blank with the correct beginning sound (onset), or the correct word. Example, "Boing begins with sound <u>/b/</u>." Or, "'B' makes the /b/ sound in the word <u>boing</u>."
PIC	Picture labeling	Parent prompts the child to label, define, or describe any picture or illustration in the story, including book cover picture. Parent must point to the picture. Note that PIC coding takes precedence over WHQ coding. Example, "Tell me what sort of animal is that," or [pointing to horse] "What is that?"
PRE	Predictions about story	Parent prompts the child to tell what might happen in the story. Note that PRE coding takes precedence over WHQ. Example, "Tell me what you think will happen to the frog," or "What do you think will happen next?"

Table 6. Continued

CODE	DEFINITION	DESCRIPTION
REL	Relates story to experience	Parent prompts the child to relate story narrative or events to real life experience. Note that REL takes precedence over WHQ. Example, "Tell me about a time that you felt sleepy like the bear," or "When did you feel sad like that?"
RFP	Reinforces or praises verbally	Parent encourages the child's responses by verbally providing positive reinforcement or praise. Parent may use a word, a phrase, and/or a sentence. Examples, "good" or "that's right" or "I heard you say the /k-k/." Nonverbal responses (pat on back, smile, wink, nod) are not coded.
WHQ	'WH' Question prompts	Parent prompts child by questioning "who, what, when, where, why, or how" type of open-ended questions about the storybook events that elicit more than a one word verbal reply (e.g., more than a Yes or No reply). Example, "What kind of things does the icky, sticky frog like to eat?" Do not code as WHQ if parent asks a question, but does not provide the opportunity or the time (< 3 seconds) for the child to respond.
NC	No code possible	Parent prompts that do not fit into above categories; describe the parent behaviors briefly in the Comments section on data collection form above. Examples, "Are you ready to read?" "Do you want to hold the book?" "Do you want to turn the page?"

Parent trainer procedural and content fidelity. A coder unfamiliar with the study reviewed video recorded parent trainer and parent interventionist sessions to assess the fidelity of the parent trainer's implementation of the baseline and intervention protocols. Both procedural and content fidelity were collected during baseline, intervention, and maintenance phases on at least one session in each condition and/or a minimum of 25% of the sessions for each phase. For the procedural and content fidelity checklists that were used for assessing parent trainer sessions, refer to Table 7 for the baseline procedural fidelity, Table 8 for the intervention procedural fidelity, and Table 9 for the intervention content fidelity.

Table 7. Baseline Procedural Fidelity Checklist for Parent Trainer Sessions

	Not Observed NA	Support Not Provided 0	Support provided 1
Management of session			
Trainer is well prepared for session and room is set up in advance		0	1
Materials (appropriate book) available for parent to read		0	1
Trainer greets parent and thanks parent for coming		0	1
Trainer follows up on initial interview & questionnaire information regarding parents daily schedules & routines & book reading opportunities		0	1
Pre-Baseline Instructions			
Trainer explains purpose of baseline sessions		0	1
Trainer explains length of parent-child book reading baseline session		0	1
Trainer explains purpose of video recording		0	1
Trainer talks at parent level and gives parent clear instructions to read the book as he/she would normally do at home		0	1
Trainer explains parent may keep book		0	1
Trainer instructs parent in use of flip video-camera		0	1
Baseline Session			
Trainer observes parent & takes notes during session		0	1
Trainer provides specific & positive comments to parent after session		0	1
Trainer reminds parent to read story to child 4 times at home, to video record each session, & to use self-checklist on bookmark		0	1
Trainer schedules next meeting with parent		0	1
Trainer thanks parent & provides weekly compensation to parent		0	1

Table 8. Intervention Procedural Fidelity Checklist for Parent Trainer Sessions

	Not Observed NA	Support Not Provided 0	Support provided 1
Management of Training Process			
Trainer well prepared for session: room & materials		0	1
Strategies underlined or highlighted in designated book prior to session		0	1
Appropriate reinforcers available (if needed)		0	1
Trainer greets parent & thanks parent for coming		0	1
Trainer provides weekly compensation to parent		0	1
Trainer asks about book reading sessions at home		0	1
Trainer thanks parent for reading at home, recording, & self-monitoring		0	1
Trainer provides parent with new book for week; explains parent may add the book to the child's library		0	1
Trainer video records the entire session from the time the parent arrives until the parent leaves		0	1
Pre-Session Parent Instructions			
Trainer provides parent-focused instructions (avoids jargon)		0	1
Trainer explains how to read the book using PETER or PIPER strategies		0	1
Trainer models use of 5 components: PETER or PIPER		0	1
Parent Interventionist Phonodialogic Reading Session			
Trainer observes parent & takes notes during session		0	1
Trainer coaches parent during session as needed & reinforces correct use of strategies		0	1
Post-Session Parent Instruction			
Trainer provides specific & positive comments		0	1
Trainer provides reminder to read & video 4 parent-child reading sessions		0	1
Trainer schedules next meeting with parent & thanks parent for coming		0	1

Table 9. Intervention Content Fidelity Checklist for Parent Trainer Sessions

	Not Observed NA	Support Not Provided 0	Support provided 1
Modeling of the PETER (rhyming) Set of Intervention Strategies			
Trainer explains and models how to prompt picture labeling in the story		0	1
Trainer explains and models how to prompt predicting story events		0	1
Trainer explains and provides an example of how to eavesdrop and evaluate child's responses		0	1
Trainer models how to point to rhyming words and pause for the child to fill in the rhyming words		0	1
Trainer models how to talk about the tale and how it relates to life experiences		0	1
Trainer models how to expand and elaborate on child's responses		0	1
Trainer models how to reinforce the child's correct responses		0	1
Modeling of the PIPER (alliteration) Set of Intervention Strategies			
Trainer models how to prompt picture labeling in the story		0	1
Trainer models how to prompt predicting story events		0	1
Trainer models how to identify initial letter sounds and pause for the child to complete the word or sound		0	1
Trainer models how to pose purposeful questions 'who, what, when, where, or how' to prompt the child's responses		0	1
Trainer models how to expand and elaborate on child's responses		0	1
Trainer models how to reinforce the child's correct responses		0	1

Reliability

To ensure accuracy and consistency of data, reliability was assessed on each aspect of data collection. These included: a) child participant responses to assessments; and b) measures of parental prompts and child participant responses during shared book readings, and c) test administrations. The interrater reliability of the testing administration and the child participant responses on the testing assessments were monitored for at least 25% of the testing sessions at the child care center. Interrater reliability assessment during the weekly curriculum-based measurement tests was determined using the standardized instrument checklists published by the test developers (Good, Laimon, Kaminski, & Smith, 2007; Missell & McConnell, 2004). A second graduate research assistant was trained as a test administration observer.

Interrater reliability was measured on 25% of the parent-child shared book reading sessions during baseline, intervention, and maintenance. A second coder used randomly selected video and audio recorded parent-child book reading sessions for all reliability assessments. Interrater agreement was calculated by dividing the number of agreements by the number of disagreements plus the number of agreements, and multiplying by 100 (Tawney & Gast, 1984). This same procedure was used to assess parent use of the intervention strategies on the audio and video recorded parent-child book reading sessions at home.

Data Analysis

Data from child participant measures were gathered, recorded, and graphed in Microsoft Excel for visual inspection as a multiple baseline across skills, replicated across the six child participants (e.g., Barton, Reichow, & Wolery, 2007; Hillman &

Miller, 2004). Following visual inspection of data (Fisher, Kelley, & Lomas, 2003; Horner et al., 2005), estimated effect sizes were calculated using the percentage of all non-overlapping data (PAND; Parker & Hagan-Burke, 2007; Parker, Hagan-Burke, & Vannest, 2007; Ziolkowski & Goldstein, 2008).

CHAPTER 4

Results

Introduction and Chapter Overview

This chapter will present the results of the activity-based intervention (dialogic reading with embedded explicit phonological awareness strategies) applied as a preventive approach that was conducted by parent interventionists in their homes that were located within a culturally and ethnically diverse region. Results of the study will be provided in four major sections. The first section presents results that inform each research hypothesis. Hypotheses one through five pertain to the effects of phonodialogic reading by parent interventionists on child participants' phonological awareness skills (e.g., rhyme identification, rhyme production, alliteration identification, blending onset and rime, and segmenting onset and rime). Hypothesis six pertains to the ability of parent interventionists, using the phonodialogic reading strategies, to demonstrate treatment fidelity. Hypothesis seven addresses the social validity of teaching parent interventionists to implement phonodialogic reading with their child participants.

The second section contains results of pre- and posttest measures used to evaluate each child participant's early language and emergent literacy characteristics. The third section describes results of pre- and post-intervention interviews that were used to assess each parent interventionist's perceptions of their child participant's early literacy skills, their home literacy practices and routines, and the quality of literacy and affective environmental supports for learning literacy at home. Finally, the fourth section provides the study reliability data based upon observations of the child participants' test examiners, the parent-child video record coders, and the parent trainer.

The effects of embedding phonodialogic strategies on child participants' phonological awareness skills were monitored by the weekly curriculum-based measurement (CBM) tests, and by observing video recorded responses to the parental prompts during home reading sessions. These data were graphed in Microsoft Excel for visual analysis as a multiple baseline across skills design and replicated across the six child participants, as well as the six parent-child dyads (e.g., Barton, Reichow, & Wolery, 2007; Hillman & Miller, 2004). The estimated effect size calculations of the phonodialogic emergent reading intervention on the child participants' phonological awareness skills (e.g., rhyme identification, rhyme production, alliteration identification, blending and segmenting onset and rime), and their correct responses to the parental prompts are presented in the analyses of research hypotheses.

Three child participants (e.g., Child 3, Child 4, & Child 5) were randomly assigned to participate in the PETER (rhyming condition) intervention first, followed by the PIPER (alliteration condition). The other three child participants (Child 1, Child 2, & Child 6) were randomly assigned to participate in the PIPER intervention first, followed by the PETER intervention.

Each set of intervention strategies (e.g., PETER-PIPER or PIPER-PETER) was instructed to the parent interventionists in a staggered order, so that child participants in the PETER (rhyming) intervention stayed in the baseline for the PIPER (alliteration) condition and vice versa. When the first set of skill intervention was no longer instructed to parent interventionists, the child participant moved to their second set of intervention strategies. For the remainder of the study, the first set of skill intervention was monitored for maintenance.

Analyses of Research Hypotheses

Hypothesis 1. Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by rhyme identification (ending sound awareness) from baseline compared to intervention and maintenance.

Presented in Figures 1 – 6, the study results suggested improvement in five of the six child participants' abilities to identify rhyming words based on the curriculum-based measurement tests. The first three child participants (Child 3, Child 4, & Child 5) described were randomly assigned first to the PETER (rhyming) intervention, followed by the PIPER (alliteration) intervention. For this trio of child participants, there was a short baseline period (e.g., one week) for rhyme identification. Throughout the rhyming intervention, child participants' alliteration skills (e.g., alliteration identification, blending onset-rime, and segmenting onset-rime) were also monitored for baseline changes and those results are described in other sections (see Hypotheses 3 – 5). The following visual analyses describe results from baseline through intervention and maintenance.

Child 3. Figure 1 shows the data point values, representing test scores that measured rhyme identification when Child 3 was administered weekly CBM tests. A total of nine data points ($M = 16.22$, $SD = 3.83$, Range = 10 - 21) was collected on the number of rhyming words she correctly identified in two minutes. Only one datum ($X = 13$) was gathered during the baseline week test session. During the PETER (rhyming) intervention phase, four data points were collected from the first to the fourth week ($M = 13.5$, Range

= 10 – 17). During the maintenance phase, four data points were collected from the fifth through the eighth week (*M* = 19.75, Range = 19 - 21).

The first graph in Figure 1 reveals a slow immediacy effect (Kennedy, 2005) with a moderate rise in the rhyme identification levels, occurring between baseline and intervention phases (30%). A larger gain in rhyme identification levels occurred between the baseline and maintenance phases (52%).

A best-fit-line approach (least squares regression) found a positive trend within the intervention phase (slope = 1.6), and a slight upward trend (slope = 0.7) within the maintenance phase. An overall positive trend (slope = 1.27) for rhyme identification was found across all phases from baseline to intervention and maintenance. The stability of data based on a criterion of plus or minus 50% of the mean found the data values to be stable during the intervention and maintenance phases with low variability (Kennedy, 2005).

Summary of results related to Child 3. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 3 showed an increase of 52% in skill levels in rhyme identification (ending sound awareness).

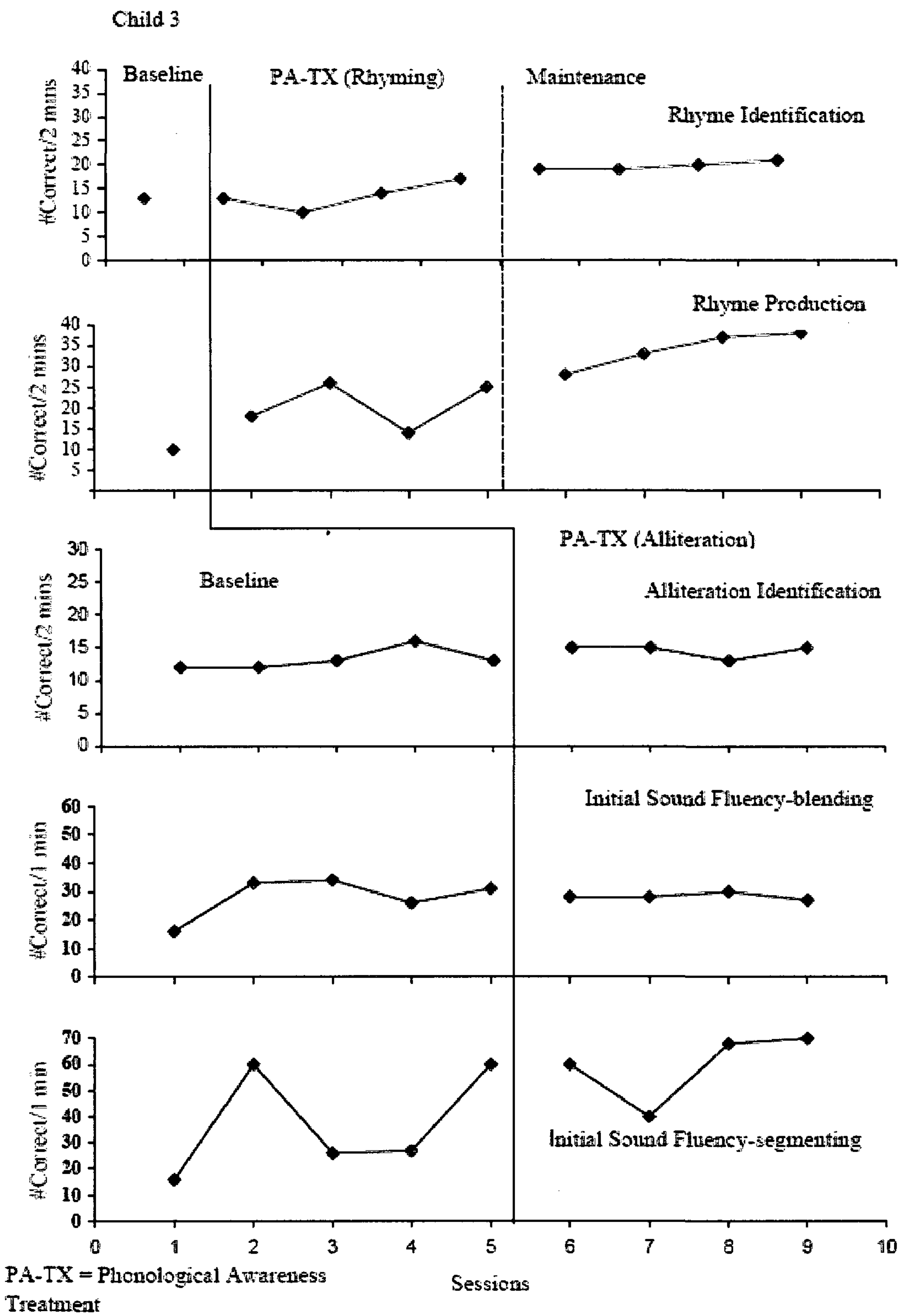


Figure 1. Child 3: Multiple Baseline Test Scores from Weekly Curriculum-Based Measures across Five Phonological Awareness Skills from Baseline to Maintenance

Child 4. Figure 2 shows the data point values, representing test scores that measured rhyme identification when Child 4 was administered weekly CBM tests. A total of nine data points ($M = 3.78$, $SD = 2.59$, Range = 0 – 9) was collected on the number of rhyming words he correctly identified in two minutes. During the baseline test session, one data point ($X = 3$) was collected. During the PETER (rhyming) intervention phase, four data points were collected from the first to the fourth week ($M = 3.25$, Range = 0 - 9). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 4.5$, Range = 4 - 6).

The first graph in Figure 2 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain in rhyme identification level, occurring between the baseline week and the first week of intervention (200%). Following this sharp initial increase in rhyming identification, a subsequent rapid decrease occurred between the first and the second week of intervention, continuing through the fourth week of intervention (-233%). The decrease was followed by large rebound between the fourth week of intervention and first week of maintenance (100%). An overall small to moderate increase (29%) in mean rhyme identification levels occurred across the baseline, intervention, and maintenance phases.

A best-fit-line approach (least squares regression) found a negative trend within the intervention phase (slope = -2.3), and a very slight upward trend (slope = 0.2) within the maintenance phase. An overall flattened trend (slope = 0.05) for rhyme identification was found across baseline to intervention and maintenance. Based on a criterion of plus or minus 50% of the mean, data values were highly variable within the intervention phase (Kennedy, 2005). However, the data stabilized within the maintenance phase.

Summary of results related to Child 4. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 4 showed an increase of 50% in skill levels, though variable within the intervention phase, in rhyme identification (ending sound awareness).

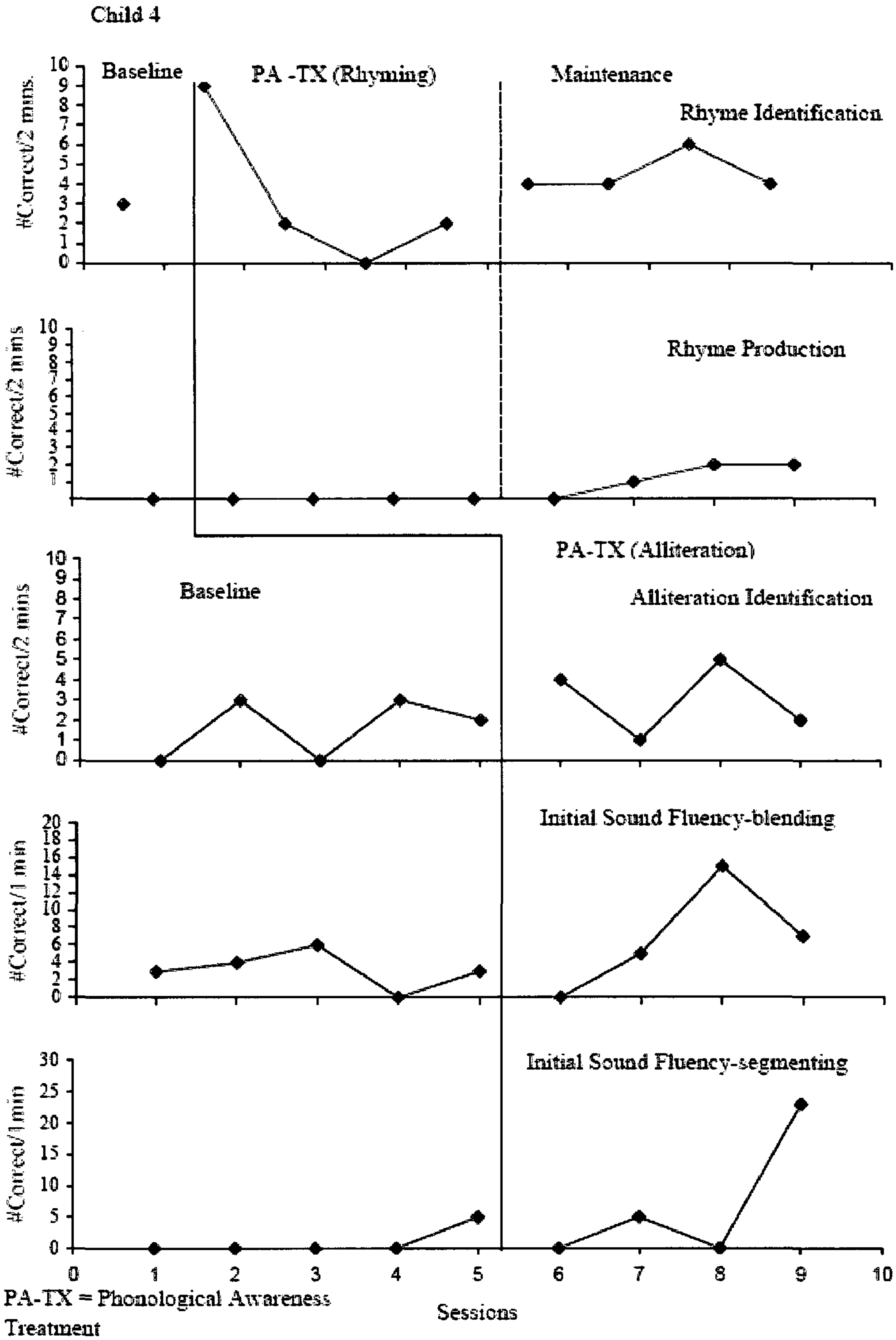


Figure 2. Child 4: Multiple Baseline Test Scores from Weekly Curriculum-Based Measures across Five Phonological Awareness Skills from Baseline to Maintenance

Child 5. Figure 3 shows the data point values, representing test scores that measured rhyme identification when Child 5 was administered weekly CBM tests. A total of nine data points (M = 3.11, SD = 2.42, Range = 0 – 6) was collected on the number of rhyming words he correctly identified in two minutes. During the baseline phase, one data point (X = 4) was gathered to represent the rhyming identification test session. During the PETER (rhyming) intervention phase, four data points were collected from the first to the fourth week (M = 2, Range = 0 - 6). During the maintenance phase, four data points were collected from the fifth through the eighth week (M = 4, Range = 1 - 6). Although the mean rhyming level within the maintenance phase was identical to the baseline data point value, the maintenance data mean showed a large gain (100%) over intervention.

The first graph in Figure 3 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain in rhyme identification level, occurring between baseline and the first week of intervention (50%). Following this increase, a subsequent rapid decline (-200%) occurred between the first and the second week of intervention. This decline continued between the third and fourth week of intervention (-100%). A large, rapid rebound effect (500%) was revealed at the onset of the maintenance phase in week five, peaking in week seven (20%), prior to a large decrease in rhyme identification levels between the third and fourth week of maintenance (-83%). Although, immediate moderate to large increases were found in the intervention and maintenance, these gains were not sustained.

A best-fit-line approach (least squares regression) found a negative trend within the intervention (slope = -2), and maintenance phases (slope = -1). Overall, a flat trend (slope = - 0.05) was found across the baseline, intervention and maintenance phases.

Based on a criterion of plus or minus 50% of the mean, data values were moderately variable within both intervention and maintenance phases (Kennedy, 2005).

Summary of results related to Child 5. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 5 did not show increased skill levels in rhyme identification (ending sound awareness).

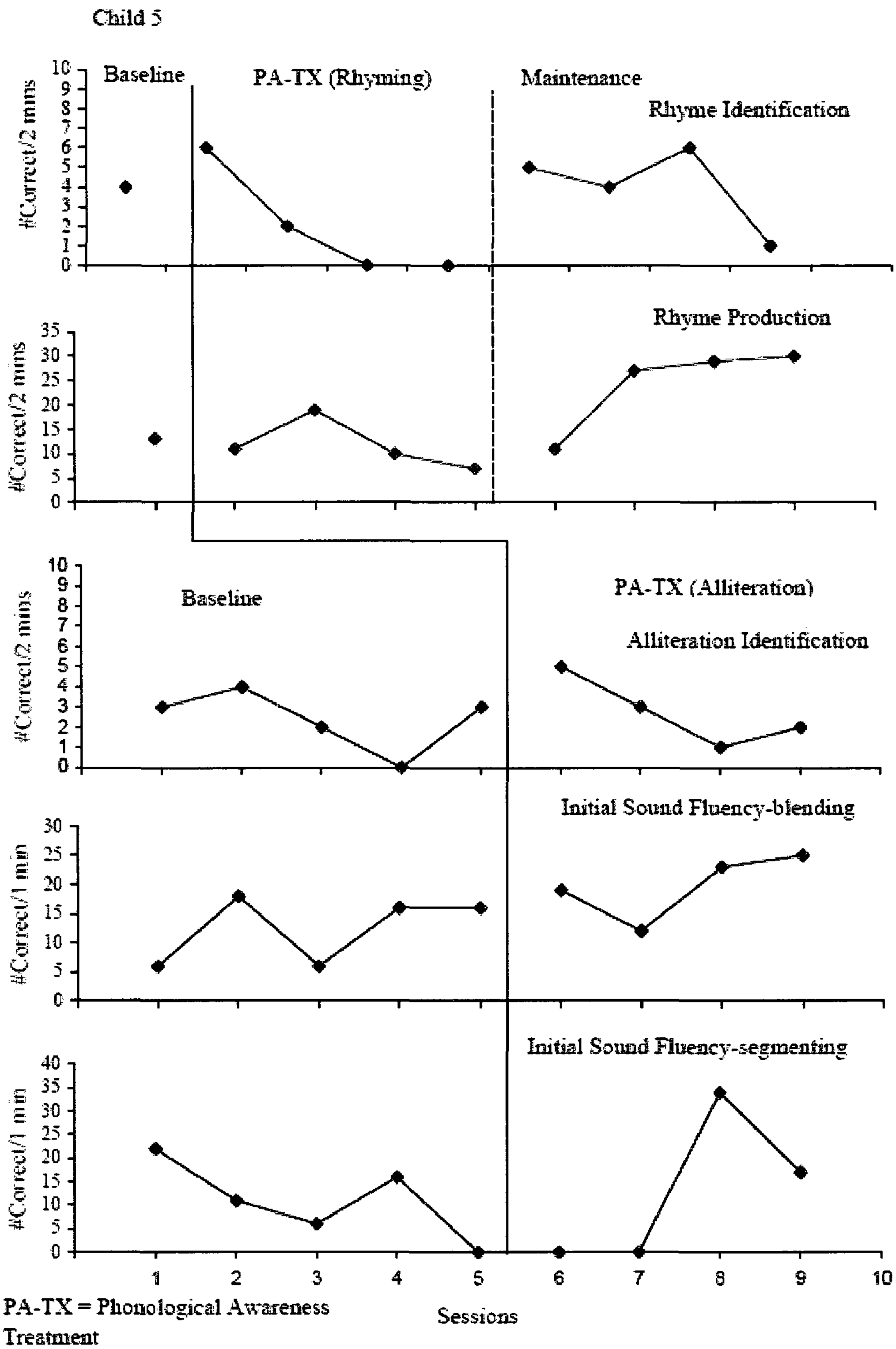


Figure 3. Child 5: Multiple Baseline Test Scores from Weekly Curriculum-Based Measures across Five Phonological Awareness Skills from Baseline to Maintenance

The next three child participants (Child 1, Child 2, & Child 6) described were randomly assigned first to the alliteration intervention, followed by the rhyming intervention. For this trio, there was no maintenance for rhyme identification. Throughout the rhyming intervention, child participants' alliteration skills were monitored for maintenance and those results are described in other sections (see Hypotheses 3 – 5). The following visual analyses describe results from baseline through intervention.

Child 1. Figure 4 shows the data point values, representing test scores that measured rhyme identification when Child 1 was administered weekly CBM tests. A total of nine data points (M = 13.67, SD = 3.67, Range = 8 – 18) was collected on the number of rhyming words she correctly identified in two minutes. During the baseline phase, five data points (M = 12.8, Range = 8 - 18) were collected. During the rhyming intervention phase, four data points were collected from the fifth through the eighth week (M = 14.75, Range = 11 - 17). The mean rhyming level within the intervention phase showed a small gain (15%) over the baseline mean.

The fourth graph in Figure 4 reveals a gradual upward rise (125%) within the baseline phase, followed by a downward spike (39%) between the last week of the baseline phase (week 5) and first week of intervention (week 6). Intervention data values rebounded (55%) between week six and week seven, leveling off at completion.

Although a best-fit-line approach (least squares regression) found a 42% lower positive trend within intervention (slope = 1.5) than baseline (slope = 2.6), the intervention data finished with an upward trend between weeks seven and eight (slope = 3). Based on a criterion of plus or minus 50% of the mean, data values were stable within both baseline and intervention (Kennedy, 2005).

Summary of results related to Child 1. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 1 showed an increase of 15% in skill levels in rhyme identification (ending sound awareness).

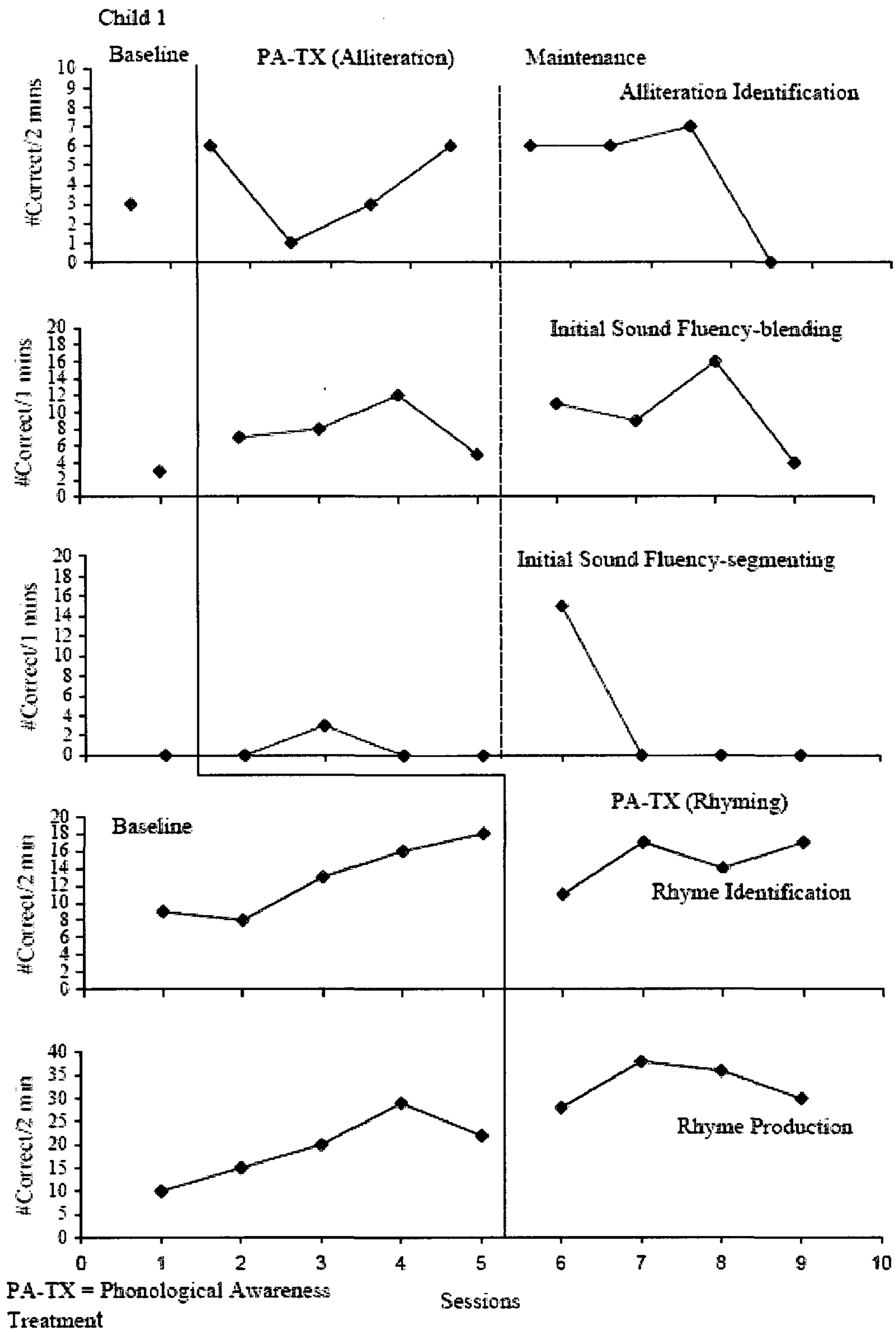


Figure 4. Child 1: Multiple Baseline Test Scores from Weekly Curriculum-Based Measures across Five Phonological Awareness Skills from Baseline to Maintenance

Child 2. Figure 5 shows the data point values, representing test scores that measured rhyme identification when Child 2 was administered weekly CBM tests. A total of nine data points (M = 1.78, SD = 1.86, Range = 0 - 5) was collected on the number of rhyming words he correctly identified in two minutes. During the baseline phase, five data points (M = 0.8, Range = 0 - 2) were collected. During the rhyming intervention phase, four data points were collected from the fifth through the eighth week of intervention (M = 3, Range = 0 - 5). The mean rhyming level within the intervention phase showed a large gain (275%) over the baseline mean.

The fourth graph in Figure 5 reveals a gradual upward rise within the baseline phase, followed by rapid immediate effect (100%) between baseline and intervention. Between the first and the second week of the rhyming intervention, data values fell sharply (-100%). A large rebound effect (125%) was followed by the data values dropping off moderately (-40%) at completion.

A best-fit-line approach (least squares regression) found a slightly positive trend (slope = .47) in the data values overall, as well as within the baseline (slope = 0.5) and intervention (slope = 0.2). However, the trend line between the sixth and seventh week of intervention revealed the most rapid rate gain (slope = 5). Based on a criterion of plus or minus 50% of the mean, the data showed moderate variability within the intervention phase (Kennedy, 2005).

Summary of results related to Child 2. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 2 showed an increase of 275% in skill levels in rhyme identification (ending sound awareness).

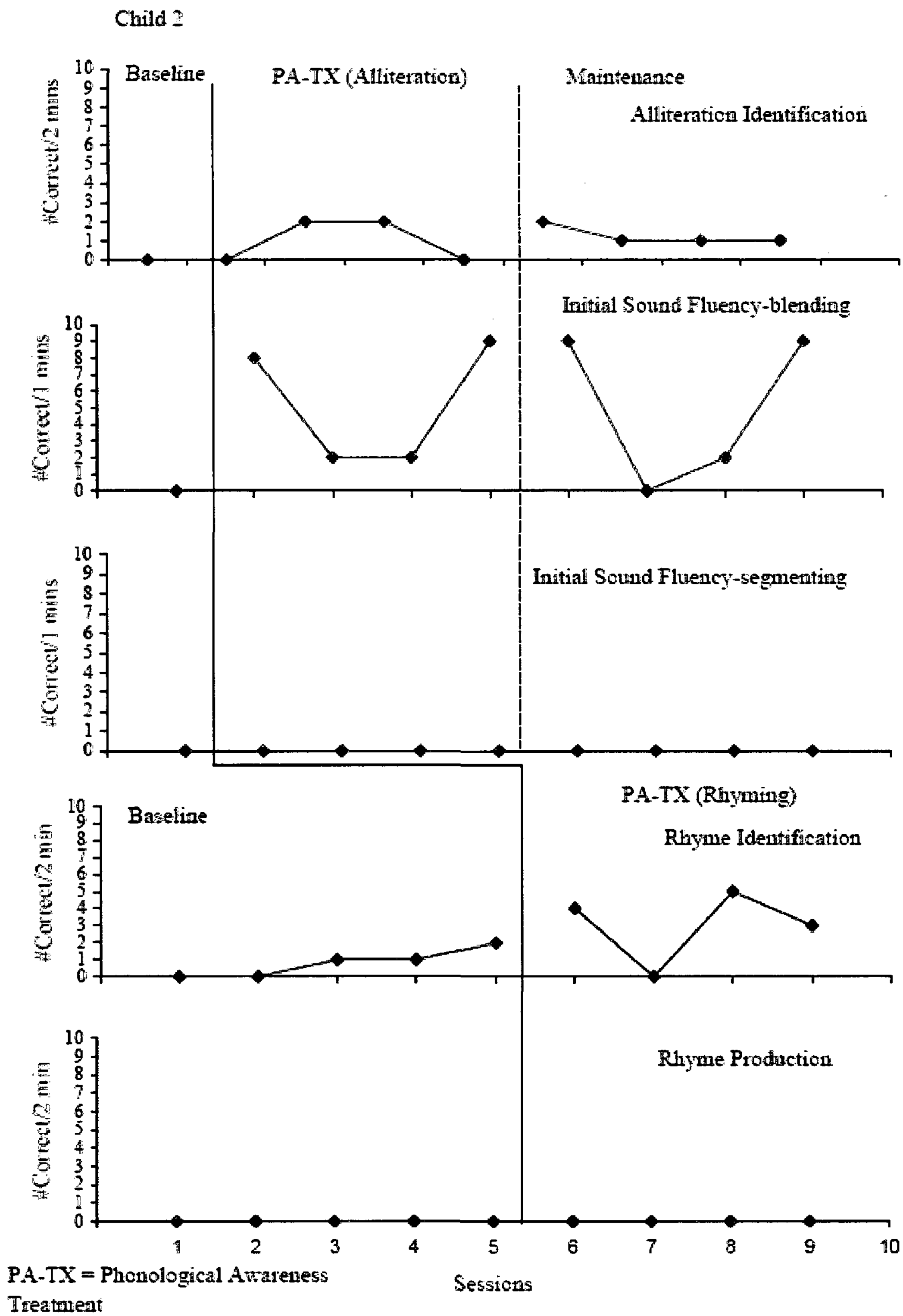


Figure 5. Child 2: Multiple Baseline Test Scores from Weekly Curriculum-Based Measures across Five Phonological Awareness Skills from Baseline to Maintenance

Child 6. Figure 6 shows the data point values, representing test scores that measured rhyme identification when Child 6 was administered weekly CBM tests. A total of nine data points (*M* = 9, *SD* = 4.53, Range = 4 - 19) was collected on the number of rhyming words he correctly identified in two minutes. During the baseline phase, five data points (*M* = 6.8, Range = 4 - 10) were collected. During the rhyming intervention phase, four data points were collected from the fifth through the eighth week of intervention (*M* = 11.75, Range = 7 - 19). The mean rhyming level within the intervention phase showed a large gain (73%) over the baseline mean.

The fourth graph in Figure 6 reveals a moderate decline (40%) within the baseline phase. A rapid immediacy effect with a large gain (217%) was found between baseline and the first week of intervention, as his rhyme identification rose to its maximum level. However, data values moderately declined between the first and the second week of the rhyming intervention (-37%), and continued to decline until finishing 63% below the initial highest intervention level.

A best-fit-line approach (least squares regression) found a negative trend (slope = -1.2) within baseline and within intervention (slope = -3.9), but a slightly positive trend overall (slope = 0.3). In addition, the trend line between the baseline and the first week of intervention revealed the most rapid rate gain (slope = 13) in rhyme identification. Based on a criterion of plus or minus 50% of the mean, baseline data showed low variability, and intervention data were moderately variable (Kennedy, 2005).

Summary of results related to Child 6. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 6 showed an increase of 73% in skill levels in rhyme identification.

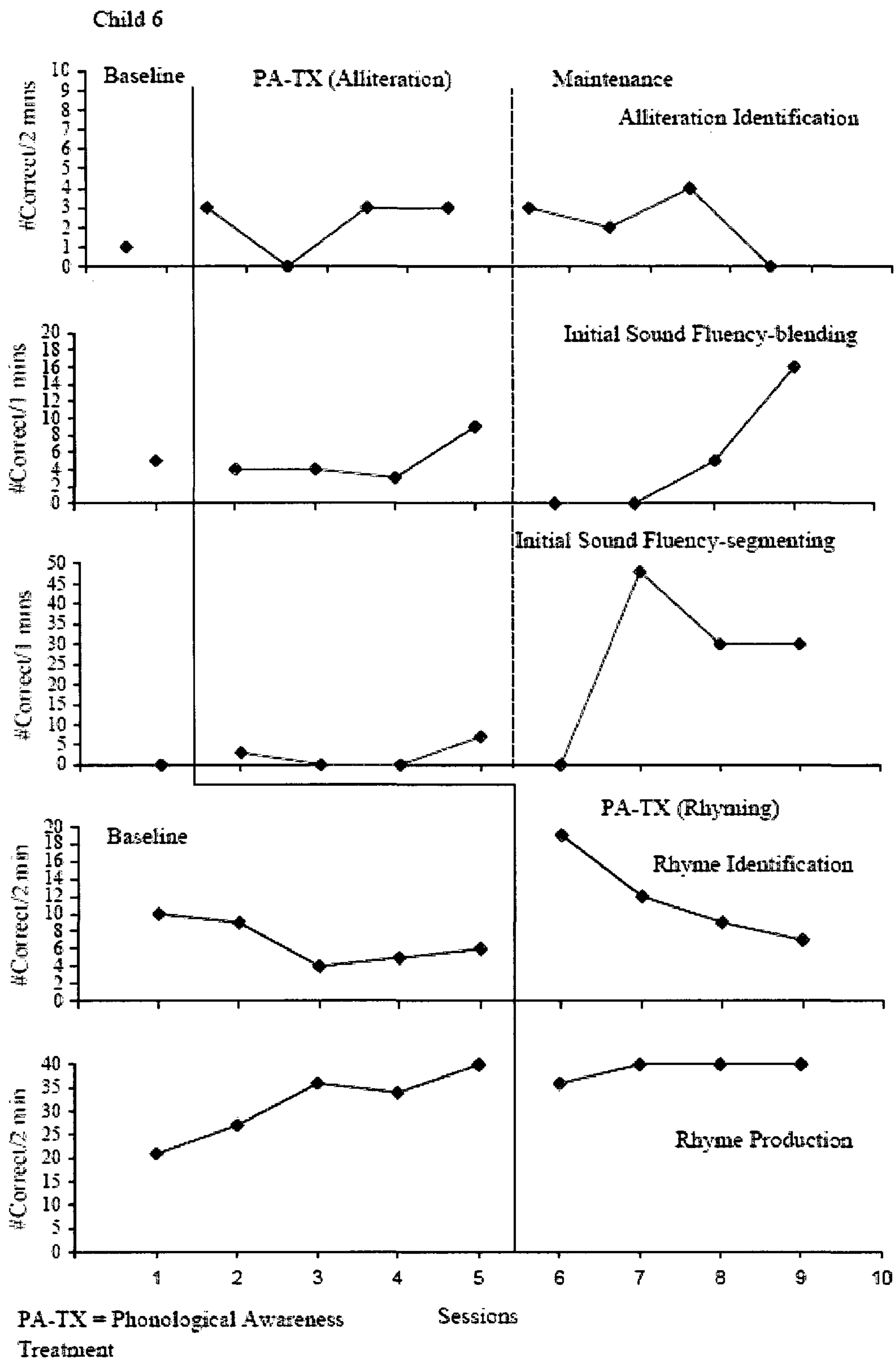


Figure 6. Child 6: Multiple Baseline Test Scores from Weekly Curriculum-Based Measures across Five Phonological Awareness Skills from Baseline to Maintenance

Summary of results related to Hypothesis 1. Based on visual inspection of the graphs, and changes in means scores between the baseline phase, and the intervention and/or maintenance phases, five of the six child participants showed increased skill levels, though variable across child participants, in rhyme identification (ending sound awareness). Refer to Table 10 for a summary of the dependent variable means across phases for child participants 1 – 6.

Hypothesis 2. Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by rhyme production from baseline compared to intervention and maintenance.

Presented in Figures 1 – 6, results suggest improvement in five of the six child participants' rhyme production skills based on the curriculum-based measurement tests. The first three child participants (Child 3, Child 4, & Child 5) described were randomly assigned first to the PETER (rhyming) intervention, followed by the PIPER (alliteration) intervention. For this trio of child participants, there was a short baseline period (e.g., one week) for rhyme production. Throughout the rhyming intervention, child participants' alliteration skills (e.g., alliteration identification, blending and segmenting onset-rime) were also monitored for baseline changes and those results are described in other sections (see Hypotheses 3 – 5). The following visual analyses describe results from baseline through intervention and maintenance.

Child 3. Figure 1 shows the data point values, representing test scores that measured rhyme production when Child 3 was administered weekly CBM tests. A total of nine data points (M = 25.44, SD = 9. 88, Range = 10 – 38) was collected on the number of rhymes she correctly produced in two minutes. Only one data point (*X* = 10) was gathered during the baseline week test session. During the PETER (rhyming) intervention phase, four data points were collected from the first to the fourth week (*M* = 20.75, Range = 14 – 26). During the maintenance phase, four data points were collected from the fifth through the eighth week (*M* = 34, Range = 28 - 38).

The second graph in Figure 1 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain in the rhyme production levels, occurring between baseline and intervention phases (80%). This large gain was followed by a smaller increase between intervention and maintenance (12%). The largest gain in rhyme production levels occurred between baseline and the end of the maintenance phase (240%).

A best-fit-line approach (least squares regression) found a small positive trend within the intervention phase (slope = 0.8), which was larger from the first week of intervention to the second (slope = 8). However, there was a decline in the data values, during the second week of intervention (slope = -12), followed by a rebound effect from the third to the fourth week of intervention (slope = 11). In addition, a slight upward trend (slope = 0.7) continued throughout maintenance. An overall positive trend (slope = 1.27) for rhyme production was found across all phases from baseline to intervention and maintenance. The stability of data based on a criterion of plus or minus 50% of the mean found stable data within the intervention and throughout maintenance (Kennedy, 2005).

Summary of results related to Child 3. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention and maintenance phases, Child 3 showed an increase of 240% in rhyme production skill levels.

Child 4. Figure 2 shows the data point values, representing test scores that measured rhyme production when Child 4 was administered weekly CBM tests. A total of nine data points ($M = 0.56$, $SD = 0.88$, Range = 0 – 2) was collected on the number of rhymes he correctly produced in two minutes. Only one data point ($X = 0$) was gathered during the baseline week test session. During the PETER (rhyming) intervention phase, four data points ($M = 0$, Sum = 0) were collected from the first to the fourth week. During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 1.25$, Range = 0 – 2).

The second graph in Figure 2 reveals no effect between baseline and intervention. (Kennedy, 2005) with rhyme production levels that remained at zero. A small to moderate gain in rhyme production levels occurred between the intervention and maintenance phases, beginning the second week of maintenance, which continued until completion.

A best-fit-line approach (least squares regression) found a slight positive trend overall (slope = 0.27), which was the result of the small upwards rise within the maintenance phase (slope = 0.70). The stability of data based on a criterion of plus or minus 50% of the mean found stable data throughout baseline, intervention and maintenance (Kennedy, 2005).

Summary of results related to Child 4. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention and maintenance phases, Child 4 showed an increase of 125% in rhyme production skill levels.

Child 5. Figure 3 shows the data point values, representing test scores that measured rhyme production when Child 5 was administered weekly CBM tests. A total of nine data points ($M = 25.44$, $SD = 9.88$, Range = 10 – 38) was collected on the number of rhymes he correctly produced in two minutes. Only one data point ($X = 13$) was gathered during the baseline week test session. During the PETER (rhyming) intervention phase, four data points were collected from the first to the fourth week ($M = 11.75$, Range = 7 – 19). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 24.25$, Range = 11 - 30).

The second graph in Figure 3 reveals a delayed effect (Kennedy, 2005) with a moderate gain in the rhyme production levels, occurring between baseline and the second week of intervention (46%). This moderate gain was followed by a large decrease from the second to fourth week of intervention (-63%). Therefore, there was minimal, less than 10%, difference between the mean rhyme production levels from baseline to intervention. Between intervention and maintenance, the rhyme production levels rebounded rapidly upwards (57%). The largest gain in rhyme production levels occurred between the first and second week of maintenance (145%), continuing to rise slightly (11%) to completion.

A best-fit-line approach (least squares regression) found a negative trend within the intervention phase (slope = - 2.1). Alternatively, there was a larger positive trend in the data values within the maintenance phase (slope = 5.9), with the largest rate of rise between the first and second week of maintenance (slope = 16). This large rise contributed to the overall positive trend (slope = 2.32) for rhyme production that was found across all phases, including baseline, intervention, and maintenance. Data stability, based on a criterion of plus or minus 50% of the mean, found moderate data variability within the intervention, and stable data within the baseline and throughout maintenance (Kennedy, 2005).

Summary of results related to Child 5. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 5 showed an increase of 86% in rhyme production skill levels.

The next three child participants (Child 1, Child 2, & Child 6) described were randomly assigned first to the alliteration intervention, followed by the rhyming intervention. For this trio, there was no maintenance for rhyme production. Throughout the rhyming intervention, child participants' alliteration skills were monitored for maintenance and those results are described in other sections (see Hypotheses 3 – 5). The following visual analyses describe results from baseline through intervention.

Child 1. Figure 4 shows the data point values, representing scores that measured rhyme production when Child 1 was administered weekly CBM tests. A total of nine data points (M = 25.33, SD = 9.34, Range = 10 – 38) was collected on the number of rhymes she correctly produced in two minutes. During baseline, five data points (M = 19.2, Range = 10 – 29) were collected from the first through the fifth week of this phase. During the PETER (rhyming) intervention phase, four data points were collected from the sixth through the ninth week (M = 33, Range = 28 – 38).

The fifth graph in Figure 4 reveals increased rhyme production levels within the baseline phase from the first through the fourth week (190%), with a small decline in the fifth week (24%). Between baseline and the first week of the rhyming intervention, an immediate, moderate gain (27%) in the rhyme production level was found, and rapidly peaked (73%) in the second week of intervention. This large gain was followed by a small decrease within the second to the fourth weeks of intervention (-21%). Overall, a large increase in the mean rhyme production levels occurred from baseline across intervention (72%). Furthermore, there was a large increase from the first baseline datum to the last intervention datum collected (200%).

A best-fit-line approach (least squares regression) found a small positive trend within the intervention phase (slope = 0.4). However, the most rapid rises occurred between intervention weeks one and two (slope = 10), suggesting a delayed intervention effect. A moderate positive trend was also found in the data values within the maintenance phase (slope = 3.8). An overall positive trend (slope = 2.97) for rhyme production was found across both baseline and intervention. Based on a criterion of plus or minus 50% of the mean, low variability was found within the baseline data, and stable data within the intervention phase (Kennedy, 2005).

Summary of results related to Child 1. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 1 showed an increase of 72% in rhyme production skill levels.

Child 2. Figure 5 shows the data point values, representing scores that measured rhyme production when Child 2 was administered weekly CBM tests. A total of nine data points ($M = 0$, $SD = 0$, Range = 0) was collected on the number of rhymes he correctly produced in two minutes. During baseline, five data points ($M = 0$, Range = 0) were collected from the first through the fifth week of this phase. During the PETER (rhyming) intervention phase, four data points were collected from the sixth through the ninth week ($M = 0$, Range = 0).

The fifth graph in Figure 5 reveals a zero rhyme production level across both the baseline and intervention phases, indicating no rhyming intervention effect. A best-fit-line approach (least squares regression) also indicated a zero trend line. No variability from the zero data values was found from baseline through intervention.

Summary of results related to Child 2. Based on visual inspection of the graphs, and mean scores between the baseline and intervention phases, Child 2 showed no increase in rhyme production skill levels.

Child 6. Figure 6 shows the data point values, representing scores that measured rhyme production when Child 6 was administered weekly CBM tests. A total of nine data points (M = 34.89, SD = 6.74, Range = 21 – 40) was collected on the number of rhymes he correctly produced in two minutes. During baseline, five data points (M = 31.6, Range = 21 – 40) were collected from the first through the fifth week of this phase. During the PETER (rhyming) intervention phase, four data points were collected from the sixth through the ninth week (M = 39, Range = 36 – 40).

The fifth graph in Figure 6 reveals increased rhyme production levels within the baseline phase from the first through the fifth week (90%), with a slight dip at the fourth week (5%). Between baseline and the first week of the rhyming intervention, another small dip (10%) occurred in the rhyme production level. The rhyme production level immediately rebounded to the ceiling for this measure, where it remained until completion of the rhyming intervention. Due to an apparent ceiling effect in the rhyme production measure for this child, only a small increase in the mean rhyme production levels occurred from baseline across intervention (23%).

A best-fit-line approach (least squares regression) found a moderate positive trend within the baseline phase (slope = 4.5), and the most rapid rise occurred from the first to the third baseline week (slope = 7.5). A smaller positive trend was also found within the intervention phase (slope = 1.2). An overall positive trend (slope = 2.08) for rhyme production was found across both baseline and intervention. Based on a variability criterion of plus or minus 50% of the mean, the data were stable across both baseline and intervention (Kennedy, 2005).

Summary of results related to Child 6. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 6 showed an increase of 23% in rhyme production skill levels.

Summary of results related to Hypothesis 2. Based on visual inspection of the graphs, and changes in means scores between the baseline phase, and the intervention and/or maintenance phases, five of the six child participants showed increased rhyme production skill levels, though variable across child participants and somewhat minimal for Child 4. Refer to Table 10 for a summary of the dependent variable means across phases for child participants 1 – 6.

Hypothesis 3. Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by alliteration identification (initial sound awareness) from baseline compared to intervention and maintenance.

Presented in the previous Figures 1 – 6, results suggest improvement in all of the six child participants' alliteration identification (initial sounds) skills based on the curriculum-based measurement tests.

Child 3. Figure 1 shows the data point values, representing test scores that measured alliteration (initial sounds) identification when Child 3 was administered weekly CBM tests. A total of nine data points (*M* = 13.78, *SD* = 1.48, Range = 12 – 16) was collected on the number of initial sounds she correctly identified in two minutes. During baseline, five data points (*M* = 13.2, Range = 12 - 16) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week (*M* = 14.50, Range = 13 – 15).

The third graph in Figure 1 reveals a rapid immediacy effect (Kennedy, 2005) with a small gain in the alliteration identification levels, occurring between baseline and intervention phases (15%). The gain was continued throughout intervention, except for a brief dip at the third week of intervention (-15%), prior to resuming its previous gain. The single largest gain in alliteration identification levels occurred at the fourth week within the baseline phase (33%). However, the mean alliteration identification level within the intervention phase was about 10% higher than the mean level within the baseline.

A best-fit-line approach (least squares regression) found a small positive trend within the baseline phase (slope = 0.3), which was identical to the overall trend across baseline and intervention. Although, there was a small decline in the trend, within the intervention (slope = -0.2), there was a rebound effect from the third to the fourth week of intervention the data finished with an upward trend (slope = 2). The stability of data based on a criterion of plus or minus 50% of the mean found stable data within the baseline and intervention (Kennedy, 2005).

Summary of results related to Child 3. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 3 showed an increase of 10% in alliteration identification skill levels.

Child 4. Figure 2 shows the data point values, representing test scores that measured alliteration (initial sounds) identification when Child 4 was administered weekly CBM tests. A total of nine data points (*M* = 2.22, *SD* = 1.72, Range = 0 – 5) was collected on the number of initial sounds he correctly identified in two minutes. During baseline, five data points (*M* = 1.6, Range = 0 - 2) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week (*M* = 3, Range = 1 – 5).

The third graph in Figure 2 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain in the alliteration identification levels, occurring between baseline and intervention phases (100%). The gain was variable throughout intervention, with 50% of the data overlapped with baseline. However, the mean alliteration identification level within the intervention phase was about 88% higher than the mean level within the baseline.

A best-fit-line approach (least squares regression) found a small positive trend within the baseline phase (slope = 0.4). Although there was a small decline in trend, within the intervention (slope = -0.2), an overall small positive trend was found across the baseline and intervention (slope = .28). Based on a criterion of plus or minus 50% of the mean, there was moderate variability in the data across both baseline and intervention (Kennedy, 2005).

Summary of results related to Child 4. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 4 showed an increase of 88% in alliteration identification skill levels.

Child 5. Figure 3 shows the data point values, representing test scores that measured alliteration (initial sounds) identification when Child 5 was administered weekly CBM tests. A total of nine data points ($M = 2.56$, $SD = 1.51$, Range = 0 – 5) was collected on the number of initial sounds he correctly identified in two minutes. During baseline, five data points ($M = 2.4$, Range = 0 - 4) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week ($M = 2.75$, Range = 1 – 5).

The third graph in Figure 3 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain in the alliteration identification levels, occurring between baseline and intervention phases (67%). The initial gain was lost over the course of the intervention, with 75% of the data overlapped with baseline. However, there was a small increase, about 15%, in the mean alliteration identification level within the intervention phase, than within the baseline.

A best-fit-line approach (least squares regression) found a small negative trend within the baseline phase (slope = -0.4). Following a brief increased trend between baseline and intervention (slope = 2), there was a subsequent small decline in trend, within the intervention (slope = -1.1). Overall, a modest positive trend was found across the baseline and intervention (slope = 0.1). Based on a criterion of plus or minus 50% of the mean, there was moderate variability in the data across both baseline and intervention (Kennedy, 2005).

Summary of results related to Child 5. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 5 showed an increase of 14% in alliteration skill levels.

Child 1. Figure 4 shows the data point values, representing test scores that measured alliteration identification when Child 1 was administered weekly CBM tests. A total of nine data points ($M = 4.22$, $SD = 2.54$, Range = 0 – 7) was collected on the number of initial sounds she correctly identified in two minutes. Only one datum ($X = 3$) was gathered during the baseline week test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 4$, Range = 1 – 6). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 4.75$, Range = 0 - 7).

The first graph in Figure 4 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain in the alliteration identification levels, occurring between baseline and intervention phases (100%). Although this large gain was followed by a large decrease between the first and second week of intervention (-83%), the alliteration levels immediately rebounded (83%) throughout the third and fourth week of intervention. This re-gained level in alliteration identification was maintained between intervention and maintenance. Within maintenance, a small increase (16%) was found in the third week of maintenance, which was not sustained as the alliteration level fell sharply (-100%) in the fourth week of maintenance. The mean alliteration level was 33% higher within intervention than baseline, and about 19% higher within maintenance than intervention. The mean alliteration level was 58% higher within maintenance, than within baseline.

A best-fit-line approach (least squares regression) found a small positive trend within the intervention phase (slope = 0.2), with the largest positive trend from the second to the fourth week of intervention (slope = 2.5). However, there was a trend decline within maintenance (slope = -1.7). Overall, a flattened trend was found across baseline, intervention and maintenance (slope = 0.07). The stability of data based on a criterion of plus or minus 50% of the mean found moderate variability within intervention and maintenance (Kennedy, 2005).

Summary of results related to Child 1. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 1 showed an increase of 58%, though variable, in alliteration skill levels.

Child 2. Figure 5 shows the data point values, representing test scores that measured alliteration identification when Child 2 was administered weekly CBM tests. A total of nine data points ($M = 1$, $SD = 0.87$, Range = 0 – 2) was collected on the number of initial sounds he correctly identified in two minutes. Only one datum ($X = 0$) was gathered during the baseline week test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 1$, Range = 0 – 2). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 1.25$, Range = 1 - 2).

The first graph in Figure 5 reveals a delayed immediacy effect (Kennedy, 2005) with a large gain in the alliteration identification levels, occurring between the first and second week of intervention. This gain continued through the third intervention week, but decreased to baseline level (-100%) at the end of the intervention phase. Between intervention and maintenance, a rebound occurred, which was followed by a 50% decrease that remained at the same plateau until completion. The mean alliteration levels within baseline and intervention were identical. The mean alliteration level was 25% higher within maintenance than baseline.

A best-fit-line approach (least squares regression) found a flattened trend across baseline, intervention and maintenance (slope = 0.08). This flattened trend was also found within the intervention (slope = 0). There was a slight trend decline within maintenance (slope = -0.3). Indicative of a delayed immediacy effect, the largest positive trends were found within intervention from the first to the second week, and between intervention and maintenance (slope = 2). The stability of data based on a criterion of plus or minus 50% of the mean found low variability within intervention and maintenance (Kennedy, 2005).

Summary of results related to Child 2. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 2 showed an increase of 125% in alliteration skill levels.

Child 6. Figure 6 shows the data point values, representing test scores that measured alliteration identification when Child 6 was administered weekly CBM tests. A total of nine data points (M = 2.11, SD = 1.45, Range = 0 – 4) was collected on the number of initial sounds he correctly identified in two minutes. Only one datum (X = 1) was gathered during the baseline week test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week (M = 2.25, Range = 0 – 3). During the maintenance phase, four data points were collected from the fifth through the eighth week (M = 2.25, Range = 0 - 4).

The first graph in Figure 6 reveals that a rapid immediacy effect (Kennedy, 2005) with a large gain (200%) in the alliteration identification levels occurred between baseline and intervention. Between baseline and intervention there was a 25% data overlap, as the initial gain was followed by a large decrease in the second week of intervention. Subsequently, data values (300%) rebounded in the third week of intervention and continued across the maintenance phase change. There was a moderate decrease (-33%) in the second week of maintenance, prior to another rebound to the highest alliteration identification level from the baseline (300%). However, this higher level was not maintained as it decreased sharply in the last week of maintenance, falling to zero. There was also 25% data overlap between baseline and maintenance. The mean alliteration level within intervention and maintenance was identical, which was 125% higher within than baseline.

A best-fit-line approach (least squares regression) found a flattened trend across baseline, intervention and maintenance (slope = 0.05). There was a small trend incline within intervention (slope = 0.3), which then declined in maintenance (slope = -0.7). The stability of data based on a criterion of plus or minus 50% of the mean found low variability within intervention and maintenance (Kennedy, 2005).

Summary of results related to Child 6. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 6 showed an increase of 125% in alliteration skill levels.

Summary of results related to Hypothesis 3. Based on visual inspection of the graphs, and changes in means scores between the baseline phase, and the intervention and/or maintenance phases, all of the six child participants showed increased skill levels in alliteration (initial sound awareness), though variable across child participants and somewhat minimal for some. Refer to Table 10 for a summary of the dependent variable means across phases for child participants 1 – 6.

Hypothesis 4. Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by blending onset and rime (beginning and ending) sounds from baseline compared to intervention and maintenance.

Presented in Figures 1 – 6, results suggest improvement in all of the six child participants' skills in blending onset and rime (beginning and ending) sounds based on the curriculum-based measurement tests.

Child 3. Figure 1 shows the data point values, representing test scores that measured blending onset and rime when Child 3 was administered weekly CBM tests. A total of nine data points (M = 28.11, SD = 5.28, Range = 16 – 34) was collected on the number of blended onset-rime sounds she correctly identified in one minute. During baseline, five data points (M = 28, Range = 16 - 34) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week (M = 28.25, Range = 27 – 30).

The fourth graph in Figure 1 reveals a large initial gain in the blending onset-rime levels within the baseline (112%), followed by a plateau. There was a slight decreased effect (-10%) between baseline and intervention. Overall, data values remained high within intervention. The mean blending onset-rime level within intervention was only slightly higher (0.9%) than baseline.

A best-fit-line approach (least squares regression) found a moderate positive trend within the baseline (slope = 2.3), with the largest positive trend from the first week in baseline to the second (slope = 17). There was only a slight decline in the trend within the intervention (slope = -0.1) as data values remained high. Based on a criterion of plus or minus 50% of the mean, the data were stable within the baseline and intervention (Kennedy, 2005).

Summary of results related to Child 3. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 3 showed a minimal increase in skill levels of one percent in blending onset and rime sounds (beginning and ending).

Child 4. Figure 2 shows the data point values, representing test scores that measured blending onset and rime when Child 4 was administered weekly CBM tests. A total of nine data points ($M = 4.78$, $SD = 4.52$, Range = 0 – 15) was collected on the number of blended onset-rime sounds he correctly identified in one minute. During baseline, five data points ($M = 3.2$, Range = 0 - 6) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week ($M = 6.75$, Range = 0 – 15).

The fourth graph in Figure 2 reveals a delayed immediacy effect (Kennedy, 2005) with a large gain (400%) in the blending onset-rime levels that occurred between the fifth (i.e., last) week of baseline, and the first to the third week of intervention. Indicative of a delayed intervention effect, there was a brief decrease between the baseline and the first week of intervention when one data point overlapped. After the rebound, the intervention gains over and above baseline levels were sustained until completion. In the fourth week of intervention, there was a reversal in direction that decreased blending onset-rime levels (53%) moderately. Overall, the mean onset-rime blending level within intervention was about 111% higher than the mean level within baseline.

A best-fit-line approach (least squares regression) found a moderate positive trend within intervention (slope = 3.1). The largest rise in trend was found within intervention from the second to the third week (slope = 10). There was a small decline in trend within baseline (slope = -0.4). Overall, a small positive trend was found across the baseline and intervention (slope = .78). Based on a criterion of plus or minus 50% of the mean, there was moderate variability in the data within the baseline and large variability within the intervention (Kennedy, 2005).

Summary of results related to Child 4. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 4 showed an increase in skill levels of 111% in blending onset and rime sounds (beginning and ending).

Child 5. Figure 3 shows the data point values, representing test scores that measured blending onset and rime when Child 5 was administered weekly CBM tests. A total of nine data points (M = 15.67, SD = 6.69, Range = 6 – 25) was collected on the number of blended onset-rime sounds he correctly identified in one minute. During baseline, five data points (M = 12.40, Range = 6 - 18) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week (M = 19.75, Range = 19 – 25).

The fourth graph in Figure 3 reveals a rapid immediacy effect (Kennedy, 2005) with a small gain (19%) in the blending onset-rime levels that occurred between the fifth (i.e., last) week of baseline, and the first week of intervention. Following a small decrease in the second week of intervention (26%), blending onset-rime levels rebounded largely

(92%) and continued to slightly rise (9%) to completion. The mean onset-rime blending level within intervention was about 59% higher than the mean level within baseline.

A best-fit-line approach (least squares regression) found a small, positive trend within intervention (slope = 2.9), with a larger rise (slope = 11) from the second to the third week. Within the baseline, there was a small, positive trend from the first to the third week (slope = 1.8) that reached a plateau (slope = 0), prior to intervention. Overall, a positive trend was found throughout baseline and intervention (slope = 1.77). Based on a criterion of plus or minus 50% of the mean, there was low variability in the data from baseline through intervention (Kennedy, 2005).

Summary of results related to Child 5. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 5 showed an increase in skill levels of 59% in blending onset and rime sounds (beginning and ending).

Child 1. Figure 4 shows the data point values, representing test scores that measured blending onset and rime when Child 1 was administered weekly CBM tests. A total of nine data points ($M = 8.33$, $SD = 4.18$, Range = 3 – 16) was collected on the number of blended onset-rime sounds she correctly identified in one minute. Only one datum ($X = 3$) was gathered during the baseline test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 8$, Range = 5 – 12). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 10$, Range = 4 - 16).

The second graph in Figure 4 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain (133%) in the blending onset-rime levels that occurred between baseline and intervention. Blending onset-rime levels continued to increase largely (71%) through the third week of intervention, followed by a large decrease (58%) at the completion of intervention. There were no overlapping data points between the baseline phase, and the intervention and maintenance phases. There was another large increase in the onset-rime blending levels between intervention and maintenance (120%) that peaked in the third week of maintenance (220%), prior to a large decrease (-75%) in the fourth (i.e., last) week of maintenance. The mean blending onset-rime level within intervention was about 167% higher than the mean level within baseline. The mean level within maintenance was about 233% higher than the mean level within baseline.

A best-fit-line approach (least squares regression) found a small, negative trend within intervention (slope = -0.2), with a moderate positive trend (slope = 4) from the second to the third week. Within maintenance, there was also a small negative trend (slope = -1.4), with a large positive trend (slope = 7) from the second to the third week. Overall, a small, positive trend was found throughout baseline, intervention, and maintenance (slope = 0.53). Based on a criterion of plus or minus 50% of the mean, there was low variability in the data from baseline through intervention (Kennedy, 2005).

Summary of results related to Child 1. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 1 showed an increase of 233% in skill levels in blending onset and rime sounds (beginning and ending).

Child 2. Figure 5 shows the data point values, representing test scores that measured blending onset and rime when Child 2 was administered weekly CBM tests. A total of nine data points ($M = 4.56$, $SD = 4.07$, Range = 0 – 9) was collected on the number of blended onset-rime sounds he correctly identified in one minute. Only one datum ($X = 0$) was gathered during the baseline test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 5.25$, Range = 2 – 9). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 5$, Range = 0 - 9).

The second graph in Figure 5 reveals a rapid immediacy effect (Kennedy, 2005) with a large gain (800%) in the blending onset-rime levels that occurred between baseline and intervention. Onset-rime blending levels decreased largely (75%) across the second and third week of intervention, followed by a large rebound (350%) in a U pattern (Kennedy, 2005) at the completion of intervention. There were no overlapping data points between baseline, and only one datum overlapped between baseline and maintenance. Between intervention and maintenance, the blending onset-rime levels reached a plateau, prior to a large decrease to zero in the second week of maintenance. In the third week of maintenance the data level reversed direction and rebounded again largely (900%) to finish in another U pattern. The mean blending onset-rime level within intervention was about 525% higher than the mean level within baseline. The mean level within maintenance was 500% higher than the mean level within baseline.

A best-fit-line approach (least squares regression) found a small, positive trend within intervention (slope = 0.3), with a large, positive trend (slope = 7) from the third to the fourth week. Within maintenance, there was also a small, positive trend (slope = 0.2), with a moderate, positive trend (slope = 4.5) from the second to the fourth week. Overall, a small, positive trend was found throughout baseline, intervention, and maintenance (slope = 0.35). Based on a criterion of plus or minus 50% of the mean, there was moderate variability in the data from intervention through maintenance (Kennedy, 2005).

Summary of results related to Child 2. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 2 showed an increase of 525% in skill levels, though variable, in blending onset and rime sounds (beginning and ending).

Child 6. Figure 6 shows the data point values, representing test scores that measured blending onset and rime when Child 6 was administered weekly CBM tests. A total of nine data points ($M = 5.11$, $SD = 4.91$, Range = 0 – 16) was collected on the number of blended onset-rime sounds he correctly identified in one minute. Only one datum ($X = 5$) was gathered during the baseline test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 5$, Range = 3 – 9). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 5.25$, Range = 0 - 16).

The second graph in Figure 6 reveals a delayed intervention effect (Kennedy, 2005) with a large gain (200%) in the blending onset-rime level that did not occur until the fourth week of intervention. Between baseline and intervention, there was a small decrease (-20%) in the onset-rime blending levels. Blending onset-rime levels decreased largely (75%) across the second and third week of intervention, followed by a large rebound (350%) in a U pattern (Kennedy, 2005) at the completion of intervention. There were three overlapping data points (75%) between baseline and intervention. Between intervention and maintenance, the onset-rime blending levels largely decreased to zero within the first and second weeks of maintenance. This decrease was followed by a large rebound that began in the third week, and continued to increase (220%) until completion.

A best-fit-line approach (least squares regression) found a small, positive trend within intervention (slope = 1.4), with a moderate, positive trend (slope = 6) from the third to the fourth week. Within maintenance, there was also a moderate, positive trend (slope = 5.3), with a large, positive trend (slope = 11) from the third to the fourth week. Overall, a small, positive trend was found throughout baseline, intervention, and maintenance (slope = 0.6). Based on a criterion of plus or minus 50% of the mean, there was moderate to large variability in the data from intervention through maintenance (Kennedy, 2005). Because of the moderate to large data variability, the mean blending onset-rime level within intervention was the same within the baseline and intervention, and only 5% higher in maintenance than in the baseline.

Summary of results related to Child 6. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 6 showed a variable and minimal increase of five percent in skill levels, in blending onset and rime sounds (beginning and ending).

Summary of results related to Hypothesis 4. Based on visual inspection of the graphs, and changes in means scores between the baseline phase, and the intervention and/or maintenance phases, all of the six child participants showed increased skill levels in blending onset and rime sounds (beginning and ending), though variable across child participants and minimal for some. Refer to Table 10 for a summary of the dependent variable means across phases for child participants 1 – 6.

Hypothesis 5. Phonodialogic reading using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children will have a positive effect on children's phonological awareness skills, as measured by segmenting onset and rime sounds from baseline compared to intervention and maintenance. Presented in Figures 1 – 6, results suggest improvement in five of the six child participants' skills in segmenting onset and rime (beginning and ending) sounds based on the curriculum-based measurement tests.

Child 3. Figure 1 shows the data point values, representing test scores that measured segmenting onset and rime when Child 3 was administered weekly CBM tests. A total of nine data points (M = 47.44, SD = 20.39, Range = 16 – 70) was collected on the number of segmented onset-rime sounds she correctly identified in one minute. During baseline, five data points (M = 37.80, Range = 16 - 60) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week (M = 59.50, Range = 40 – 70).

The fifth graph in Figure 1 reveals a large initial gain in the segmenting onset-rime levels within the baseline (275%), followed by subsequent loss (-67%), a plateau and another gain (122%) in the fifth (i.e., last) week of baseline. Between baseline and intervention, there was no change until the second week of intervention when there was a slight decreased effect (-33%). The segmenting onset-rime levels rebounded (75%) within the third and fourth (i.e., last) week of intervention to the highest level. Data values remained high within intervention, except for one datum that overlapped in the second week of intervention. There was a moderate to large increase in the mean level (57%) of segmenting onset-rime from the baseline to the intervention.

A best-fit-line approach (least squares regression) found a moderate, positive trend within the intervention (slope = 5.8), with a large, positive trend from the third to fourth week of intervention (slope = 28). There was also a moderate, positive in the trend within the baseline (slope = 5.5), with the largest, positive trend from the first to the second week of the baseline (slope = 44). Based on a criterion of plus or minus 50% of the mean, the data were moderately variable within the baseline, and stable within the intervention (Kennedy, 2005).

Summary of results related to Child 3. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 3 showed an increase of 57% in skill levels in segmenting onset and rime sounds.

Child 4. Figure 2 shows the data point values, representing test scores that measured segmenting onset and rime when Child 4 was administered weekly CBM tests. A total of nine data points (M = 3.67, SD = 7.57, Range = 0 – 23) was collected on the number of segmented onset-rime sounds he correctly identified in one minute. During baseline, five data points (M = 1, Range = 0 - 5) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week (M = 7, Range = 0 – 23).

The fifth graph in Figure 2 reveals a flat, zero baseline until the fifth (i.e., last) week of baseline, which produced a relatively small gain. Between baseline and intervention, there was a reversal in a downward direction in the first week of intervention. This reversal was followed by a small rebound in the second week of intervention, and another decrease in the third week of intervention. Within intervention, a three-week delay in the intervention effect on the segmenting onset-rime level occurred.

In the fourth week of intervention, the segmenting onset-rime level increased immediately from zero to 23. There was a large increase in the mean level (600%) of segmenting onset-rime from the baseline to the intervention.

A best-fit-line approach (least squares regression) found a moderate, positive trend within the intervention (slope = 6.4), with a large, positive trend from the third to fourth week of intervention (slope = 23). There was also a small, positive in the trend within the baseline (slope = 1). Overall, from baseline through intervention, there was a small, positive trend (slope = 1.70). Based on a criterion of plus or minus 50% of the mean, the data were largely variable throughout baseline and intervention (Kennedy, 2005).

Summary of results related to Child 4. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 4 showed an increase of 600% in skill levels in segmenting onset and rime sounds.

Child 5. Figure 3 shows the data point values, representing test scores that measured segmenting onset and rime when Child 5 was administered weekly CBM tests. A total of nine data points (M = 11.78, SD = 11.69, Range = 0 – 34) was collected on the number of segmented onset-rime sounds he correctly identified in one minute. During baseline, five data points (M = 11, Range = 0 - 22) were gathered during the test sessions. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth intervention week (M = 12.75, Range = 0 – 34).

The fifth graph in Figure 3 reveals a decreasing baseline until the fourth week of baseline, which produced a large gain (167%), followed by a reversal to a zero baseline. Between baseline and intervention, there was delayed immediacy effect through the second week of intervention, followed by a large, rapid increase in the segmenting onset-rime level. This large increase was followed by a relatively moderate decrease (50%) to completion. rebound in the second week of intervention, and another decrease in the third week of intervention. However, there was only a small net increase in the mean level (16%) of segmenting onset-rime from the baseline to the intervention.

A best-fit-line approach (least squares regression) found a large, positive trend within the intervention (slope = 8.5), with the largest, positive trend from the second to third week of intervention (slope = 34). There was also a relatively small, negative in the trend within the baseline (slope = -3.9). Overall, from baseline through intervention, there was a small, positive trend (slope = .35). Based on a criterion of plus or minus 50% of the mean, the data were largely variable throughout baseline and intervention (Kennedy, 2005).

Summary of results related to Child 5. Based on visual inspection of the graphs, and changes in means scores between the baseline and intervention phases, Child 5 showed an increase of 16% in skill levels in segmenting onset and rime sounds.

Child 1. Figure 4 shows the data point values, representing test scores that measured segmenting onset and rime when Child 1 was administered weekly CBM tests. A total of nine data points ($M = 2$, $SD = 4.97$, Range = 3 – 16) was collected on the number of blended onset-rime sounds she correctly identified in one minute. Only one datum ($X = 0$) was gathered during the baseline test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 0.75$, Range = 0 – 3). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 3.75$, Range = 0 - 15).

The third graph in Figure 4 reveals a delayed intervention effect (Kennedy, 2005) with a relatively small increase in the segmenting onset-rime level that occurred in the second week of intervention, and was not sustained. Between intervention and maintenance, a large, rapid increase (150%) in the segmenting onset-rime level occurred in the first week of maintenance, but this was not sustained. In the second to the fourth week of maintenance, segmenting onset-rime levels continued to follow a zero baseline. The mean segmenting onset-rime level within maintenance was about 400% higher than the mean level within intervention. However, the mean level within intervention was 75% higher than the baseline level, which was zero.

A best-fit-line approach (least squares regression) found a small, negative trend within intervention (slope = -0.3), with a small positive trend (slope = 3) from the first to the second week. Within maintenance, there was also a small to moderate negative trend (slope = -4.5). Overall, a small, positive trend was found throughout intervention and maintenance (slope = 3.75). Based on a criterion of plus or minus 50% of the mean, there was large variability in the data within intervention and maintenance (Kennedy, 2005).

Summary of results related to Child 1. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 1 showed an increase of 375% in skill levels, though variable, in segmenting onset and rime sounds.

Child 2. Figure 5 shows the data point values, representing scores that measured segmenting onset-rime when Child 2 was administered weekly CBM tests. A total of nine data points ($M = 0$, $SD = 0$, Range = 0) was collected on the number of segmented onset-rime sounds he correctly identified in one minute. Only one datum ($X = 0$) was gathered during the baseline test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 0$, Range = 0). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 0$, Range = 0).

The third graph in Figure 5 reveals a zero segmenting onset-rime level across the baseline, intervention, and maintenance phases, indicating no alliteration intervention effect. A best-fit-line approach (least squares regression) also indicated a zero trend line. No variability from the zero data values was found from baseline through intervention and maintenance.

Summary of results related to Child 2. Based on visual inspection of the graphs, and mean scores between the baseline, intervention, and maintenance phases, Child 2 did not show an increase in skill levels in segmenting onset and rime sounds.

Child 6. Figure 6 shows the data point values, representing test scores that measured blending onset and rime when Child 6 was administered weekly CBM tests. A total of nine data points ($M = 13.11$, $SD = 18.08$, Range = 0 – 48) was collected on the number of segmented onset-rime sounds he correctly identified in one minute. Only one datum ($X = 0$) was gathered during the baseline test session. During the PIPER (alliteration) intervention phase, four data points were collected from the first to the fourth week ($M = 2.5$, Range = 0 – 7). During the maintenance phase, four data points were collected from the fifth through the eighth week ($M = 27$, Range = 0 - 48).

The third graph in Figure 6 reveals a relatively slight intervention effect (Kennedy, 2005) with a small gain in the blending onset-rime level that was not sustained in the second through the third week of intervention. In the fourth week of intervention, there was another small increase that was not sustained across the phase change to maintenance. In the second week of maintenance, a large increase in segmenting onset-rime sounds occurred that dropped slightly, but was sustained to completion. The mean segmenting onset-rime level within maintenance was about 980% higher than the mean level within intervention. However, the mean level within intervention was 250% higher than the baseline level, which was zero.

A best-fit-line approach (least squares regression) found a small, positive trend within intervention (slope = 1.2), with a moderate, positive trend (slope = 5) from the third to the fourth week. Within maintenance, there was also a large, positive trend (slope = 7.2), with a very large, positive trend (slope = 48) from the first to the second week of maintenance. Overall, a small, positive trend was found throughout intervention maintenance (slope = 4.95). Based on a criterion of plus or minus 50% of the mean, there was large variability in the data from intervention through maintenance (Kennedy, 2005).

Summary of results related to Child 6. Based on visual inspection of the graphs, and changes in means scores between the baseline, intervention, and maintenance phases, Child 6 showed an increase of 2,700% in skill levels, though variable, in segmenting onset and rime sounds.

Summary of results related to Hypothesis 5. Based on visual inspection of the graphs, and changes in means scores between the baseline phase, and the intervention and/or maintenance phases, five of the six child participants showed increased skill levels in segmenting onset and rime sounds, though variable across child participants, and somewhat minimal for Child 1. Refer to Table 10 for a summary of the dependent variable means across phases for child participants 1 – 6.

Table 10. Hypotheses 1 – 5: Dependent Variable Means across Phases for Child Participants 1 - 6

	H1: Rhyme ID Phase Means			H2: Rhyme Prod Phase Means			H3: Alliteration ID Phase Means			H4: Blend Onset-Rime Phase Means			H5: Segment Onset-Rime Phase Means		
Child	B	I	M	B	I	M	B	I	M	B	I	M	B	I	M
Child 1	12.80	14.75*	---	19.20	33.00*	---	3.00	4.00*	4.75*	3.00	8.00*	10.00*	0	0.75*	3.75*
Child 2	0.80	3.00*	---	0	0	---	0	1.00*	1.25*	0	5.25*	5.00	0	0	0
Child 3	13.00	13.50*	19.75*	10.00	20.75*	34.00*	13.20	14.5*	---	28.00	28.25*	---	37.80	59.50*	---
Child 4	3.00	3.25*	4.50*	0	0	1.25*	1.60	3.00*	---	3.20	6.75*	---	1.00	7.00*	---
Child 5	4.00	2.00	4.00	13.00	11.75*	24.25*	2.40	2.75*	---	12.40	19.75*	---	11.00	12.75*	---
Child 6	6.80	11.75*	---	31.60	39.00*	---	1.00	2.25*	2.25	5.00	5.00	5.25*	0	2.50*	27.00*

Note: H = Hypothesis; B = Baseline; I = Intervention; M = Maintenance; Rhyme ID = Rhyme Identification; Rhyme Prod = Rhyme Production; Alliteration ID = Alliteration Identification; Blend Onset-Rime = Blending Onset and Rime Sounds; Segment Onset-Rime = Segmenting Onset and Rime Sounds

* Denotes increased skill levels from baseline to intervention and/or maintenance

Estimates of effect sizes. The method of calculation of the estimated effect sizes used in this study included the percentage of all non-overlapping data (PAND; Parker & Hagan-Burke, 2007; Parker, Hagan-Burke, & Vannest, 2007; Ziolkowski & Goldstein, 2008). The usefulness of PAND is comparable to the effect size estimate that uses the percentage of non-overlapping data (PND; Scruggs & Mastropieri, 1998, 2001). However, PAND has been demonstrated as more suitable for longer single subject designs employing at least 20 data points, such as the multiple baseline design, because it includes all data in the calculation. Data points that overlap were defined as the minimum number of data points that would need to be traded across the study phases to completely separate the baseline scores from the intervention and maintenance scores (Parker et al., 2007). The steps used to calculate the PAND follow: a) calculate the data overlap for each set of graphs (e.g., Child 1, Child 2, Child 3, Child 4, Child 5, & Child 6); b) calculate the data overlap for each measure of phonological awareness skills (e.g., rhyme identification, rhyme production, alliteration identification, initial sound fluency-blending, initial sound fluency-segmenting); c) sum the data overlap for each measure of phonological awareness for each child participant; d) divide the sum of data overlap by the total number of data points collected for each measure (e.g., 54 total data points for each graph); e) convert the decimal to a percentage by multiplying it by 100; and f) calculate the percentage of the data non-overlap (or under lap) by subtracting from 100.

The PAND for each curriculum-based measurement was also converted to Cohen's *d* as an indicator of the magnitude of effect size, and to R and R^2 as regression effect sizes. The conversion of PAND effect sizes to their associated estimates of Cohen's *d*, R, and R^2 was based on the tables and figures that Parker and Hagan-Burke

(2007) interpreted and applied to single case research in behavior therapy. The standard mean difference (SMD; Olive & Smith, 2005) effect size method was abandoned in this study, because it could not be used to calculate effect sizes when single subject designs result in a flat baseline (i.e., a zero baseline) that was found in some of the measures. A more recent calculation for effect size, the improvement rate difference (IRD; Parker, Vannest, & Brown, 2009), was not used because that calculation is more effective with longer baselines. In this study, many of the baseline phases consisted of only one datum.

The results of the calculations for PAND and the associated Cohen's *d*, *R*, and R^2 for each dependent variable are presented in Table 11. The PAND calculations indicated that the phonodialogic intervention produced small to moderate effects on child participants' phonological awareness skills. The range of PAND effect sizes of the dependent variables was found to be from 56% to 74%. Two of the variables, rhyme identification (72%) and initial sound fluency-blending (74%), met the guidelines for PND effect size levels (70% - 90%) for effective treatments as indicated by Scruggs and Mastropieri (1998, 2001). The remaining three dependent variables, rhyme production (67%), alliteration identification (69%), and initial sound fluency-segmenting (56%), fell within the guidelines (50%-70%) for questionably effective interventions (Scruggs & Mastropieri, 1998, 2001).

Table 11. Percentage of All Non-Overlapping Data (PAND) with Associated Cohen's *d*, *R*, and R^2 for Each Dependent Variable Measure

Measure	PAND	Cohen's *d*	*R*	R^2
Rhyme identification (Rhyming IGDI)	72%	1.65	0.60	0.36
Rhyme production	67%	1.50	0.56	0.31
Alliteration identification (Alliteration IDGI)	69%	1.60	0.57	0.32
Initial sound fluency – blending (DIBELS)	74%	1.70	0.62	0.38
Initial sound fluency – segmenting (DIBELS)	56%	1.10	0.47	0.22

Note: IGDI = Individual Growth and Development Indicator; DIBELS = Diagnostic Indicators of Basic Early Literacy Skills – Sixth Edition

Behavioral observation measures. Assessment of parental usage of intervention strategies and child participant responses to parental prompts were based on the coded data from the video recorded parent-child storybook reading sessions. Twenty-five percent of the video-records of the parent-child reading sessions in the home setting, or a minimum of one video recorded reading session per week, was selected at random and coded, using frequency counting measures of parent and child behaviors. These data were graphed (see Figures 7 – 12) in Microsoft Excel for visual inspection as a multiple baseline design across parent strategy prompts and replicated across the six parent-child dyads (e.g., Barton, Reichow, & Wolery, 2007; Hillman & Miller, 2004). The estimated effect size calculations of the child participants' correct responses to the parental strategy prompts follow.

The nine strategy prompt codes follow: picture labeling, predicting story events, ending (rhyming) sounds, talking about the tale (relating to experience), eliciting details, reinforcement/praise, identifying initial (alliteration) sounds, posing wh-questions (who, what, when, where, why, how), and no code. Detailed definitions and descriptions of each strategy prompt are located within Table 6 in the Method section. The video-audio data collection sheet with parental prompt codes and child response codes is provided in Appendix A.

The strategy prompts provided by parent interventionists are graphed with an overlay of the child participant correct response data. Parental prompt data are displayed in red for the first set of intervention strategy prompts, and blue for the second set of strategy prompts. Child participant data for correct responses are displayed in pink. For each parental prompt that a parent interventionist provided to his or her child, the child participant's response was counted as either a correct response, an incorrect response, no response, or a response for which there was not a code available (i.e., no code). However, only the child participant's correct response data were graphed and included in the estimated effect size calculations. The other possible types of responses (e.g., incorrect, no response, or no code) were not displayed in the graphs or included in the effect size calculations. In addition, the parental strategy prompt of reinforcement and praise was not counted as a prompt that elicited a response, due to the fact that parental reinforcement and/or praise prompting always coincided with another parental prompt (e.g., picture labeling) intended to elicit a response of the same type (e.g., picture labeling) from the child participant. Therefore, the graph that displayed the parental prompt data for reinforcement and praise lacked a corresponding overlay of the child response data.

Three parent-child dyads (e.g., Dyad 3, Dyad 4, & Dyad 5) were randomly assigned to participate in the PETER (rhyming condition) intervention first, followed by the PIPER (alliteration condition). This set of dyads (3, 4 & 5) is presented respectively in Figures 7 – 9. The other three parent-child dyads (Dyad 1, Dyad 2, & Dyad 6) were randomly assigned to participate in the PIPER intervention first, followed by the PETER intervention. This set of dyads (1, 2, & 3) is presented respectively in Figures 10 - 12.

The study results presented in Figures 7 – 12 suggested small to moderate improvement in some of the child participants' abilities to correctly respond to parent use of intervention strategies based on the behavioral observations from video recorded parent-child data. However, child correct responding mirrored and appeared to be inextricably linked to the parent's strategy use. For example, the larger the number of parent prompts provided to the child, the larger the number of child correct responses observed. Conversely, when parental prompting was low, or at the zero baseline level, correct child participant responses were low or at the zero baseline level. Further, child response data were either equally matched to parental prompt data, or at a slightly lower level. On few occasions, the child response data levels exceeded the parental prompt data levels.

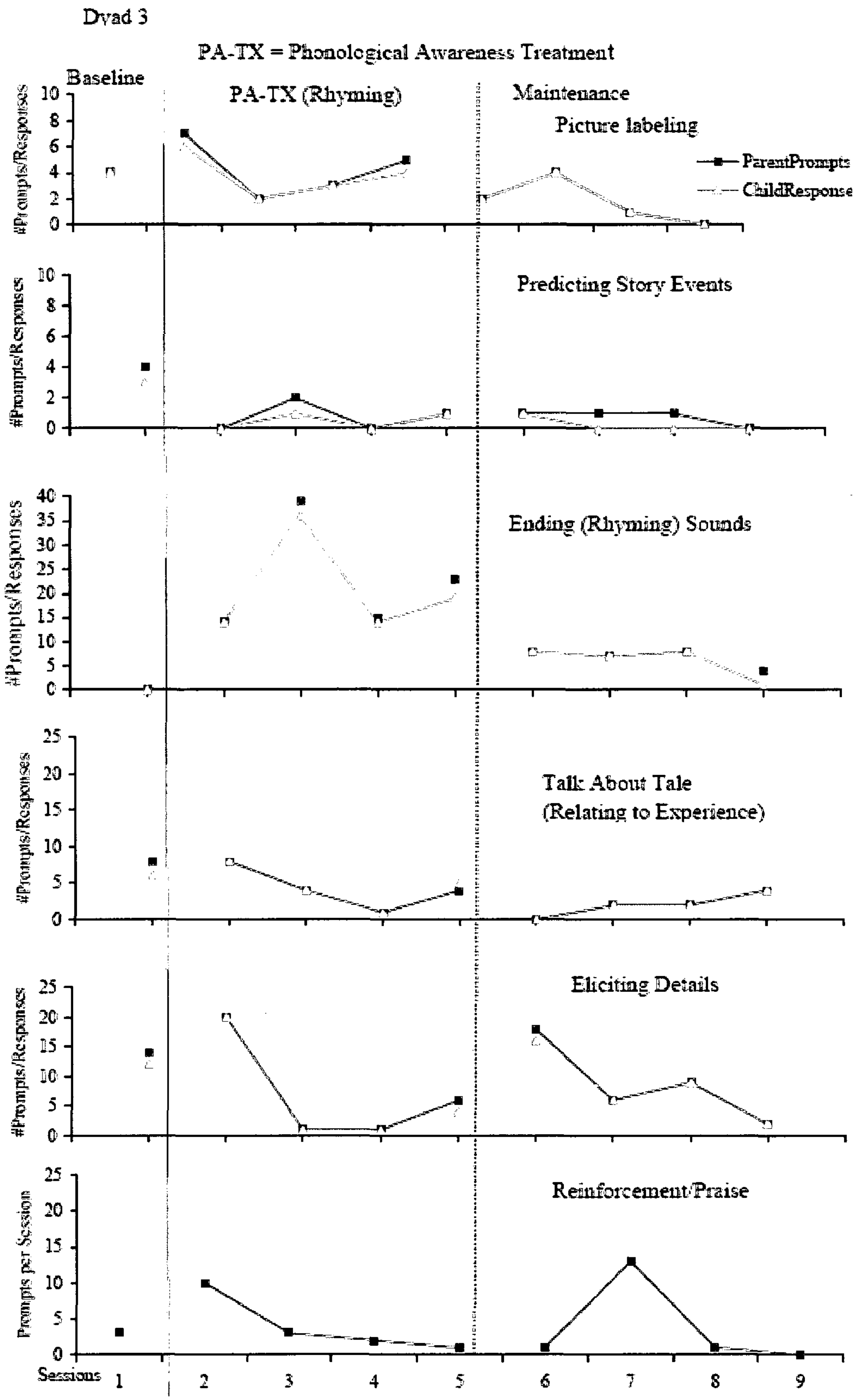


Figure 7. Dyad 3: Parental Prompts Per Session and Child Correct Responses

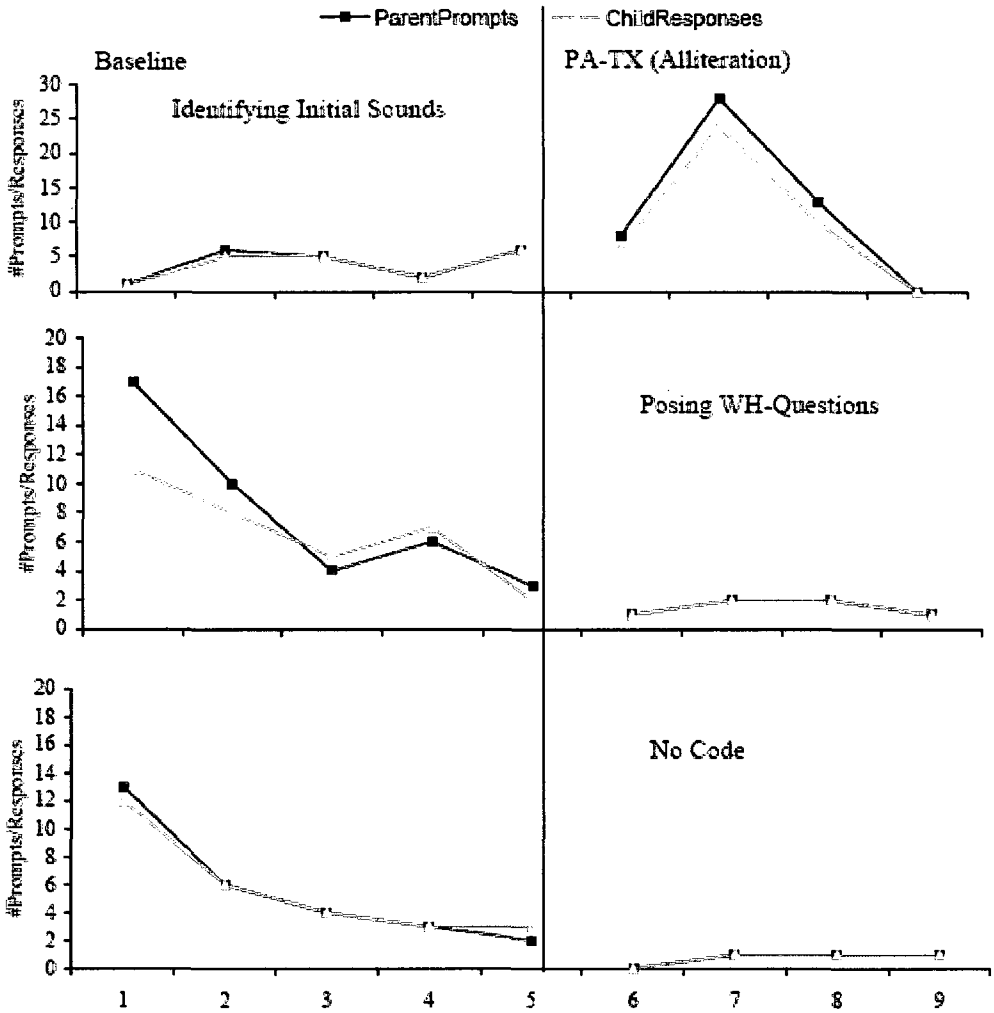


Figure 7. Continued

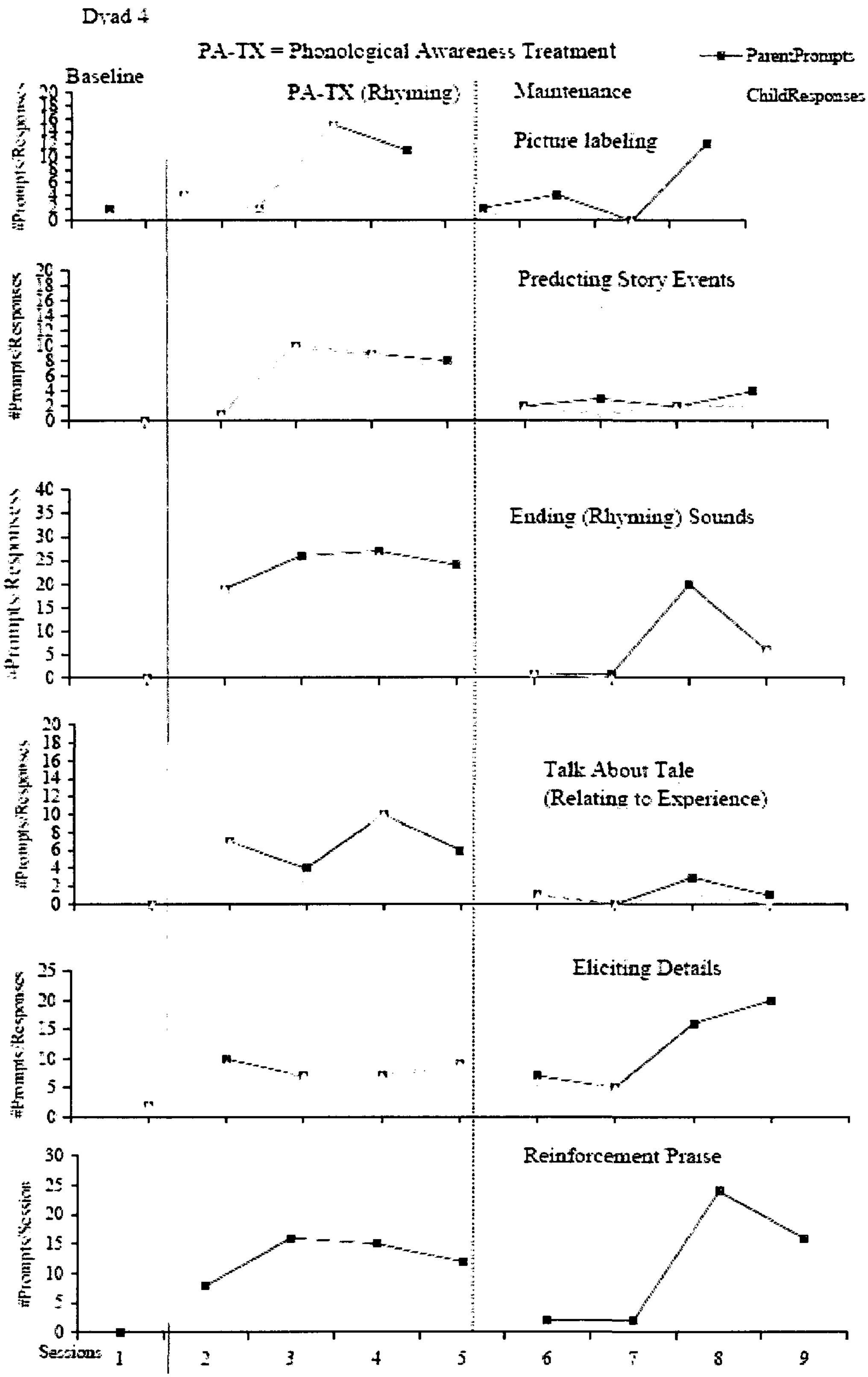


Figure 8. Dyad 4: Parental Prompts Per Session and Child Correct Responses

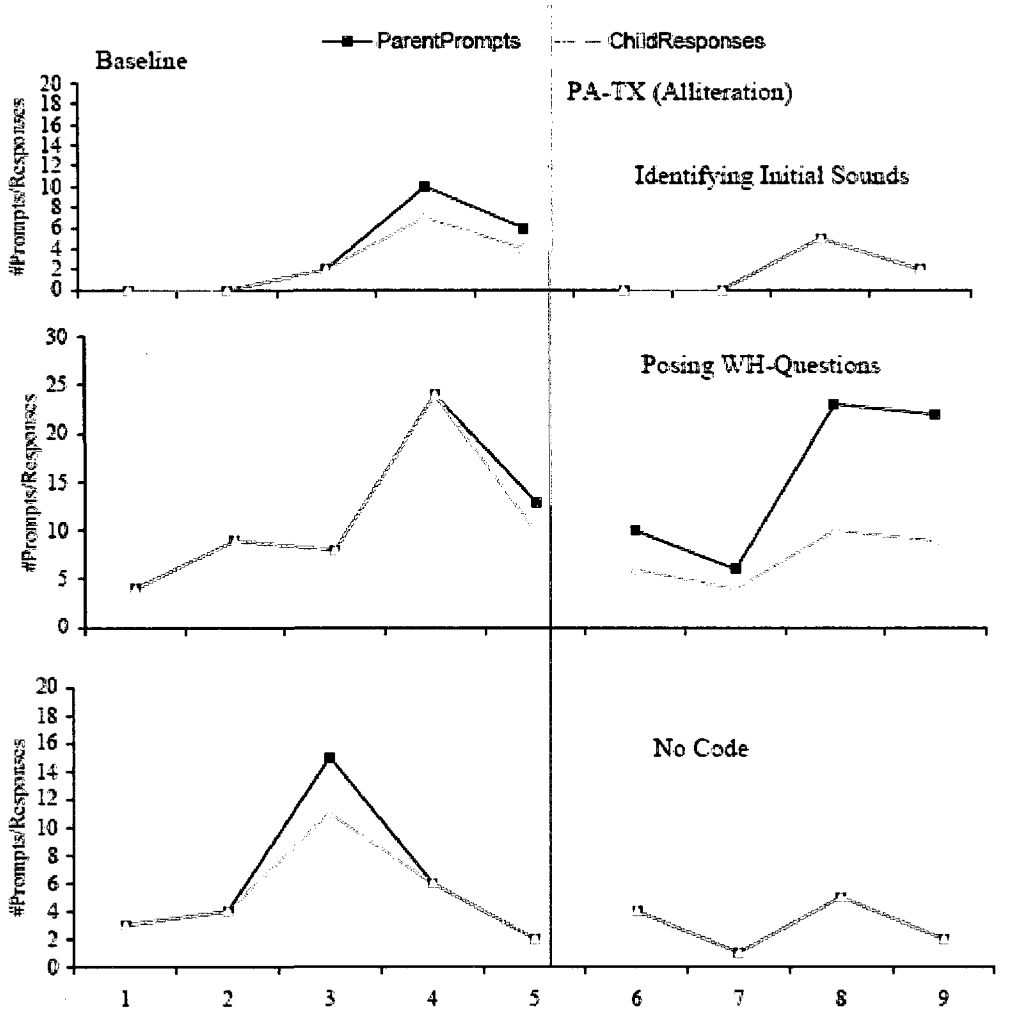


Figure 8. Continued

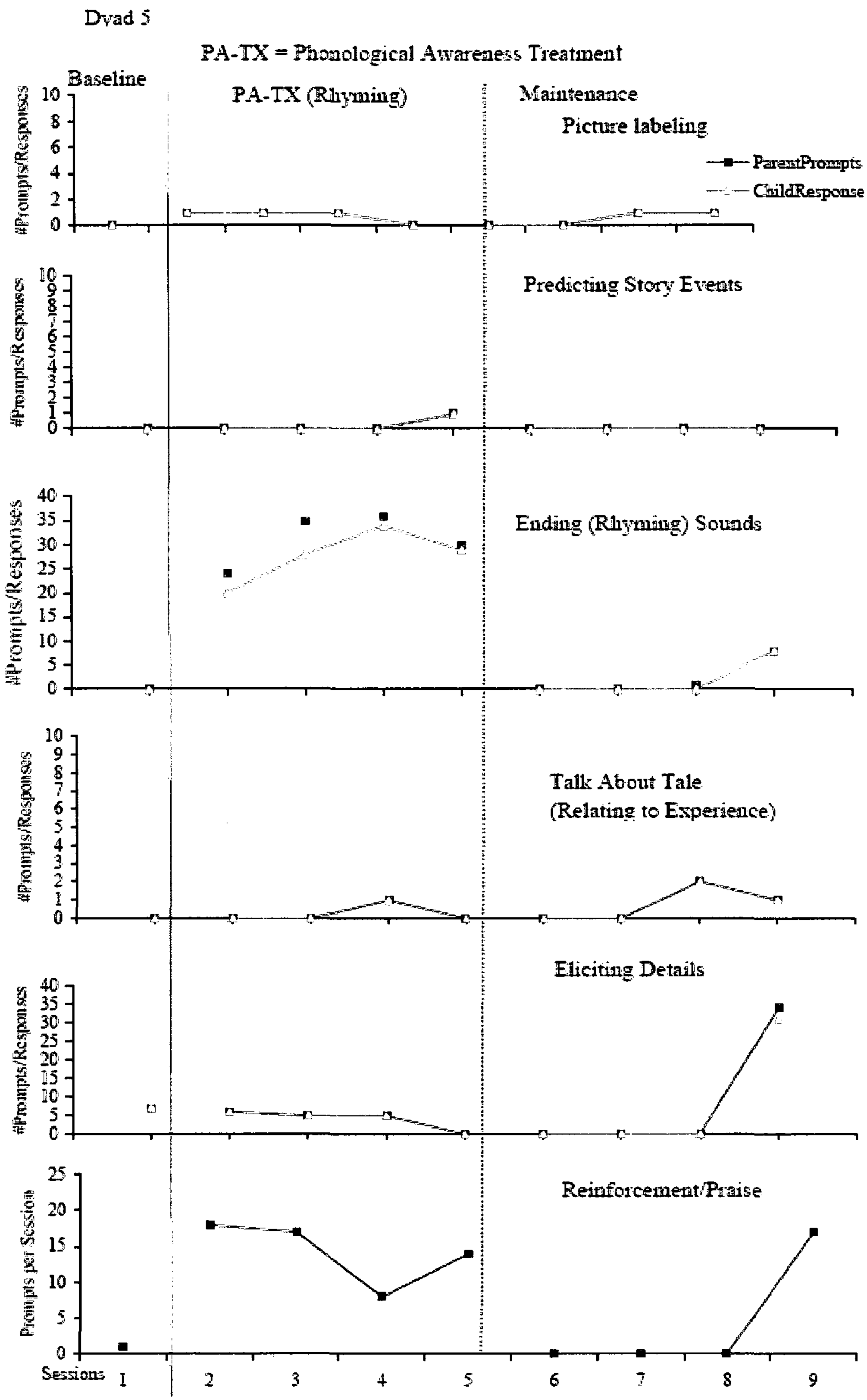


Figure 9. Dyad 5: Parental Prompts Per Session and Child Correct Responses

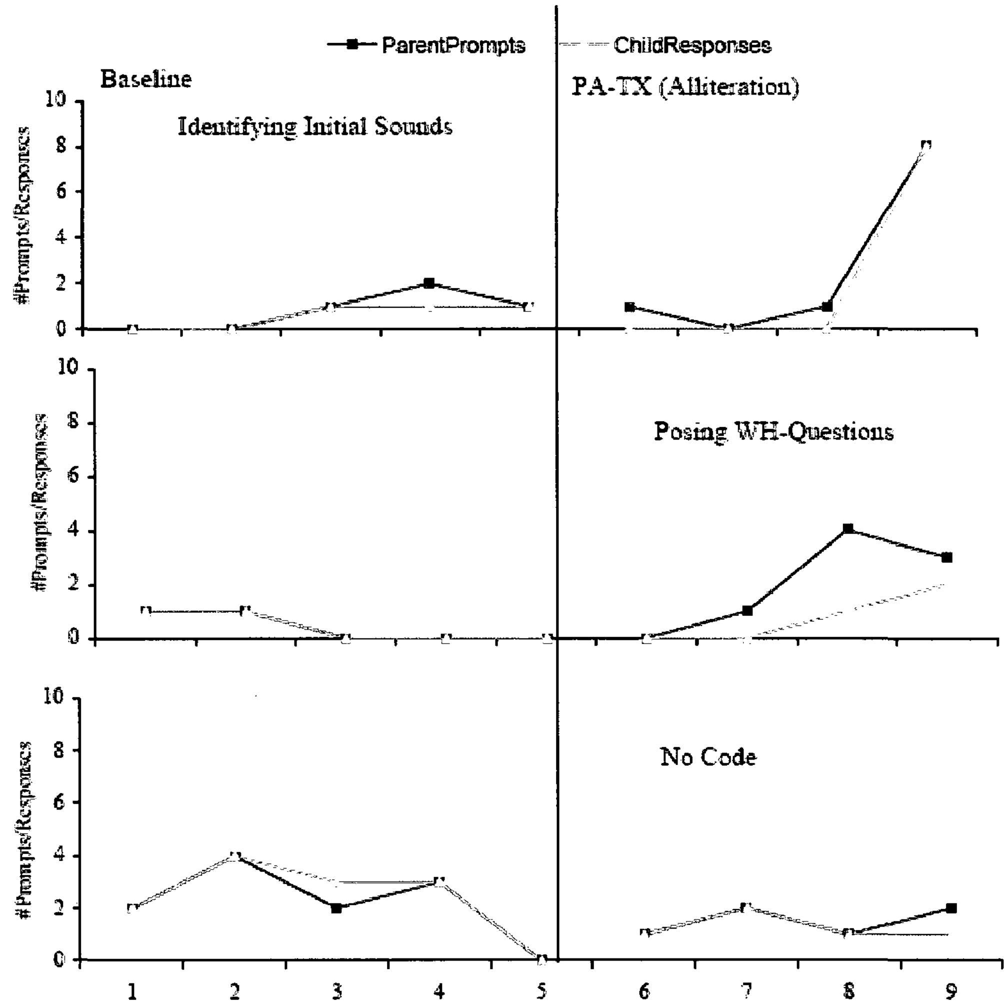


Figure 9. Continued

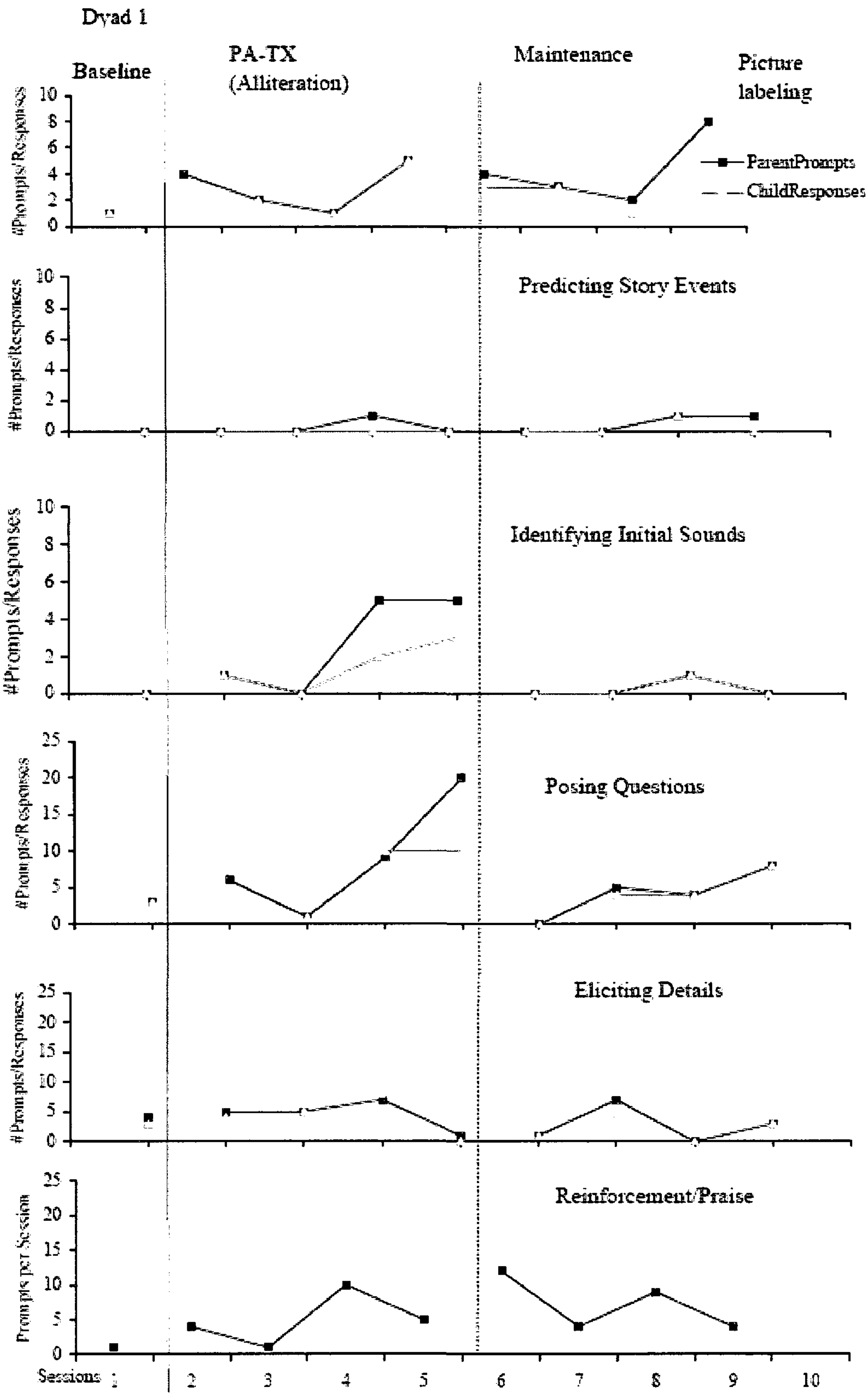


Figure 10. Dyad 1: Parental Prompts Per Session and Child Correct Responses

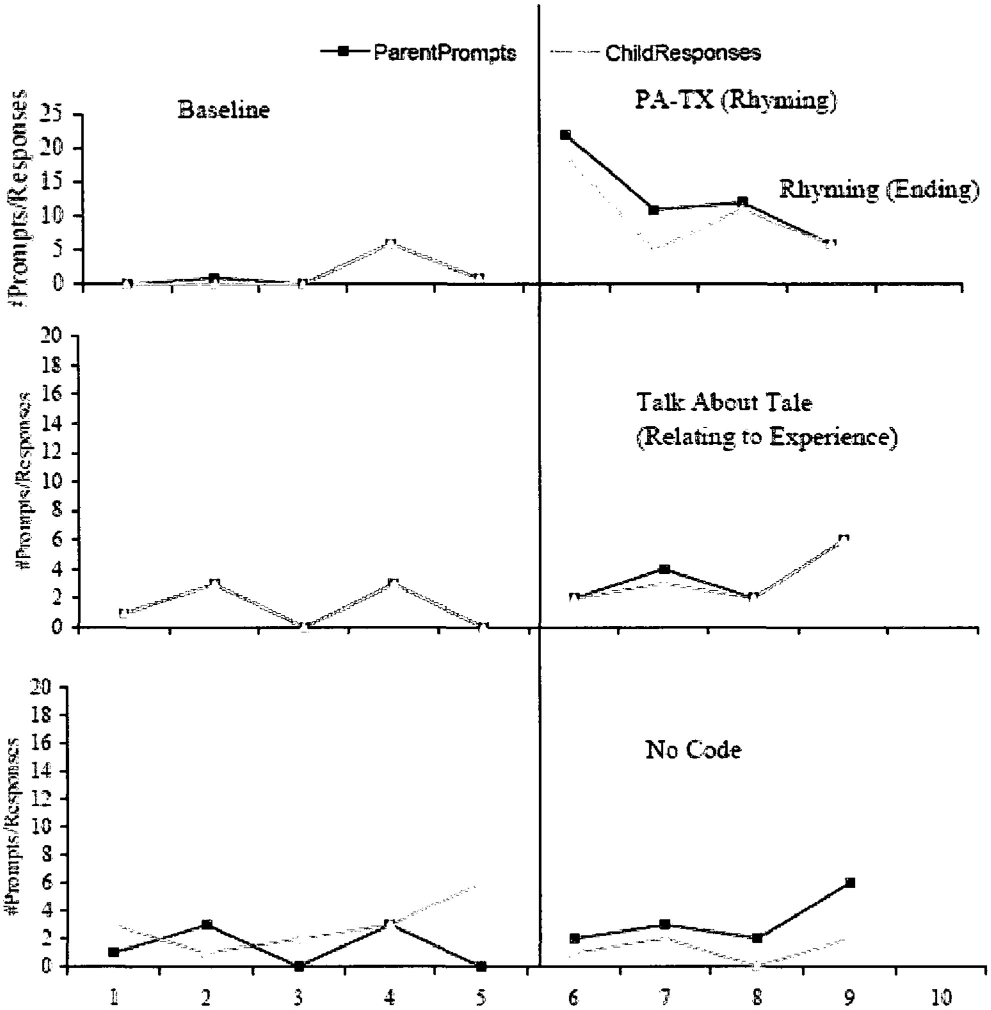


Figure 10. Continued

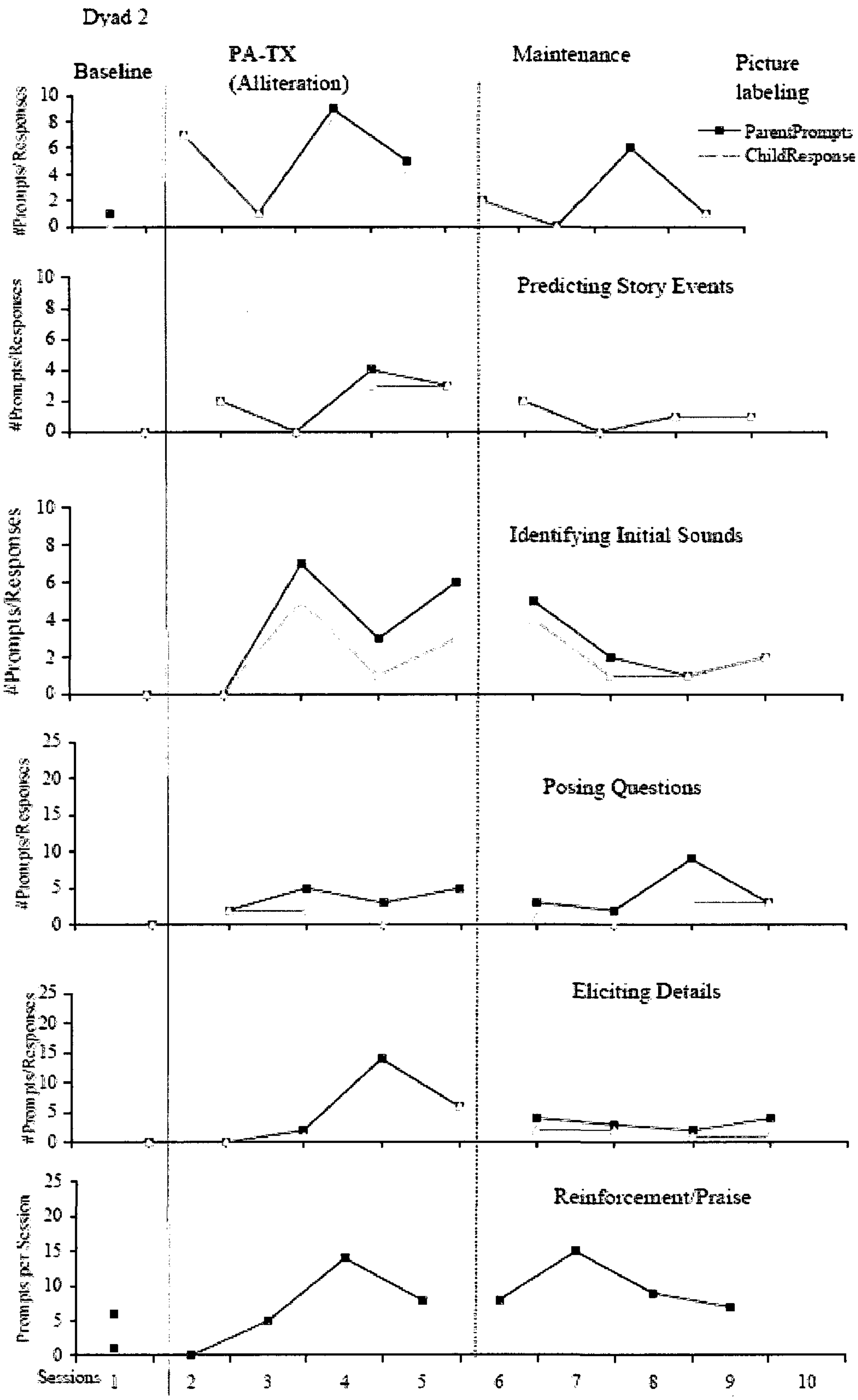


Figure 11. Dyad 2: Parental Prompts Per Session and Child Correct Responses

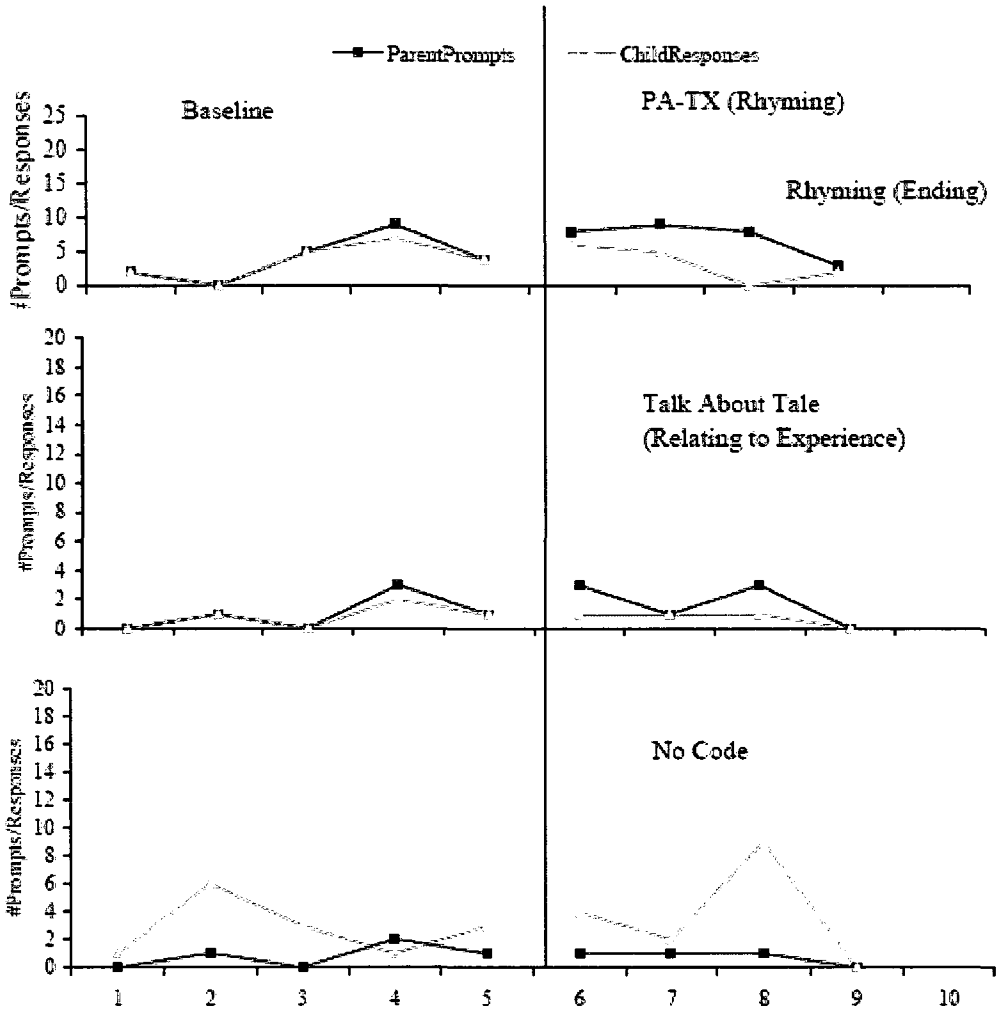


Figure 11. Continued

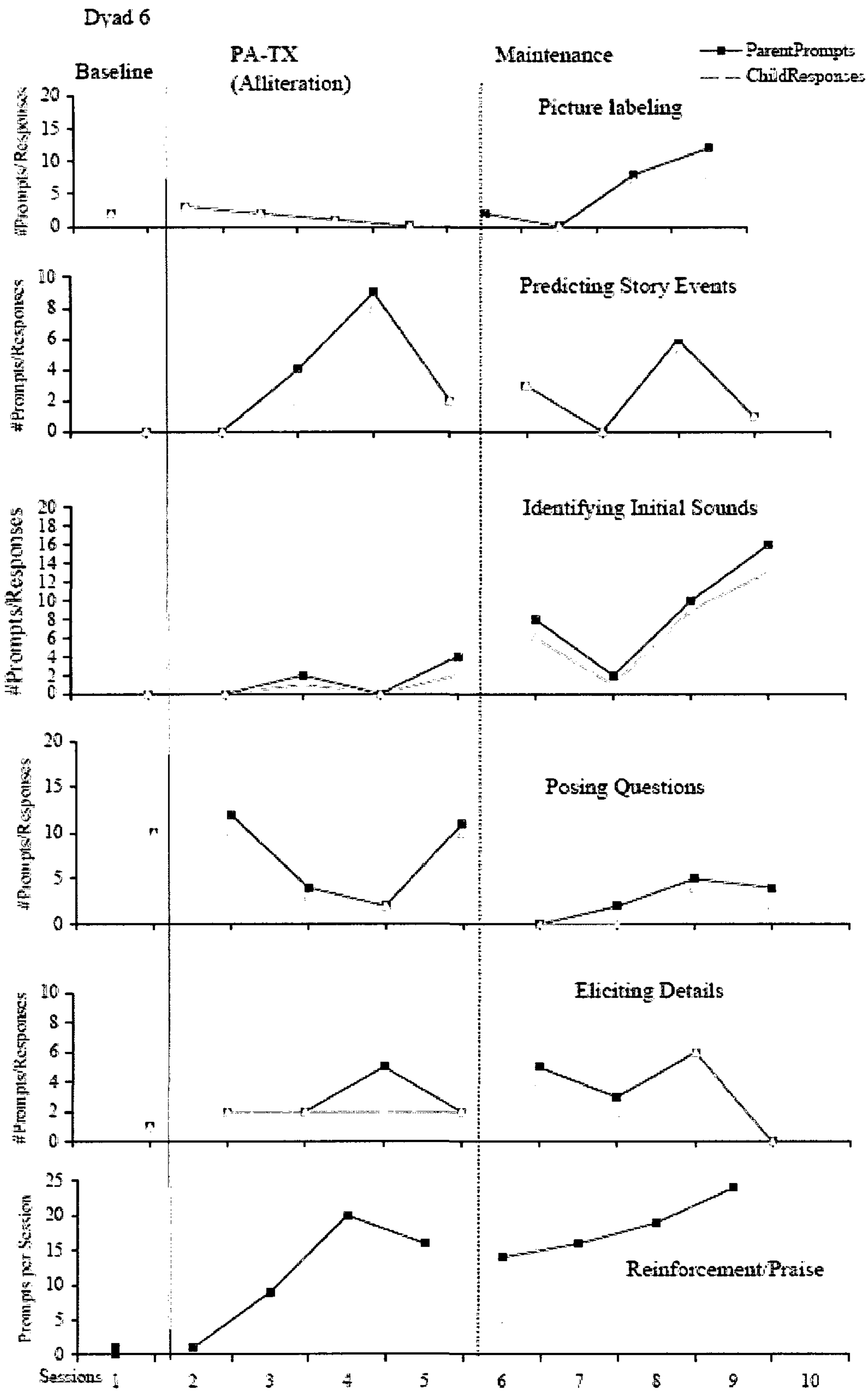


Figure 12. Dyad 6: Parental Prompts Per Session and Child Correct Responses

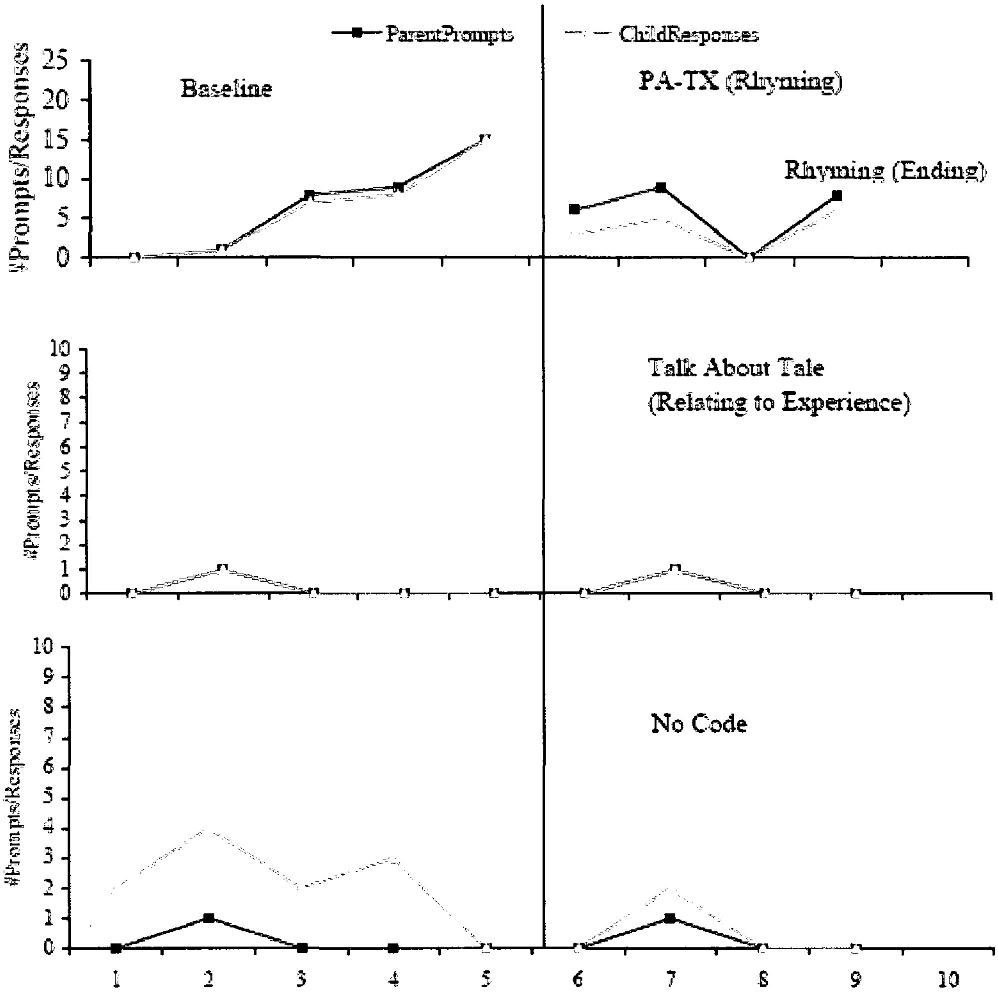


Figure 12. Continued

Estimates of effect sizes. The method of calculation of the estimated effect sizes used in the child response data, as in the phonological awareness curriculum-based measures, included the percentage of all non-overlapping data (PAND; Parker & Hagan-Burke, 2007; Parker, Hagan-Burke, & Vannest, 2007; Ziolkowski & Goldstein, 2008). Data points that overlap were defined as the minimum number of data points that would need to be traded across the study phases to completely separate the baseline scores from the intervention and maintenance phase scores (Parker et al., 2007). The steps used to calculate the PAND follow: a) calculate the data overlap for each set of graphs (e.g., Dyad 1, Dyad 2, Dyad 3, Dyad 4, Dyad 5, & Dyad 6); b) calculate the data overlap for each child participant's correct response to the parental strategy prompts (e.g., picture labeling, predicting story events, ending (rhyming) sounds, talking about the tale (relating to experience), eliciting details, identifying initial (alliteration) sounds, and posing wh-questions (who, what, when, where, why, how); c) sum the data overlap for each child participant's correct responses; d) divide the sum of data overlap by the total number of data points collected for each observation session (e.g., total data points for each graph); e) convert the decimal to a percentage by multiplying it by 100; and f) calculate the percentage of the data non-overlap (or under lap) by subtracting from 100.

The PAND for each type of child participant response was also converted to Cohen's d as an indicator of the magnitude of effect size, and to R and R^2 as regression effect sizes. The conversion of PAND effect sizes to their associated estimates of Cohen's d, R, and R^2 was based on the tables and figures that Parker and Hagan-Burke (2007) interpreted and applied to single case research in behavior therapy.

The results of the calculations for PAND and the associated Cohen's *d*, *R*, and R^2 for child participant responses to each parental strategy prompt are presented in Table 12. The PAND calculations indicated that parent use of phonodialogic intervention strategies produced small to moderate effects on child participants' abilities to provide correct responses. The overall range of the PAND effect sizes was found to be from 50% to 74%. Child participants' gains in two of the effect sizes for identifying initial (alliteration) sounds (74%) and identifying ending (rhyming) sounds (70%), met the guidelines for PND effect size levels (70% - 90%) for effective treatments as indicated by Scruggs and Mastropieri (1998, 2001). These results are consistent with the results from the curriculum-based measures of child participants' phonological awareness skills, indicating that rhyme identification and initial sound fluency (blending) demonstrated the largest effect sizes. The remaining effect sizes for correct responses to parental prompts of picture labeling (63%), predicting story events (52%), talking about the tale (relating to experience) (63%), eliciting details (65%), and posing wh-question (50%), remained within the guidelines (50% - 70%) for questionably effective interventions (Scruggs & Mastropieri, 1998, 2001).

Table 12. Percentage of All Non-Overlapping Data (PAND) with Associated Cohen's *d*, *R*, and R^2 for Child Correct Responses to Each Parental Strategy Prompt

Child Correct Response to Parental Prompts	PAND	Cohen's *d*	*R*	R^2
Picture labeling	63%	1.20	0.50	0.25
Predicting story events	52%	1.00	0.43	0.18
Ending (rhyming) sounds	70%	1.62	0.58	0.34
Talking about the tale (relating to experience)	63%	1.20	0.50	0.25
Eliciting details	65%	1.40	0.52	0.27
Identifying initial (alliteration) sounds	74%	1.70	0.62	0.38
Posing wh-questions	50%	0.90	.40	0.16

Hypothesis 6. Parent interventionists will be able to demonstrate a high degree of treatment fidelity (content and process) by meeting a target goal of reading the books provided for this study at least four times per week using phonodialogic reading strategies during a nine-week study duration period.

Frequency of parent-child reading sessions. A total of 202 parent-child reading sessions (M = 33.67, SD = 12.50, Range = 18 – 54) were video recorded over the nine-week duration of the study, including the baseline, intervention and maintenance phases. Parent-child reading sessions ranged from one to seven per week (M = 3.74, SD = 1.74). Of the six parent-interventionists, two demonstrated a high degree of treatment fidelity by exceeding the target goal of reading with their children at least four times per week. Moreover, one of them read an average of six times per week with her child participant. Two other parent interventionists averaged reading between three to four times per week. Lastly, two parent interventionists read less than three times per week on average, including one parent interventionists, who averaged reading only twice per week. Each parent interventionist's mean number of parent-child reading sessions per week is presented in Figure 13.

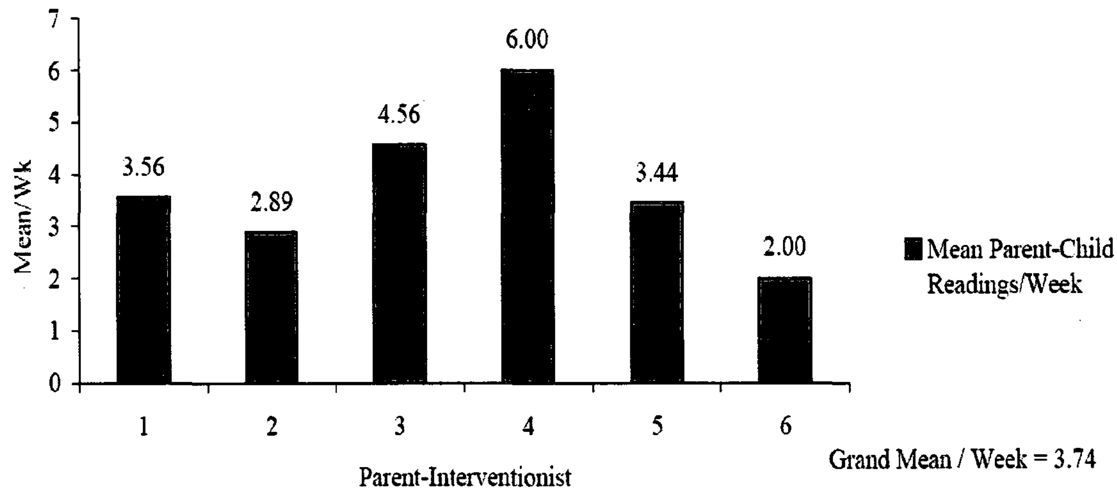
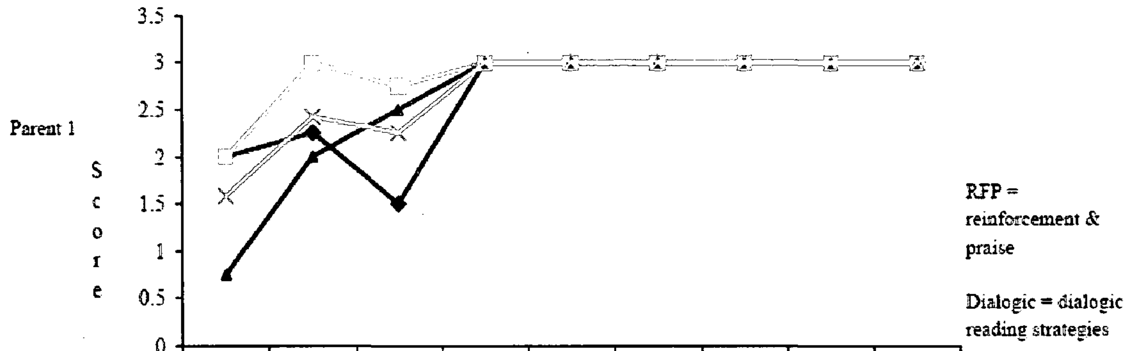


Figure 13. Mean Number of Parent-Child Reading Sessions per Week by Each Parent Interventionist (Parent Interventionists 1 – 6)

Parent implementation of intervention. Treatment fidelity was measured through three sources to determine each parent interventionist's implementation of the intervention strategies. The first source of treatment fidelity data was from the administration of *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009) on a weekly basis for progress monitoring strategy implementation. Information from ACIRI assessment was useful in the study as an intervention training tool to provide positive feedback, verbally and visually, and to suggest improvements to parent interventionists in his or her use of the intervention strategies during the training sessions. The use of the ACIRI as a training tool represents a modification and a divergence from the tool's intended purpose (DeBruin-Parecki, 2007, 2009). Therefore, the ACIRI results from the study must be interpreted with caution, and are not representative of a validated use of this tool in measurement of the parent-child interactive reading behaviors.

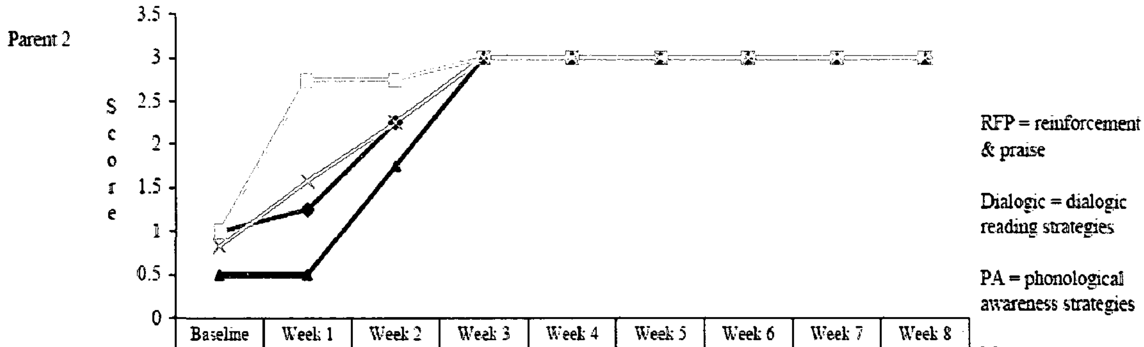
Data from the individual parent interventionist ACIRI assessments conducted weekly from baseline to study completion are presented in Figures 14 – 19. Although these data are based on relatively subjective parent trainer observations of strategy usage, the process and content provided helpful suggestions that parent interventionists could incorporate into their home reading sessions. These results represent a dynamic aspect of treatment fidelity as this information was shared with parent interventionists. These results also provide evidence of parent interventionists' improvement in the frequency of strategy use ranging from no use at all, to infrequent use, to use of the strategies some, or most of the time during the child care center sessions. Data for Parent 5 were missing from Week 3 because he had to be gone for several days on an urgent family matter.



	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
RFP	2	2.25	1.5	3	3	3	3	3	3
Dialogic	2	3	2.75	3	3	3	3	3	3
PA	0.75	2	2.5	3	3	3	3	3	3
Mean	1.58	2.42	2.25	3	3	3	3	3	3

Scale: 3 = most of the time 2 = some of the time 1 = infrequently 0 = no evidence

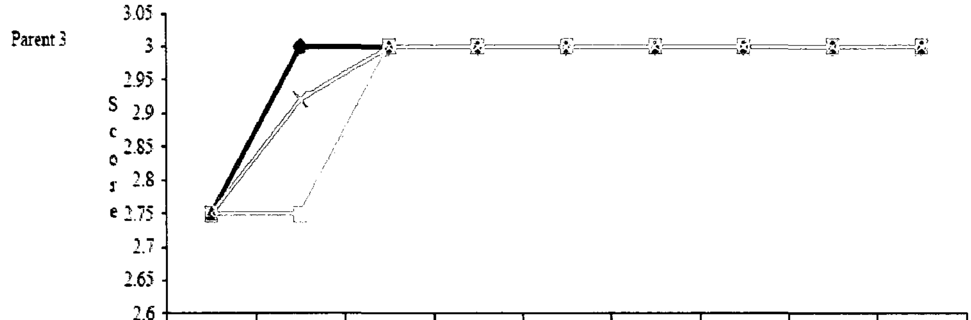
Figure 14. Parent1: Phonodialogic Reading Strategies Implementation during Child Care Center Reading Sessions Using *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009)



	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
RFP	1	1.25	2.25	3	3	3	3	3	3
Dialogic	1	2.75	2.75	3	3	3	3	3	3
PA	0.5	0.5	1.75	3	3	3	3	3	3
Mean	0.83	1.58	2.25	3	3	3	3	3	3

Scale 3 = most of the time 2 = some of the time 1 = infrequently 0 = no evidence

Figure 15. Parent 2: Phonodialogic Reading Strategies Implementation during Child Care Center Reading Sessions Using *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009)



	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
RFP	2.75	3	3	3	3	3	3	3	3
Dialogic	2.75	2.75	3	3	3	3	3	3	3
PA	2.75	3	3	3	3	3	3	3	3
Mean	2.75	2.92	3	3	3	3	3	3	3

RFP = reinforcement & praise

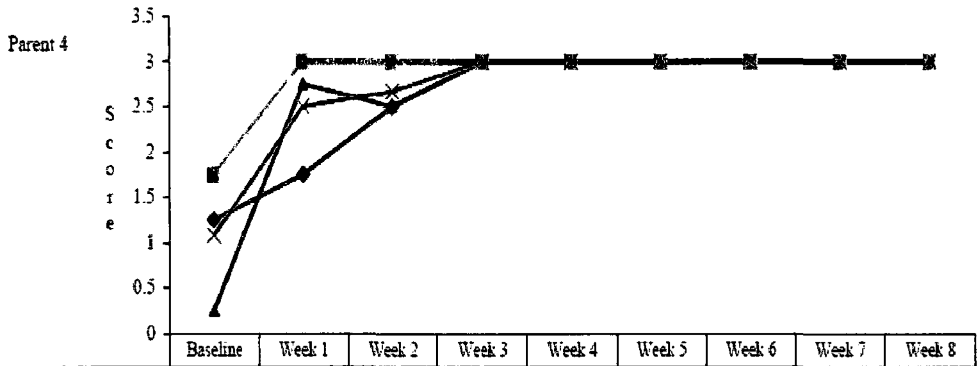
Dialogic = dialogic reading strategies

PA = phonological awareness strategies

Mean = mean of all strategies

Scale 3 = most of the time 2 = some of the time 1 = infrequently 0 = no evidence

Figure 16. Parent 3: Phonodialogic Reading Strategies Implementation during Child Care Center Reading Sessions Using *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009)



	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
RFP	1.25	1.75	2.5	3	3	3	3	3	3
Dialogic	1.75	3	3	3	3	3	3	3	3
PA	0.25	2.75	2.5	3	3	3	3	3	3
Mean	1.08	2.5	2.67	3	3	3	3	3	3

RFP = reinforcement & praise

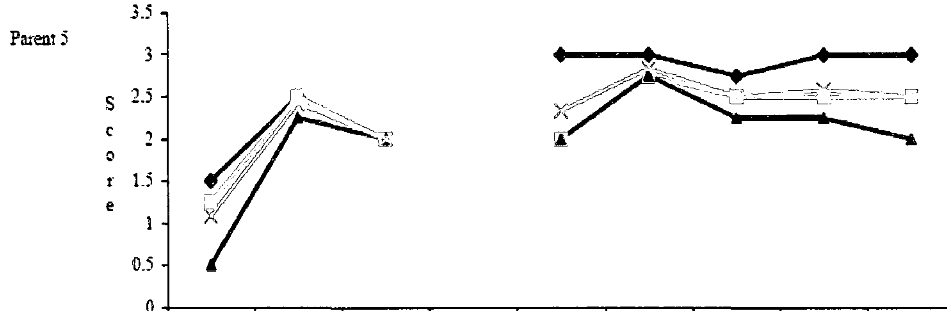
Dialogic = dialogic reading strategies

PA = phonological awareness strategies

Mean = mean of all strategies

Scale 3 = most of the time 2 = some of the time 1 = infrequently 0 = no evidence

Figure 17. Parent 4: Phonodialogic Reading Strategies Implementation during Child Care Center Reading Sessions Using *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009)



	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
RFP	1.5	2.5	2		3	3	2.75	3	3
Dialogic	1.25	2.5	2		2	2.75	2.5	2.5	2.5
PA	0.5	2.25	2		2	2.75	2.25	2.25	2
Mean	1.08	2.42	2		2.33	2.83	2.5	2.58	2.5

RFP = reinforcement & praise

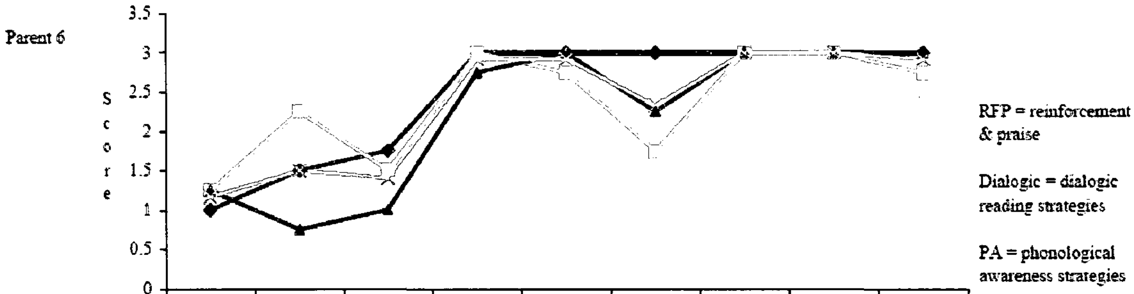
Dialogic = dialogic reading strategies

PA = phonological awareness strategies

Mean = mean of all strategies

Scale 3 = most of the time 2 = some of the time 1 = infrequently 0 = no evidence

Figure 18. Parent 5: Phonodialogic Reading Strategies Implementation during Child Care Center Reading Sessions Using *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009)



	Baseline	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
RFP	1	1.5	1.75	3	3	3	3	3	3
Dialogic	1.25	2.25	1.5	3	2.75	1.75	3	3	2.75
PA	1.25	0.75	1	2.75	3	2.25	3	3	3
Mean	1.17	1.5	1.4	2.92	2.92	2.33	3	3	2.92

Scale 3 = most of the time 2 = some of the time 1 = infrequently 0 = no evidence

Figure 19. Parent 6: Phonodialogic Reading Strategies Implementation during Child Care Center Reading Sessions Using *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009)

The second source of treatment fidelity data related to the intervention strategy checklist that was incorporated into the strategy bookmark (see Appendix D, Parent Training Protocol). Parent interventionists were instructed to complete the strategy checklist, immediately following each dialogic reading home session. The checklist was intended to be used as a self-report measure for the parent interventionist to self-monitor his or her use of the intervention strategies. However, none of the parents provided evidence that they used the checklists or brought them back to the center for data collection.

The third source of treatment fidelity data required that each parent-child dyad be video recorded at least once per week during a phonodialogic reading session in the child care center and/or in the home setting. Sessions were video recorded during the baseline, intervention, and maintenance conditions. Parent interventionists were provided with Flip video camera recording equipment to use at home. They were instructed to self-record at least four dialogic reading sessions on a weekly basis and retain the recording until the next week's appointment. Graphs for visual inspection of the types and numbers of phonodialogic reading strategy prompts used by the parent interventionists, during their activity-based reading sessions are provided in Figures 7 through 12. The means of each parent interventionist's usage of the phonodialogic reading strategies across baseline, intervention and maintenance are provided in Figures 20 - 28. Finally, the percent of change, in a positive or a negative direction, in the uses of the specific types of phonodialogic reading strategy prompts between the baseline and maintenance phases is provided in Figure 29. The parental strategy prompts that demonstrated positive changes from baseline to intervention, from the largest to the smallest percentage of change, are as follows: ending sounds (748%), reinforcement and praise (393%), initial sounds (269%), predicting story events (267%), picture labeling (110%), relating story to experience (58%), wh- questions (17%), and eliciting details (14%). The one variable measured that demonstrated a change in a negative direction was parental comments for which there was no code available (-53%). Comments that did not match any of the above parental prompt categories were defined as no code. Examples of parent interventionists' comments that were defined as no code included, "Are you ready to read?" and "Do you want to turn the page?" As parent interventionists increased their usage of the strategy prompts, there were fewer comments for which there was no code available.

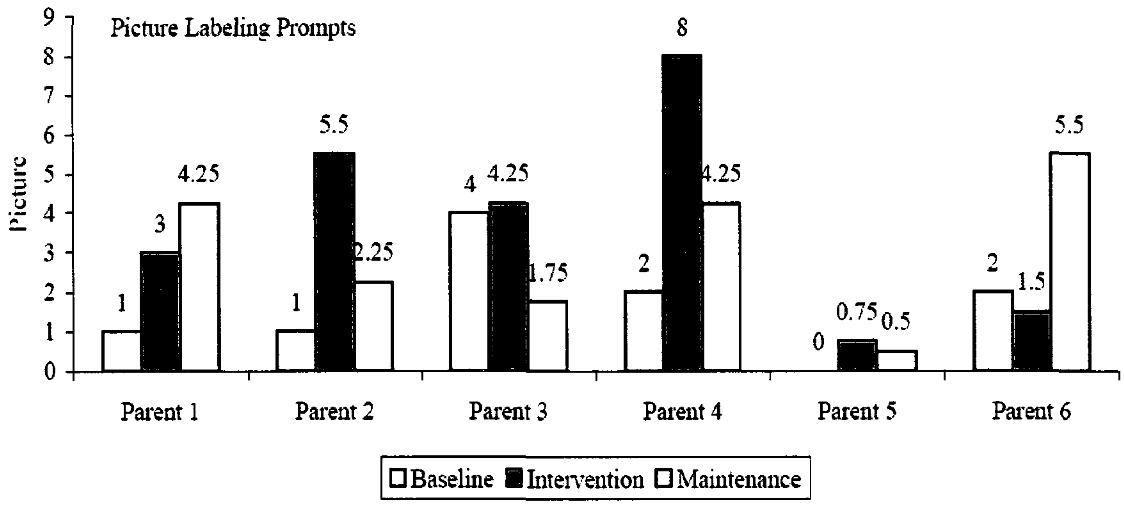


Figure 20. Mean Number of Parent Provided Picture Labeling Prompts

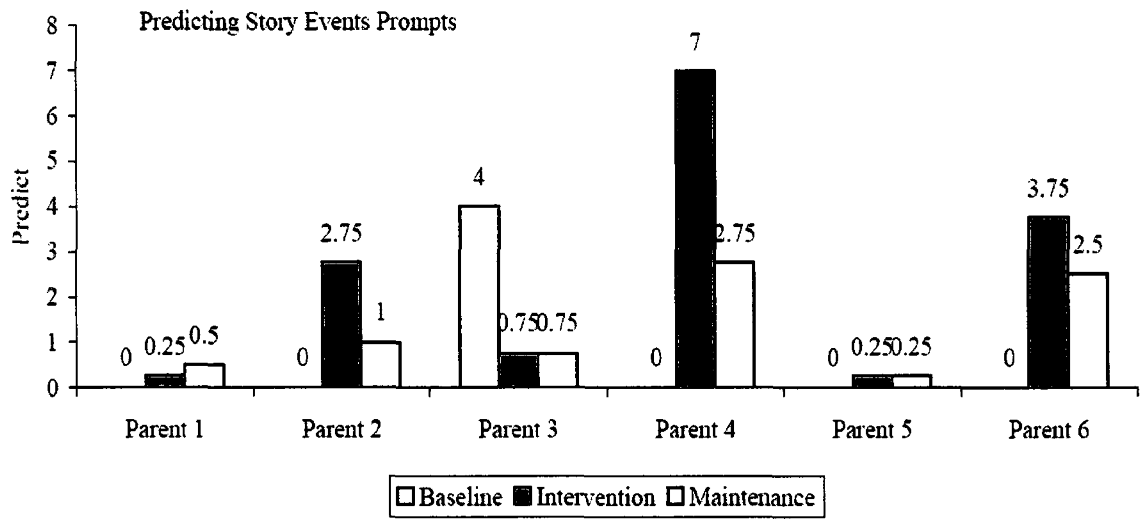


Figure 21. Mean Number of Parent Provided Predicting Story Event Prompts

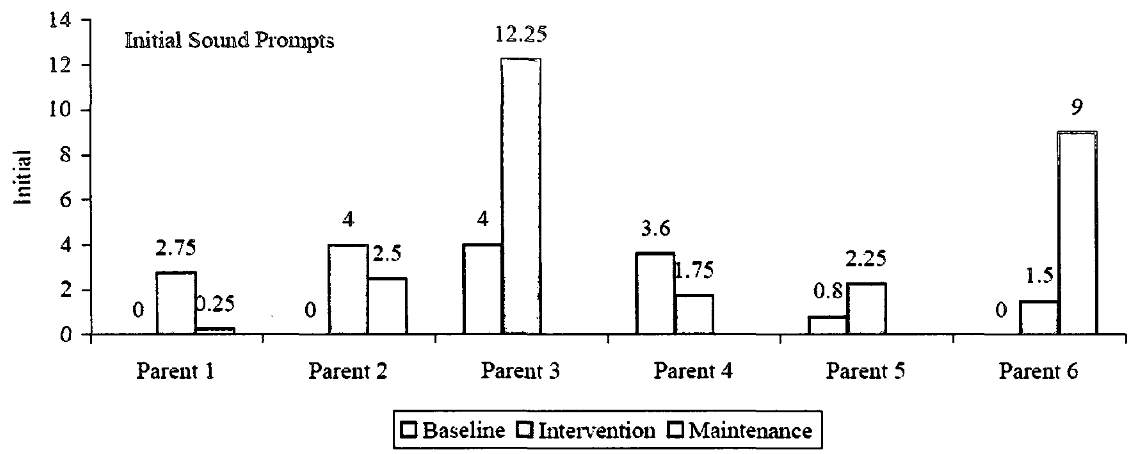


Figure 22. Mean Number of Parent Provided Initial Sound Prompts

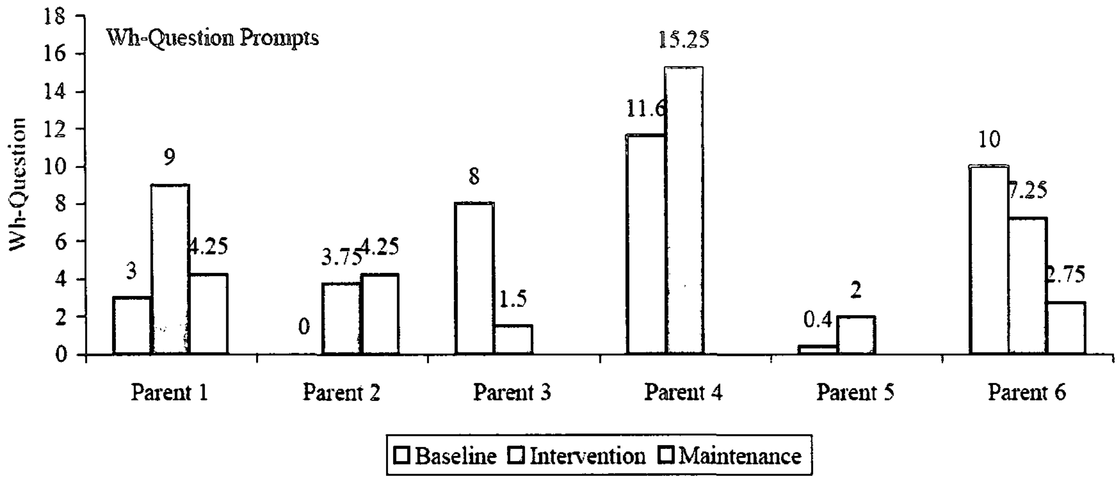


Figure 23. Mean Number of Parent Provided Wh- Question Prompts

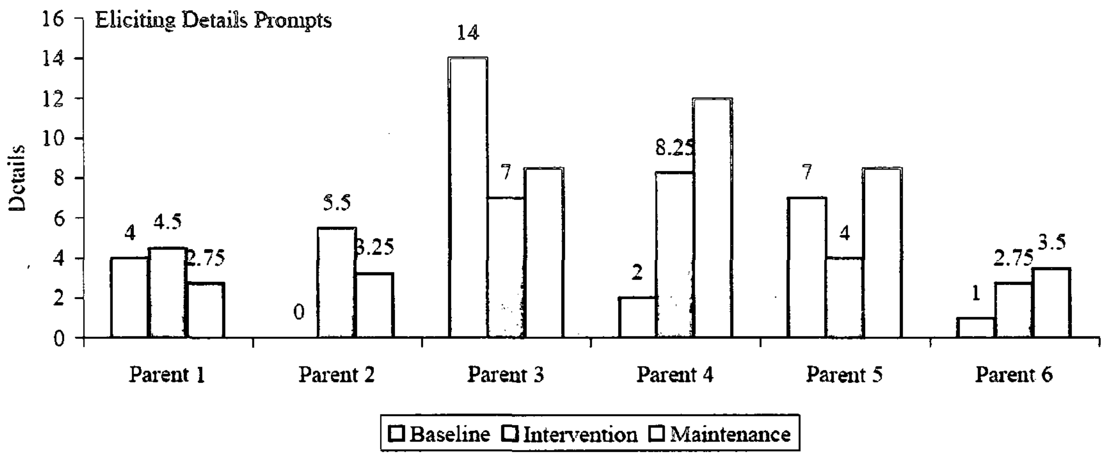


Figure 24. Mean Number of Parent Provided Eliciting Details Prompts

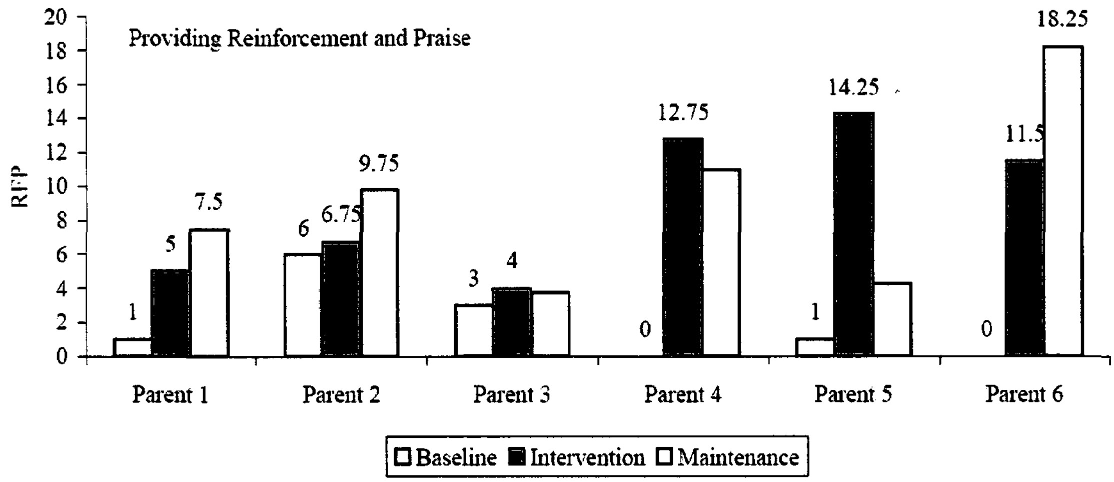


Figure 25. Mean Number of Parent Provided Reinforcement and Praise

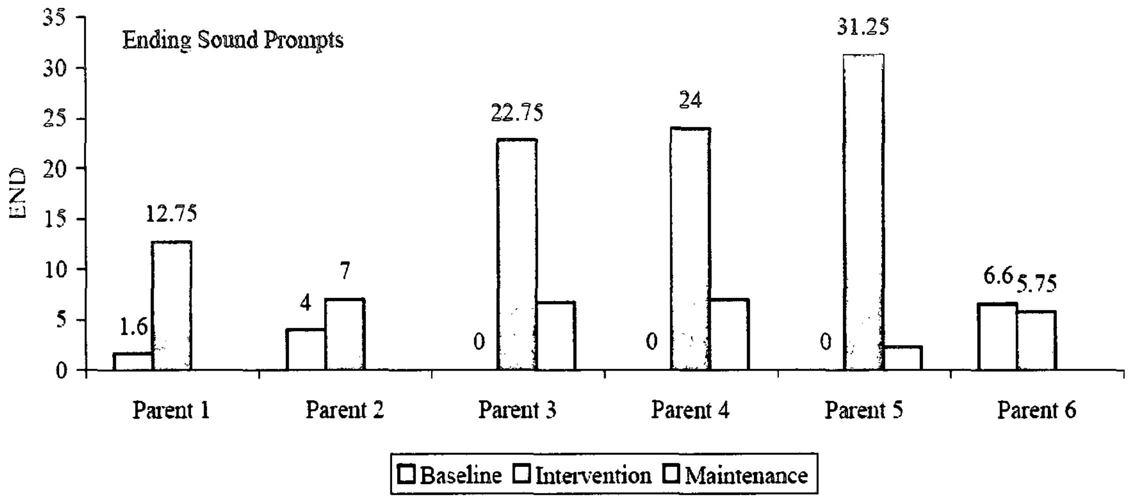


Figure 26. Mean Number of Parent Provided Ending Sound Prompts

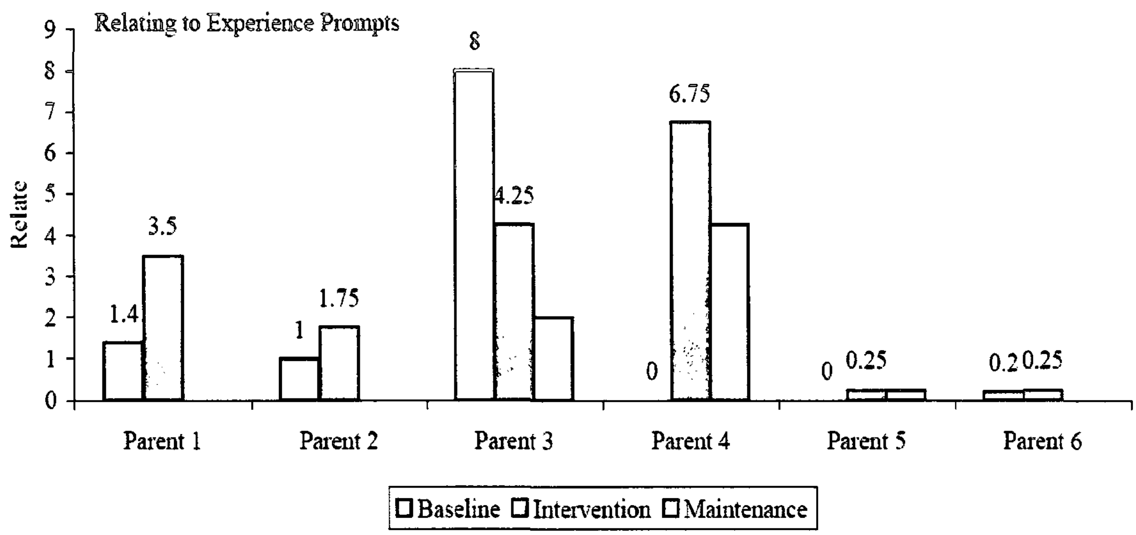


Figure 27. Mean Number of Parent Provided Relating Story to Experience Prompts

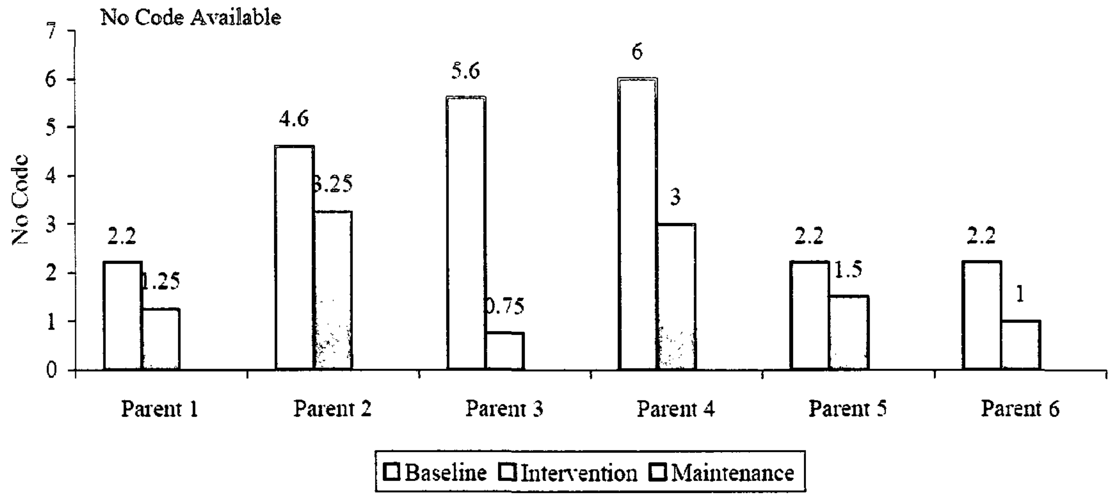


Figure 28. Mean Number of Parent Dialogue Comments with No Code Available

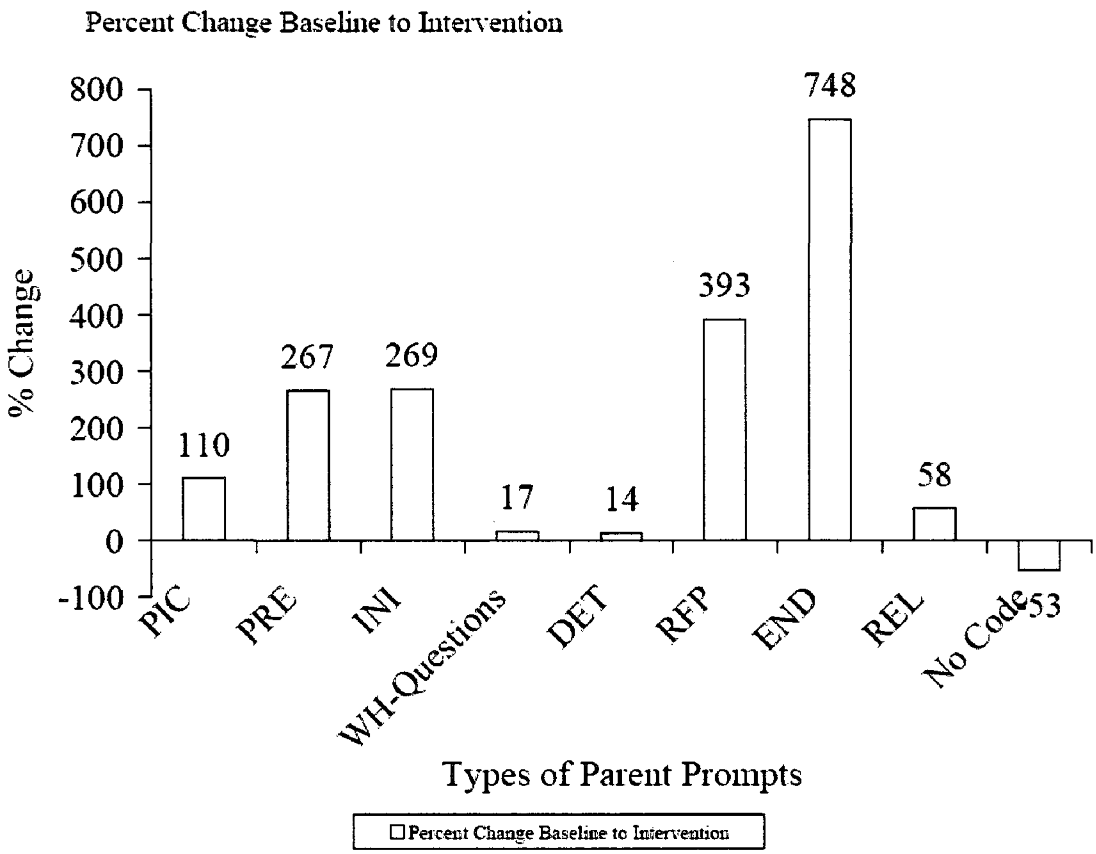


Figure 29. Percent Change in Mean Number of Type of Parental Prompts Used from Baseline to Intervention

Hypothesis 7. Parent interventionists rate their satisfaction with the training intervention sessions to implement phonological awareness strategies with their children as positive and worthy of their time and effort.

Parent satisfaction and intervention acceptability. Social validity was rated, using a *Parent Interventionist Satisfaction Survey* questionnaire (e.g., Ziolkowski & Goldstein, 2008), with 10 quantitative items measured on a five-point Likert scale (1 = Strongly Agree, 2 = Agree, 3 = Neither Agree nor Disagree, 4 = Disagree, and 5 = Strongly Disagree). The parents were instructed to rate their satisfaction with the information they received in the training, the ease of use of the early reading intervention, the changes they were able to see in their child participants' phonological awareness skills (e.g., rhyming, beginning sounds), and the usefulness of the reading intervention. The questionnaire also provided an opportunity for parent interventionists to respond to three open-ended questions, regarding their specific likes and dislikes about the storybook reading intervention, and whether the experience changed the way they feel about reading with their child participants. Lastly, the questionnaire requested their demographic information (e.g., date of birth, ethnicity, highest level of school completed, profession or current job position), which was optional. A copy of the questionnaire used for assessing social validity can be found in Appendix B.

Table 13 contains the results of the satisfaction survey, indicating that parent interventionists tended to agree or strongly agree with the questionnaire items ($M = 1.25$, $SD = 0.51$, Range = 1 – 3). Three of them strongly agreed on all ten items. One of these parent interventionists wrote that the reading "...helped me to include him more in the telling of the story instead of me just reading to him." Another parent interventionist agreed on one item and strongly agreed on nine items. Another agreed on two items and strongly agreed on eight items. This parent interventionist wrote that she most liked "seeing the excitement in my child when we read. I also enjoyed watching her put sounds together and learn new words." Finally, one parent interventionist agreed on eight items, and neither agreed nor disagreed on two items that related to his ability to see a change in his child's rhyming, and blending the beginning and ending sounds of words. Notwithstanding the lower ratings, this parent interventionist wrote that using the early reading intervention, "...gave me a greater sense of educational purpose when I read with my child." In response to one question that asked if he would like to see anything about the intervention changed, he wrote, "With so many books (1 per week) I often felt I wanted more time per skill instruction."

In summary, parent interventionists' ratings and comments (see Appendix D for all written comments) supported a high level of satisfaction with the intervention training, a positive perception toward storybook reading with their child participants, and a perception that this was a valuable experience that they would recommend to other parents.

Table 13. Responses to Parent Interventionist Satisfaction Survey Items

Questionnaire Item	Parent Interventionist Response
1. I gained valuable information about improving my child's early reading skills.	Strongly Agree = 5 Agree = 1
2. I gained valuable information about and experience with using the early reading intervention with my child.	Strongly Agree = 5 Agree = 1
3. I am satisfied with the amount of teaching time needed in order to use the early reading intervention with my child.	Strongly Agree = 5 Agree = 1
4. I feel confident that I am able to use the reading intervention when I read with my child in the future.	Strongly Agree = 5 Agree = 1
5. I was able to see a change in my child's skill level in identifying rhyming words in the storybook reading activity, such as saying or pointing to words that rhyme "frog, log."	Strongly Agree = 4 Agree = 1 Neither Agree or Disagree = 1

Table 13. Continued

Questionnaire Item	Parent Interventionist Response
6. I was able to see a change in my child's skill level in identifying rhyming words in the storybook reading activity, such as filling in the blank "frog rhymes with log."	Strongly Agree = 5 Agree = 1
7. I was able to see a change in my child's skill level in blending the beginning and ending sounds of words in the storybook reading activity, such as filling in the blank "/B/ is the beginning sound in bear."	Strongly Agree = 5 Agree = 1
8. I was able to see a change in my child's skill level in segmenting the beginning and ending sounds of words in the storybook reading activity, such as filling in the blank "Bear begins with the sound /b/."	Strongly Agree = 4 Agree = 1 Neither Agree or Disagree = 1

Table 13. Continued

Questionnaire Item	Parent Interventionist Response
9. I am satisfied with this intervention and feel it is worth my time and effort to use with my child at home.	Strongly Agree = 5 Agree = 1
10. I would recommend this intervention to other parents for their children, ages 4 – 5 years old.	Strongly Agree = 5 Agree = 1

Table 13. Continued

Questionnaire Item	Parent Response
11. Demographic information provided by parents:	
Age (calculated from birthdates)	Range = 30 – 45 years old
	(*M* = 37, *SD* = 6.49)
Sex	Female = 6; Male = 1
Ethnicity	Black and White = 1
	Human = 1
	Mixed Race = 1
	White/Caucasian = 3
Highest educational level completed	High School = 1
	Bachelor's Degree = 2
	Master's Degree = 2
	Doctoral Degree = 1
Profession or current job position	Waitress = 1
	Health Care / Nursing Student = 1
	Research Assistant = 1
	Academic Librarian = 1
	Educational Consultant = 1
	College Professor = 1

Preschool Children's Language and Literacy Characteristics

Each child participant's language and emergent literacy characteristics were evaluated individually pre- and post-intervention by speech-language pathology graduate students. Comparisons of the results of the child participants' test scores from the pre- and post-intervention measures, including means and standard deviations, are presented in Tables 14 and 15.

Table 14. Child Pre- and Post-Intervention Tests: MAVA and ELSA

Child	MAVA-R (M = 100, SD = 15)		MAVA-E (M = 100, SD = 15)		ELSA-C (Range ≥ 15)		ELSA-PA (Range = 14 – 19)		ELSA-AP (Range = 17 – 26)		ELSA-CAP (Range = 18 – 21)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	96	105	110	115	26	14	12	14	25	26	17	19
2	< 55	87	99	85	3	8	0	10	0	7	11	14
3	110	109	111	108	25	13	18	18	13	26	21	21
4	91	104	83	99	10	4	8	7	5	6	16	21
5	69	82	81	79	6	5	9	3	25	26	11	9
6	106	106	100	113	9	5	7	15	3	19	21	21
M	87.83	98.83	97.33	99.83	13.17	8.17	9.00	11.17	11.83	18.33	16.17	17.50
SD	21.59	11.34	12.88	15.00	9.87	4.36	5.93	5.56	11.07	9.56	4.49	4.97
Range	< 55-110	82-109	81-111	79-115	3 – 26	5 – 14	0 – 18	3 – 18	0 – 25	6 – 26	11 – 21	9 – 21

Note: MAVA = *Montgomery Assessment of Vocabulary Acquisition*; R = Receptive; E = Expressive; ELSA = *Early Literacy Skills Assessment*; C = Comprehension; PA = Phonological Awareness; AP = Alphabetic Principle (uppercase letter recognition); CAP = Concepts About Print

Table 15. Child Pre- and Post-Intervention Tests: PALS-PreK

Child	Name Writing		Upper Case Letters		Lower Case Letters		Letter Sounds		BSA		PWA		RA		NRA	
	Range = 1-7		Range = 12-21		Range = 9 -17		Range = 4-8		Range = 5-8		Range = 7-9		Range = 5-7		Range = 6-10	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	7	7	25	26	21	24	11	8	8	8	8	8	9	9	6	6
2	3	3	0	3	0	0	0	0	2	5	1	4	7	4	2	5
3	7	7	26	26	24	26	21	17	10	10	10	10	10	10	8	8
4	7	7	7	7	0	0	0	0	3	9	9	9	4	4	6	7
5	2	7	26	26	24	23	20	17	0	10	3	7	3	3	4	5
6	4	4	13	17	0	14	0	0	9	10	5	9	10	10	8	10
M	5	5.83	16.17	17.50	11.50	14.50	8.67	7.00	5.33	8.67	6.00	7.83	7.17	6.67	5.67	6.83
SD	2.28	1.83	11.20	10.37	12.65	11.96	10.11	8.34	4.18	1.97	3.58	2.14	3.06	3.33	2.34	1.94
Range	2 – 7	3 – 7	0-26	3-26	0 - 24	0 - 26	0 - 21	0 - 17	0-10	5-10	1-10	4-10	3-10	3-10	2-8	5-10

Note: PALS-PreK = *Phonological Awareness Literacy Screening*; BSA = Beginning Sound Awareness; PWA = Print and Word Awareness; RA = Rhyme Awareness; NRA = Nursery Rhyme Awareness; Range = Developmental range associated with early reading success for the spring of the four-year-old pre-kindergarten year

Parental Perceptions and Home Literacy Environment

Pre- and post-intervention, parent interventionists completed the *Early Literacy Parent Questionnaire* (Boudreau, 2005) to assess their perceptions of their child participants' early literacy skills, and their practices and routines related to their home literacy experiences. The results of this analysis found no change, following intervention, in the perceptions and practices about their child participants' early literacy skills on more than one-half of the 36 items on the questionnaire (M = .54, SD = 2.34, Range = .47 - 63). A moderate increase in the percentage of items (M = .32, SD = 1.64, Range = .28 - .39) that parent interventionists answered were related to positive changes in their perceptions and practices about their child participants' early literacy skills. Conversely, on a small percentage of the questionnaire items (M = .13, SD = 2.56, Range = .08 - .25), there was a relatively small decrease in the positive perceptions and routines, following the intervention.

A similar set of results was found after a research assistant conducted the *Child/Home Environmental Language and Literacy Observation* (CHELLO; Neuman, Koh, & Dwyer, 2008), observation checklist to assess the quality of literacy supports for learning literacy at home. On this measure of assessing the child participants' home literacy environments, 91% (Range = 81% - 100%) of the parental responses to the checklist items (e.g., book reading area, location of books, number, types, and accessibility of books, writing materials, and cognitively stimulating toys) indicated no change from pre- to post-intervention. These outcomes that indicated few, if any, changes to the home literacy environment are not surprising, given that the phonodialogic intervention was centered on increasing the phonodialogic benefits of parent-child shared reading activities, instead of altering the home literacy environment to an appreciable extent.

Parent Trainer Procedural and Content Fidelity

A coder unfamiliar with the study reviewed video recorded parent trainer and parent interventionist sessions to assess the fidelity of the parent trainer's implementation of the baseline and intervention protocols. Both procedural and content fidelity were collected during baseline, intervention, and maintenance phases for a minimum of 25% of the sessions for each phase. Procedural and content fidelity checklists (see Method section) were used for assessing parent trainer sessions for the baseline procedural fidelity, the intervention procedural fidelity, and for the intervention content fidelity. Inter-observer agreement was calculated by dividing the number of agreements by the number of disagreements plus the number of agreements, and multiplying by 100 (Tawney & Gast, 1984). The overall mean procedural fidelity for the baseline sessions was 88.41% (Range = 85.71% – 92.86%). The overall mean procedural fidelity for the intervention sessions was 96.73% (Range 88% - 100). For the content fidelity, during the intervention sessions, the overall mean was 98.42% (Range = 87.5 – 100%).

Reliability

To ensure accuracy and consistency of child participant assessments, reliability was assessed on these aspects: a) child participant responses to assessments, b) curriculum-based measurement test administrations, and b) measures of parental prompts and child participant responses during shared book reading. Interrater reliability assessment during the weekly curriculum-based measurement tests was determined using the standardized instrument checklists published by the test developers (Good et al., 2007; Missell & McConnell, 2004). The interrater reliability of the testing administration and the child participant responses on the testing assessments were monitored for at least 25% of the testing sessions at the child care center. A second graduate research assistant was trained as a test administration observer. Interrater agreement was calculated by dividing the number of agreements by the number of disagreements plus the number of agreements, and multiplying by 100 (Tawney & Gast, 1984). The overall mean interrater reliability percentages of the curriculum-based measurements follow: a) rhyme production = 96.76% (Range = 86% - 100%), b) rhyme identification = 97.14% (Range = 88% - 100%), c) alliteration identification = 96.86% (Range = 89% - 100%), and d) initial sound fluency (blending and segmenting) = 96.45% (Range = 86% - 100%).

Interrater reliability was also measured on 25% of the parent-child shared book reading sessions during baseline, intervention, and maintenance. A second coder used randomly selected video and audio recorded parent-child book reading sessions for all reliability assessments. The same calculation procedure for interrater reliability was used to assess parent interventionist usage of the intervention strategies on the audio and video recorded parent-child book reading sessions at home. The overall mean interrater reliability for coding the parent-child shared book reading sessions was 90% (Range = 85% – 98%).

CHAPTER 5

Discussion

Chapter Introduction

This chapter will begin with a discussion of the findings from each research question in the study within the related context of the published, peer-reviewed empirical literature. Acknowledgment of the limitations inherent within this study, and the implications for future research and current practice in early childhood special education will follow.

Research Question 1

Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by rhyme identification (ending sound awareness) from baseline compared to intervention and maintenance?

In the present study, each child's ability to identify word sounds that rhyme was measured in two ways. First, it was measured using the weekly standardized procedure for the rhyming task from the *Individual Growth and Development Indicators* (Rhyming IGDI; Early Childhood Research Institute on Measuring Growth and Development [ECRI-MGD], 1998). In this task, each child participant was presented with a card with four, color pictures. On each picture card, one of the bottom pictures rhymed with the picture at the top of the card. Each child participant was asked to point to the one picture at the bottom of the card that rhymes or sounds the same as the top picture. The total number of correct test cards in a two-minute period represented the rhyme identification level, which was graphed and included in estimated effect size calculations. Second, each child participant's correct rhyming responses to parental prompts were measured using a frequency count, during video recorded parent-child storybook reading sessions. Each child participant's correct rhyming response data were graphed and included in estimated effect size calculations.

Based on visual inspection of the graphed changes in skill levels between the baseline phase, and the intervention and/or maintenance phases, five of the six child participants showed increased rhyme identification skills. Further, the estimated effect size calculations indicated that the phonodialogic emergent reading intervention produced overall moderate effects on rhyme identification skills. The range of the effect sizes for rhyme identification (70% – 72%) met the guidelines for effective treatments as indicated by Scruggs and Mastropieri (1998, 2001).

The findings indicated that parental usage of the phonodialogic intervention strategies had a positive effect on most of the child participants' rhyme identification skills. This result is consistent with another shared storybook reading study that embedded phonological awareness strategies to increase children's rhyming skills (Ziolkowski & Goldstein, 2008). In the study by Ziolkowski and Goldstein, graduate students in speech-language pathology were trained as interventionists, who conducted storybook reading sessions with preschool children across two intervention conditions (rhyming and alliteration). Although the previous research resulted in a higher effect size for rhyme identification (91%), than was found in the present study, graduate student interventionists had demonstrated each strategy with 100% accuracy prior to initiating the children's storybook reading intervention. In contrast, parent interventionists in the present study were not required to demonstrate a high level of accuracy prior to strategy implementation. The implementation data showed that parent interventionists required training and practice for two to four weeks to reach criterion levels across strategies. This finding was expected and based on the prior literature in enhanced milieu language teaching that included parents as interventionists (Hemmeter & Kaiser, 1994; Hester et al., 1995). Therefore, lower effect sizes were not surprising given the time required for parent-interventionists to demonstrate proficiency in strategy implementation.

Research Question 2

Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by rhyme production from baseline compared to intervention and maintenance? In the present study, each child participant's ability to produce word sounds that rhyme was measured in two ways. First, it was measured using the weekly standardized procedure for the rhyme production task in which each child participant was presented with single syllable words in a randomized sequence without picture cards for prompts (Bryant et al., 1989; Bryant et al., 1990; MacLean et al., 1987; Ziolkowski & Goldstein, 2008). Each child participant was asked to say a word that has the same ending sound as the stimulus word presented orally by the test examiner. Each correctly produced rhyming word (real or nonsense word) was counted as one correct response to the stimulus word. The total number of correct test items in a two-minute period represented the rhyming production level, which was graphed and included in estimated effect size calculations. Second, each child participant's correct rhyming responses to parental prompts were measured using a frequency count, during video recorded parent-child storybook reading sessions. Each child participant's correct rhyming response data were graphed and included in estimated effect size calculations.

Based on visual inspection of the graphed changes in skill levels between the baseline phase, and the intervention and/or maintenance phases, five of the six child participants showed increased rhyme production skills. Estimated effect size calculations indicated that the phonodialogic intervention produced a 5% lower effect size on rhyme production skills, than on rhyme identification. The range of the effect sizes for rhyme production (67% – 70%) spanned the borderline between questionable and effective treatments as indicated by Scruggs and Mastropieri (1998, 2001).

The findings suggested that parental usage of the phonodialogic intervention strategies had a smaller, but still an overall positive effect on five of the six child participants' rhyme production skills. Not surprisingly, two of the children experienced floor effects on the standardized measure for rhyme production. This result is also consistent with the prior study by Ziolkowski and Goldstein (2008), who found that the intervention produced an 8% lower effect size for rhyme production (83%), than it did for rhyme identification. Moreover, research by Anthony and Lonigan (2004) found abundant floor effects with a similar measurement tool for rhyme production. They reported that, in some cases, 4- to 6-year-old children refused to complete the rhyme production task and their attempts "more often brought tears than scorable responses" (Anthony & Lonigan, 2004, p. 51). In the present study; however, the child participants were usually very cooperative in this task, though they were not altogether successful. This could indicate a need for a more authentic and dynamic measure of a child's ability to produce rhyming words, such as within the context of phonodialogic reading.

Research Question 3

Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by alliteration identification (initial sound awareness) from baseline compared to intervention and maintenance? In the present study, each child participant's ability to identify the word sounds that have the same initial (beginning) sound was measured in two ways. First, it was measured using the weekly standardized procedure for the alliteration task from the *Individual Growth and Development Indicators* (Alliteration IGDI; Early Childhood Research Institute on Measuring Growth and Development [ECRI-MGD], 1998). In this task, each child participant was presented with a card that had four, color pictures. On each picture card, one of the bottom pictures started with the same sound as the picture at the top of the card. The total number of correct test cards in a two-minute period represented the child participant's alliteration skill level, which was graphed and included in estimated effect size calculations. Second, each child participant's correct alliteration (initial/beginning) sound responses to parental prompts were measured using a frequency count, during video recorded parent-child storybook reading sessions. Each child participant's correct alliteration response data were graphed and included in estimated effect size calculations.

Based on visual inspection of the graphed changes in skill levels between the baseline phase, and the intervention and/or maintenance phases, all of the six children showed increased alliteration identification skills, though minimal for some. Further, the estimated effect size calculations indicated that the phonodialogic emergent reading intervention produced overall smaller to moderate effects on alliteration identification skills. The range of the effect sizes for alliteration identification (69% – 74%), which was a somewhat borderline indication of effective treatment (Scruggs & Mastropieri, 1998, 2001). Child participants in this study generally responded with greater accuracy when asked to identify initial sounds within the context of the parent-child shared storybook reading, than when tested with the Alliteration IDGI picture card tasks. Alliteration identification standardized measures tended to be more variable than rhyming, and showed longer delays in immediacy effects within the intervention phases.

The findings indicated that parental use of the phonodialogic intervention strategies had an overall smaller to moderate effect on most of the child participants' alliteration identification skills. This result is also consistent with the prior study by Ziolkowski and Goldstein (2008), who found that the intervention produced an 4% lower effect size for alliteration identification (87%), than it did for rhyme identification (91%). The intervention in their study also tended to produce more variability and delays in immediacy effects on children's alliteration identification skill levels. Further, a study by Lonigan et al. (1999) that compared dialogic (interactive-shared) reading to typical shared reading found that children, with low or below average language development or low income, in the typical shared reading outperformed the dialogic reading group, on alliteration measures. Results from the present study provide further evidence that alliteration might be a more challenging phonological awareness skill for preschool children to learn and demonstrate proficiently, especially children with developmental delay or socioeconomic disadvantage. Those children may require more intensive and specifically directed interventions to help them develop this area of phonological awareness.

Research Question 4

Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on their children's phonological awareness skills, as measured by blending onset and rime sounds from baseline compared to intervention and maintenance? In the present study, each child participant's ability to accurately blend the onset and rime sounds of a word was measured in two ways. First, the ability to accurately form a word (e.g., /kat/) by blending the initial word sound, defined as the onset, (e.g., /k--/) with the ending word sound, defined as the rime, (e.g., /-at/) was measured weekly, using the first three out of four parts of the *Initial Sound Fluency* (ISF) task from the *Diagnostic Indicators of Basic Early Literacy Skills* (DIBELS; Good et al., 2007). This task required the child participant to orally produce a whole word and to blend the onset with the rime, given only the onset prompt plus a picture stimulus of the target word. Each child participant was presented with four stimulus pictures. The examiner asked the child participant to orally identify the name of the picture that began with the onset sound produced orally by the examiner. The child participant was also permitted to respond by pointing to the correct picture stimulus. For example, the examiner stated, "This is a sink, a cat, gloves, and a hat. Which picture begins with /s/?" When the child participant correctly responded by orally naming (e.g., said the word 'sink') or pointing to the correct picture stimulus (e.g., pointed to the picture of a 'sink'), the examiner calculated the amount of time that the child participant took to produce the correct word, or point to the correct picture stimulus, and converted the score to the number of correct words identified in 60 seconds (i.e. ISF blending rate per minute). Thus, the onset-rime fluency rate provided one measure of the ability to blend the onset and the rime sounds to produce a word.

In the present study, each child participant's ability to blend onset and rime fluency was calculated, and based upon her or his weekly performance on four different stimulus picture card sets, representing the skill level in blending onset-rime. Skill level data were graphed and included in estimated effect size calculations. Second, each child participant's correct responding to parental initial sound prompts was measured using a frequency count, during video recorded parent-child storybook reading sessions. Each child participant's correct initial sound responses were graphed and included in estimated effect size calculations.

Based on visual inspection of the graphed changes in skill levels between the baseline phase, and the intervention and/or maintenance phases, all of the six child participants showed increased skills, though variable and minimal for some, in blending onset and rime. Further, the estimated effect size calculations indicated that the phonodialogic emergent reading intervention produced moderate effects on child participants' skills. The effect size for blending onset and rime (74%) provided an indication of effective treatment (Scruggs & Mastropieri, 1998, 2001). Child participants responded with equal accuracy when asked to identify initial sounds within the context of the parent-child shared storybook reading, and on the DIBELS picture card tasks. Initial sound fluency in blending onset and rime tended to show the most consistently positive intervention effects, even though there was some variability in two of the child participants.

The findings indicated that parental use of the phonodialogic intervention strategies had a moderate and positive effect on four of the child participants' blending onset and rime skills. This result differs from the prior study by Ziolkowski and Goldstein (2008), who found that the intervention produced an 8% lower effect size for initial sound fluency (83%), than it did for rhyme identification (91%). The intervention in their study tended to produce more variability and lower immediacy effects in initial sound fluency skill levels, than in rhyming or alliteration identification skills. However, these researchers did not measure blending onset and rime as a separate measure from segmenting onset and rime, as was done in the present study. This difference in the type of initial sound fluency measures might help to explain the differences among study findings.

Research Question 5

Does phonodialogic reading, using an activity-based intervention implemented by parent interventionists in a home setting with 4 – 5 year old children, have a positive effect on children's phonological awareness skills, as measured by segmenting onset and rime sounds from baseline compared to intervention and maintenance? In the present study, each child participant's ability to accurately segment the onset and rime sounds within a word was measured in two ways. The ability to accurately segment the sound of the onset (e.g., /k--/) from the sound of the rime (e.g., /-at/) was measured using the last part of the ISF task from the DIBELS (Good et al., 2007). This task required the child participant to orally produce only the onset sound for an orally presented word that matches one of the stimulus pictures. Each child participant was presented with four stimulus pictures. The child participant was asked to orally produce the beginning sound for a stimulus word that the examiner stated and that matched one of the stimulus pictures. For example, the examiner stated, "Sink begins with the sound /s/. Listen, /s/ sink. What sound does cat begin with?" When the child participant stated the sound of the onset /k/ that matched the picture stimulus of the cat, the examiner calculated the amount of time that the child participant took to produce the correct onset sound and converted the score to the number of correct words in 60 seconds (e.g., ISF segmenting rate per minute). Thus, the onset-rime fluency rate provided one measure of the ability to segment the onset from the rime sound in a word.

In the present study, each child participant's fluency in segmenting onset and rime was calculated, and based upon her or his weekly performance on four different stimulus picture cards sets, representing the skill level in segmenting onset-rime. Skill level data were graphed and included in estimated effect size calculations. Second, each child participant's correct responding to parental initial sound prompts were measured using a frequency count, during video recorded parent-child storybook reading sessions. Each child participant's correct initial sound responses were graphed and included in estimated effect size calculations.

Based on visual inspection of the graphed changes in skill levels between the baseline phase, and the intervention and/or maintenance phases, five of the six child participants showed increased skills in segmenting onset and rime. However, the estimated effect size calculations indicated that phonodialogic emergent reading intervention produced the lowest effect on this measure of children's phonological awareness skills. The range of effect sizes for segmenting onset and rime (56% – 74%) provided treatment effects ranging from questionable to moderately effective (Scruggs &

Mastropieri, 1998, 2001). Child participants responded with greater accuracy when asked to identify initial sounds within the context of the parent-child shared storybook reading, than when tested with the DIBELS picture card tasks. Findings on these standardized measures for segmenting onset and rime demonstrated greater variability, longer delays in immediacy effects, and some floor effects within the intervention and/or maintenance phases.

The findings indicated that parental usage of the phonodialogic intervention strategies had a small to moderate effect on most of the child participants' segmenting onset and rime skills. This result differs from the prior study by Ziolkowski and Goldstein (2008) in that they did not provide a separate measure of segmenting onset and rime. Although Yeh (2003) found in Boston Head Start classrooms that were studied, children, who were provided with specific intervention in phoneme segmentation, blending, deleting, and substitution, outperformed children in the rhyming intervention group. Children in the phoneme segmentation group were provided with explicit instruction in segmentation within a context of spelling three-letter words and reading short sentences based on those words. Further, a commercial program was used to supplement the instruction, which was provided by teachers. A study by O'Connor et al. (1993), found that when children with diverse learning needs received explicit, direct instruction, the children in the segmentation group also improved in blending phonemes. In the present study, the phonodialogic strategies might not have been as focused on explicitly teaching phoneme segmentation skills as they could have been. In addition, teachers, rather than parents, were providing the intervention in both of the previous studies, which might also explain some of the discrepant findings.

Research Question 6

Do parent interventionists demonstrate a high degree of treatment fidelity (content and process) by meeting a target goal of reading the selected books provided for the study at least four times per week, using phonodialogic reading strategies during the nine-week activity-based study duration? In the present study, treatment fidelity was actually measured through two data sources to determine each parent interventionist's usage of the intervention strategies: a) the ACIRI (DeBruin-Parecki, 2007), and b) the video recorded phonodialogic reading sessions in the child care center and in the home settings. Overall, parental strategy prompts demonstrated positive changes from baseline to intervention. Not surprisingly, the largest degree of increased use of prompts related to the ending sounds of words (rhyming), followed by reinforcement and praise, initial sound prompts, predicting story events, picture labeling, relating story to experience, wh-questions, and eliciting details. In addition, four out of the six parent interventionists in the present study exceeded or nearly met the targeted frequency of parent-child reading, and using the phonodialogic strategies four times per week. Remarkably, the parent interventionist with the highest reading frequency mean ($M = 6$) was on vacation for over two weeks. Nevertheless, she managed to communicate with the research team on a regular basis via the Skype network (web-based video-audio communication), and she continued to read regularly with her child participant while they were on vacation.

Few previous studies have documented the degree of parents' participation and their fidelity to implementing interventions (Hockenberger et al., 1999; McNeill & Fowler, 1999; Skibbe et al., 2004). Of the studies containing this degree of documentation, researchers have also reported several barriers to achieving a high degree of treatment fidelity, such as participant attrition (Hockenberger et al.), scheduling conflicts and/or missed appointments (Hockenberger et al.; Skibbe et al.), and failure to maintain criterion levels of implementing the intervention (McNeill & Fowler). The present study faced some of these barriers to treatment fidelity, but was able to avoid others. For example, one parent interventionist missed four intervention training appointments without cancellation, but the appointments were able to be rescheduled within the same week. At other times, parent interventionists' schedules required early morning and late evening appointments, and the flexibility to change appointments several times a week. In fact, meeting parent interventionists' busy schedules was one of the greatest practical challenges. On the other hand, all parent interventionists were able to complete the study. More to the point of treatment fidelity, all parent interventionists maintained a high degree of implementing the intervention strategies with their child participants, based on the video records. The use of the digital video recording equipment seemed to appeal to both parent interventionists and their child participants. In addition to a small monetary compensation for time and travel expenses, and the storybooks for their children's home library, parent interventionists were also provided with a permanent copy of their digitalized videos of their parent-child storybook reading sessions.

Research Question 7

Do parent interventionists rate their satisfaction with the training intervention sessions to implement phonological awareness strategies with their child participants as positive and worthy of their time and effort? In the present study, social validity data were collected using a modified version of the *Parent Interventionist Satisfaction Survey* questionnaire (Ziolkowski & Goldstein, 2008) that contained 10 quantitative items measured on a five-point Likert scale (1 = Strongly Agree, 2 = Agree, 3 = Neither Agree nor Disagree, 4 = Disagree, and 5 = Strongly Disagree). Parent interventionists were requested to rate their satisfaction with the information they received throughout the intervention training, the user friendliness of the intervention, and the changes they were able to see in their child participants' phonological awareness skills (e.g., rhyming, beginning sounds). Parent interventionists also responded to three open-ended questions, and provided demographic information. The questionnaire used for assessing social validity can be found in Appendix B.

Based on the findings from parent interventionists' responses on the questionnaire, the satisfaction ratings and the written comments (see Appendix D for all written comments) indicated a high level of satisfaction with the intervention training, the information provided to them, and a positive perception towards their phonodialogic reading with their child participants, as worthy of their time and effort. In the numerous verbal comments that parent interventionists shared with the parent trainer, they were overwhelmingly positive in their estimation of the benefits of reading with their child participant. One parent interventionist shared a particularly important episode that occurred when she went to read with her daughter one evening at home. On this occasion, the mother walked in her daughter's room to find her seated in a chair, surrounded by all of her stuffed toy dolls and animals, and reading a storybook aloud to her toys and her older sister. The daughter was modeling her mother's reading strategies. At their last study appointment, the parent interventionist asked the parent trainer to reassure her daughter that, although we were not going to have the regularly scheduled weekly reading sessions together, it would not be the last time that we would be able to visit and enjoy reading a book together.

Arnold et al. (1994) acknowledged the importance of modeling in training parents in dialogic reading. In their systematic replication of one of the landmark studies in dialogic reading (Whitehurst et al., 1988), Arnold and colleagues standardized the parent training sessions by developing videotaped parent training, finding benefits for children's language skills over the direct parent-training method. While standardization has its benefits by reducing confounding variables associated with multiple parent trainers, it may lack the advantage of individual responsiveness to each parent-child dyad's specific strengths and requirements. On the other hand, with the availability of newer technologies (e.g., avatars), individualizing parent training to better respond to each parent-child dyad's characteristics may serve this dual purpose.

Limitations

This study had a number of limitations. Limitations that are important to note include the short duration of the study, the small sample size of participants, and implementation integrity of the intervention. The duration of the study, including baseline, intervention, and maintenance phases, was planned for nine weeks in accordance with similar single-subject design studies in dialogic reading (Briesch et al., 2008; McNeill & Fowler, 1999), although not necessarily with parents as interventionists. Because the study was only for nine weeks, and the resulting data are suggestive that the intervention was beneficial for both parent interventionists and child participants, a follow-up study for these same participants would help to determine if intervention effects are maintained over a six-month period. Although the small sample size limits the ability to generalize results, and randomly distribute errors, further direct or systematic replications of this study would help to contribute to the evidence, supporting this form of dialogic reading intervention. Progress monitoring with ongoing formative assessments, recording and monitoring use of the intervention strategies, and training and testing procedures will be required to further improve implementation fidelity.

Other limitations specific to the present study included limited baseline data and a somewhat artificial baseline, as each parent-child dyad was characteristically unique. Some of the parent interventionists displayed considerably more prompting skills from the beginning within the baseline phase. The curriculum-based measurement tests were apart from the storybook reading context and therefore, unfamiliar to the child participants. They tended to display consistently higher skill levels within the context of the activity of storybook reading, than during CBM testing sessions, suggesting difficulty with generalization of these skills. Moreover, within the testing setting there were a number of environmental distractions on several occasions. These visual and auditory distractions (e.g., other parents and children passersby, maintenance workers, other studies being conducted concurrently) created challenges for some of the child participants, especially two of the boys with relatively limited attention spans. Finally, previous research has found that parents can learn and apply new dialogic reading strategies after a short period of time (Skibbe et al., 2004). However, other researchers (e.g., Hester et al., 1994) have recommended that parents benefit most from a minimum of 20 – 30 training sessions when learning new skill sets for working with their children. The limited time frame available for the present study might have dampened the potential for larger positive effects, had there been more time for parent interventionists to learn and practice their strategy implementation with researcher supports.

Implications for Future Research

This study contributes to the dialogic reading literature demonstrating that parent-child shared storybook reading with embedding phonological awareness strategies (Ziolkowski & Goldstein, 2008) can occur after only a few weeks of training sessions. Parent interventionists were able to make their shared reading sessions more interactive and responsive to the specific learning needs of their child participants. In turn, child participants were able to respond meaningfully and imitate parental modeling of reading strategies. The present study indicates that parent interventionists learned to increase their phonodialogic reading techniques, by using the PETER – PIPER strategies, and the child participants increased their phonological awareness skills to a modest degree. However, the study did not address other important areas of emergent reading skills, such as the alphabetic principle, letter naming, and reading comprehension. Moreover, there was limited emphasis on phoneme segmentation that could be a salient component in a future study. Based on the findings of this study, future studies could also directly compare different types of dialogic reading with a variety of storybooks, and include larger participant samples.

Implications for Current Practice

This study provides support for parent-child usefulness of phonodialogic reading interventions and the relative ease for other parents and children to implement these strategies. It supports the evidence that dialogic reading intervention with embedded phonological awareness strategies can work for helping children develop their emergent reading and oral language skills. However, it reiterates the necessity for treatment fidelity and progress monitoring over several weeks before positive changes are realized. Thus, the intervention could be reasonably extended to home-school collaboration programs in a shared storybook reading activity that might be embraced by teachers, parents, and children.

Conclusions

This study examined whether parents in a culturally and ethnically diverse urban region could be taught to implement, with fidelity, a phonodialogic reading intervention within an activity-based intervention with their preschool children, who were at risk for reading disabilities due to socioeconomic disadvantage or a history of developmental delay. Data collected indicate that parent interventionists learned to apply these strategies with a relatively high degree of treatment fidelity over the course of the nine-week study duration. All of the child participants made gains in some of their phonological awareness abilities, emergent reading skills: rhyme identification, rhyme production, blending and/or segmenting of initial word sounds. The study appears to be the first of its kind in which parent interventionists were asked to learn phonodialogic reading strategies to increase their preschool children's phonological awareness skills, while capturing the data on self-recorded digitized video media. While this study provides further evidence to support an activity-based intervention in phonodialogic emergent reading, it also expands the opportunity for parents to have a positive effect on their children's growth and development of their emergent reading skills.

References

Al Otaiba, S., Kosanovich-Grek, M. L., Torgesen, J. K., Hassler, L., & Wahl, M. (2005). Reviewing core kindergarten and first-grade reading programs in light of No Child Left Behind: An exploratory study. *Reading & Writing Quarterly, 21*, 377 - 400.

Al Otaiba, S., & Smartt, S. M. (2003). Summer sound camp: Involving parents in early literacy intervention for children with speech and language delays. *TEACHing Exceptional Children, 35*(3), 30 - 34.

Alpert, C. L., & Kaiser, A. P. (1992). Training parents to do milieu language teaching with their language-impaired preschool children. *Journal of Early Intervention, 16*, 31 - 52.

Altarac, M., & Saroha, E. (2007). Lifetime prevalence of learning disability among US children. *Pediatrics, 119,* S77 - S83.

Anthony, J. L., & Lonigan, C. J. (2004). The nature of phonological awareness: Converging evidence from four studies of preschool and early grade school children. *Journal of Educational Psychology, 96*, 43-55.

Aram, D. (2006). Early literacy interventions: The relative roles of storybook reading, alphabetic activities, and their combination. *Reading and Writing 19*, 489-515.

Arnold, R., & Colburn, N. (2007, July). Read to me! Summer reading programs are not catering to the preschool set. *School Library Journal*, 25.

*Arnold, D. H., Lonigan, C. J., Whitehurst, G. J., & Epstein, J. N. (1994). Accelerating language development through picture book reading: Replication and extension to a video-tape training format. *Journal of Educational Psychology, 86,* 235-243.

Baer, D., Wolf, M., & Risley, T. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91 -97.

Bailey, D. B., Bruder, M. B., Hebbeler, K., Carta, J., Defosset, M., & Greenwood, C. et al. (2006). Recommended outcomes for families of young children with disabilities. *Journal of Early Intervention, 28,* 227 - 251.

Ball, E. W., & Blachman, B. A. (1991). Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly, 26,* 49 - 66.

Barbarin, O., Bryant, D., McCandies, T., Burchinal, M., Early, D., & Clifford, R. et al. (2006). Children enrolled in public pre-K: The relation of family life, neighborhood quality, and socioeconomic resources to early competence. *American Journal of Orthopsychiatry, 76,* 265 - 276.

Barton, E. E., Reichow, B., & Wolery, M. (2007). Guidelines for graphing data with Microsoft PowerPoint. *Journal of Early Intervention, 29,* 320 - 336.

Bingham, G. E. (2007). Maternal literacy beliefs and the quality of mother-child book-reading interactions: Associations with children's early literacy development. *Early Education and Development, 18,* 23 - 49.

Bishop, A. G. (2003). Prediction of first-grade reading achievement: A comparison of fall and winter kindergarten screenings. *Learning Disability Quarterly, 26*, 189 - 200.

Blom-Hoffman, J., O'Neil-Pirozzi, T., & Cutting, J. (2006). Read together, talk together: The acceptability of teaching parents to use dialogic reading strategies via videotaped instruction. *Psychology in the Schools, 43,* 71 - 78.

Blom-Hoffman, J., O'Neil-Pirozzi, T., Volpe, R., Cutting, J., & Bissinger, E. (2006). Instructing parents to use dialogic reading strategies with preschool children: Impact of a video-based training program on caregiver reading behaviors and children's related verbalizations. *Journal of Applied School Psychology, 23,* 117 – 131.

Borkowski, J. G., Lounds, J. J., Noria, C. W., Lefever, J. B., Weed, K., & Keogh, D. A. et al. (2004). Precursors of mild mental retardation in children with adolescent mothers. *International Review of Research in Mental Retardation, 20,* 197 - 228.

Borrero, C. S. W., Vollmer, T. R., Borrero, J. C., & Bourret, J. (2005). A method for evaluating parameters of reinforcement during parent-child interactions. *Research in Developmental Disabilities, 26,* 577 - 592.

Boudreau, D. (2005). Use of a parent questionnaire in emergent and early literacy assessment of preschool children. *Language, Speech, and Hearing Services in Schools, 36*, 33 - 47

*Bowey, J. A. (1995). Socioeconomic status differences in preschool phonological sensitivity and first-grade reading achievement. *Journal of Educational Psychology, 87,* 476-487.

Bowyer-Crane, C., Snowling, M. J., Duff, F. J., Fieldsend, E., Carroll, J. M., & Miles, J. et al. (2008). Improving early language and literacy skills: Differential effects of an oral language versus a phonology with reading intervention. *Journal of Child Psychology and Psychiatry, 49,* 422 - 432.

*Bradley, L., & Bryant, P. E. (1983). Categorizing sounds and learning to read--A causal connection. *Nature, 301,* 419 - 421.

Bricker, D., & Gumerlock, S. (1988). Application of a three-level evaluation plan for monitoring child progress and program effects. *The Journal of Special Education, 22,* 66 - 81.

*Briesch, A. M., Chafouleas, S. M., Lebel, T. J., & Blom-Hoffman, J. A. (2008). Impact of videotaped instruction in dialogic reading strategies: An investigation of caregiver implementation integrity. *Psychology in the Schools, 45,* 978 – 993.

Britto, P. R., Brooks-Gunn, J., & Griffin, T. M. (2006). Maternal reading and teaching patterns: Associations with school readiness in low-income African American Families. *Reading Research Quarterly, 41,* 68 - 89.

Bronfenbrenner, U. (1979). *The ecology of human development.* Cambridge, MA: Harvard University Press.

Brown-Gorton, R., & Wolery, M. (1988). Teaching mothers to imitate their handicapped children: Effects on maternal mands. *The Journal of Special Education, 22,* 97 - 107.

Brownwell, R. (Ed.). (2000). *Expressive one-word picture vocabulary test* (3rd ed.). Navato, CA: Academic Therapy Publications.

Brownwell, R. (Ed.). (2000). *Receptive one-word picture vocabulary test* (3rd ed.). Navato, CA: Academic Therapy Publications.

Bryant, P. E., MacLean, M., Bradley, L. L., & Crossland, J. (1990). Rhyme and alliteration, phoneme detection and learning to read. *Developmental Psychology, 26,* 429 – 438.

Bryant, P. E., Bradley, L. L., MacLean, M., & Crossland, J. (1989). Nursery rhymes, phonological skills and reading. *Journal of Child Language, 16,* 407 - 428.

*Burgess, S. R., & Lonigan, C. J. (1998). Bidirectional relations of phonological sensitivity and prereading abilities: Evidence from a preschool sample. *Journal of Experimental Child Psychology, 70,* 117 - 141.

Bus, A. G., & van IJzendoorn, M. H. (1999). Phonological awareness and early reading: A meta-analysis of experimental training studies. *Journal of Educational Psychology, 91,* 403 – 414.

Caffrey, E., & Fuchs, D. (2007). Differences in performance between students with learning disabilities and mild mental retardation: Implications for categorical instruction. *Learning Disabilities Research & Practice, 22,* 119 - 128.

Campbell, P. H. (2004). Participation-based services: Promoting children's participation in natural settings. *Young Exceptional Children, 8*(1), 20 - 29.

Campbell, P. H., & Sawyer, L. B (2007). Supporting learning opportunities in natural settings through participation-based services. *Journal of Early Intervention, 29,* 287 – 305.

Carta, J. J. (1995). Developmentally appropriate practice: A critical analysis as applied to young children with disabilities. *Focus on Exceptional Children, 27,* 1 – 14.

Castles, A., & Coltheart, M. (2004). Is there a causal link from phonological awareness to success in learning to read? *Cognition, 91,* 77 – 111.

Catts, H. W., Bridges, M. S., Little, T. D., & Tomblin, J. B. (2008). Reading achievement growth in children with language impairments. *Journal of Speech, Language, and Hearing Research, 51,* 1569 - 1579.

Charlesworth, R. (1998). Developmentally appropriate practice is for everyone. *Childhood Education, 74,* 274 - 282.

Cheung, H. (2007). The role of phonological awareness in mediating between reading and listening to speech. *Language & Cognitive Processes, 22,* 130 - 154.

Clay, M. (1977). An emphasis on prevention. *The Journal of Special Education, 11,* 183 - 188.

Clingenpeel, B. T., & Pianta, R. C. (2007). Mothers' sensitivity and book-reading interactions with first graders. *Early Education and Development, 18,* 1 - 22.

Coleman, M. R., Buysse, V., & Neitzel, J. (2006). *Recognition and response: An early intervening system for young children at-risk for learning disabilities. Full report.* Chapel Hill: The University of North Carolina at Chapel Hill, FPG Child Development Institute.

Copple, C., & Bredekamp, S. (2008). Getting clear about developmentally appropriate practice. *Young Children, 63*(1), 54 - 55.

Council for Exceptional Children. (1983). Code of ethics and standards for professional practice. *Exceptional Children, 50,* 205 - 209.

Crain-Thoreson, C., & Dale, P. S. (1999). Enhancing linguistic performance: Parents and teachers as book reading partners for children with language delays. *Topics in Early Childhood Special Education, 19,* 28-39.

Crowe, L. (2000). Reading behaviors of mothers and their children with language impairment during repeated storybook reading. *Journal of Communication Disorders, 33*, 503-524.

Cutspec, P. A. (2004). Influences of dialogic reading on the language development of toddlers. *Bridges Practice-Based Research Syntheses, 2*(2). Retrieved on August 14, 2009 from http://researchtopractice.info/productBridges.php.

Cutspec, P. A. (2006). Effects of dialogic reading on the language development of 4 and 5 year old children. *Bridges Practice-Based Research Syntheses, 4*(3). Retrieved on August 14, 2009 from http://researchtopractice.info/productBridges.php.

Darling, S., & Westberg, L. (2004). Parent involvement in children's acquisition of reading. *The Reading Teacher, 57,* 774 - 776.

Dearing, E., Kreider, H., Simpkins, S., & Weiss, W. B. (2006). Family involvement in school and low-income children's literacy: Longitudinal associations between and within families. *Journal of Educational Psychology, 98,* 653 - 664.

DeBruin-Parecki, A. (2009). Establishing a family literacy program with a focus on interactive book reading: The role of research and accountability. *Early Childhood Education Journal, 36,* 385 - 392.

DeBruin-Parecki, A. (2007). *Let's read together: Improving literacy outcomes with the adult-child interactive reading inventory (ACIRI).* Baltimore: Brookes Publishing.

DeBruin-Parecki, A. (2005). *Early literacy skills assessment (ELSA): User Guide.* Ypsilanti, MI: High Scope Press.

DeBruin-Parecki, A., & Krol-Sinclair, B. (Eds.). (2003). *Family literacy from theory to practice.* Newark, DE: International Reading Association.

DeBruin-Parecki, A., & Paris, S. G. (1997). Family literacy: Examining practice and issues of effectiveness. *Journal of Adolescent & Adult Literacy, 40,* 596 - 606.

DeCusati, C. L., & Johnson, J. E. (2004). Parents as classroom volunteers and kindergarten students' emergent reading skills. *The Journal of Educational Research, 97,* 235 - 246.

Delaney, E. M., & Kaiser, A. P. (2001). The effects of teaching parents blended communication and behavior support strategies. *Behavioral Disorders, 26,* 93 – 116.

Dickinson, D. K., & DeTemple, J. (1998). Putting parents in the picture: Maternal reports of preschoolers' literacy as a predictor of early reading. *Early Childhood Research Quarterly, 13,* 241 - 261.

Dodici, B. J., Draper, D. C., & Peterson, C. A. (2003). Early parent-child interactions and early literacy development. *Topics in Early Childhood Special Education, 23,* 124 - 136.

Dunst, C. J., Bruder, M. B., Trivette, C. M., Hamby, D., Raab, M., & McLean, M. (2001). Characteristics and consequences of everyday natural learning opportunities. *Topics in Early Childhood Special Education, 21*, 68 - 92.

Duursma, E., Pan, B. A., & Raikes, H. (2008). Predictors and outcomes of low-income fathers' reading with their toddlers. *Early Childhood Research Quarterly, 23*, 351 - 365.

Early Childhood Research Institute on Measuring Growth and Development. (1998). *Research and development of individual growth and development indicators for children between birth and age eight* (Tech. Rep. No. 4), Minneapolis, MN: University of Minnesota, Center for Early Education and Development. Retrieved on November 8, 2009 from http://ggg.umn.edu.

Ehri, L. C. (1989). The development of spelling knowledge and its role in reading acquisition and reading disability. *Journal of Learning Disabilities, 22,* 356 - 365.

Ehri, L. C., Dreyer, L. G., Flugman, B., & Gross, A. (2007). Reading rescue: An effective tutoring intervention model for language minority students who are struggling readers in first grade. *American Educational Research Association, 44,* 414 - 448.

Faires, J., Nichols, W. D., & Rickelman, R. J. (2000). Effects of parental involvment in developing competent readers in first grade. *Reading Psychology, 21*, 195 - 215.

Fielding-Barnsley, R., & Purdie, N. (2003). Early intervention in the home for children at risk of reading failure. *Support for Learning, 18,* 77 - 82.

Fisher, W. W., Kelley, M. E., & Lomas, J. E. (2003). Visual aids and structured criteria for improving visual inspection and interpretation of single case designs. *Journal of Applied Behavior Analysis, 36,* 387 – 406.

Fletcher, K. L., Perez, A., Hooper, C., & Claussen, A. H. (2005). Responsiveness and attention during picture-book reading in 18-month-old to 24-month-old toddlers at risk. *Early Child Development and Care, 175,* 63 - 83.

Fletcher, J. M., Shaywitz, S. E., Shankweiler, D. P, Katz, L., Liberman, I. Y., & Stuebing, K. K. et al. (1994). Cognitive profiles of reading disability: Comparisons of discrepancy and low achievement definitions. *Journal of Educational Psychology, 86,* 6 - 23.

Foster, W. A., & Miller, M. (2007). Development of the literacy achievement gap: A longitudinal study of kindergarten through third grade. *Language, Speech, and Hearing Services in Schools, 38,* 173 - 181.

Fox, B., & Routh, D. K. (1975). Analyzing spoken language into words, syllables, and phonemes: A developmental study. *Journal of Psycholinguistic Research, 4,* 331 - 342.

Gable, R. A., Hester, P. P., Hester, L. R., Hendrickson, J. M., & Sze, S. (2005). Cognitive, affective, and relational dimensions of middle school students: Implications for improving discipline and instruction. *The Clearing House, 79*(1), 40-44.

Gamse, B. C., Jacob, R. T., Horst, M., Boulay, B., & Unlu, R. (2008). *Reading first impact study final report* (NCEE 2009-4038). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U. S. Department of Education.

*Gettinger, M., & Stoiber, K. (2007). Applying a response-to-intervention model for early literacy development in low-income children. *Topics in Early Childhood Special Education, 27,* 198 – 213.

*Gillon, G. T. (2005). Facilitating phoneme awareness development in 3- and 4-year old children with speech impairment. *Language, Speech, and Hearing Services in Schools, 36*, 308 - 324.

Good, R. H., & Kaminski, R. (1996). Toward a technology for assessing basic early literacy skills. *School Psychology Review, 25*, 215 - 227.

Good, R. H., Laimon, D., Kaminski, R. A., & Smith, S. (2007). Initial sound fluency. In R. H. Good & R. A. Kaminski (Eds.), *Dynamic indicators of basic early literacy skills* (6th ed.). Eugene, OR: Institute for Development of Educational Achievement. Retrieved on November 29, 2009 from http://dibels.uoregon.edu/

Good, R. H., Simmons, D. C., & Smith, S. B. (1998). Effective academic interventions in the United States: Evaluating and enhancing the acquisition of early reading skills. *Educational and Child Psychology, 15,* 56 - 70.

Gottardo, A., Siegel, L. S., & Stanovich, K. E. (1997). The assessment of adults with reading disabilities: What can we learn from experimental tasks? *Journal of Research in Reading, 20,* 42 - 54.

Gottardo, A., Stanovich, K. E., & Siegel, L. S. (1996). The relationships between phonological sensitivity, syntactic processing, and verbal working memory in the reading performance of third-grade children. *Journal of Experimental Child Psychology, 63,* 563 - 582.

Gray, A., & McCutchen, D. (2006). Young readers' use of phonological information: Phonological awareness, memory, and comprehension. *Journal of Learning Disabilities, 39,* 325 – 333.

Guralnick, M. J. (2002). Model service systems as research priorities in early intervention. *Journal of Early Intervention, 25,* 100 - 101.

Hallahan, D. P., & Kauffman, J. M. (1977). Labels, categories, behaviors: ED, LD, and EMR reconsidered. *Journal of Special Education, 11,* 139 - 149.

Hancock, T. B., Kaiser, A. P., & Delaney, E. M. (2002). Teaching parents of preschoolers at high risk: Strategies to support language and positive behavior. *Topics in Early Childhood Special Education, 22,* 191 - 222.

Hardman, M., & Jones, L. (1999). Sharing books with babies: Evaluation of an early literacy intervention. *Educational Review, 51,* 221 - 229.

Hargrave, A. C., & Senechal, M. (2000). A book reading intervention with preschool children who have limited vocabularies: The benefits of regular reading and dialogic reading. *Early Childhood Research Quarterly, 15,* 75 - 90.

Hart, B. (2000). A natural history of early language experience. *Topics in Early Childhood Special Education, 20,* 28 - 32.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children.* Baltimore: P. H. Brookes.

Hart, B., & Risley, T. R. (1992). American parenting of language-learning children: Persisting differences family-child interactions observed in natural home environments. *Developmental Psychology, 28,* 1096 - 1105.

Hatcher, P., Hulme, C., & Ellis, A. W. (1994). Ameliorating early reading failure by integrating the teaching of reading and phonological skills: The phonological linkage hypothesis. *Child Development, 65*, 41 - 57.

*Hemmeter, M. L., & Kaiser, A. P. (1994). Enhanced milieu teaching: Effects of parent-implemented language intervention. *Journal of Early Intervention, 18,* 269 - 289.

Hester, P. P., Baltodano, H. M., Gable, R. A., Tonelson, S. W., & Hendrickson, J. (2003). Early intervention with children at risk of emotional/behavioral disorders: A critical examination of research methodology and practices. *Education and Treatment of Children, 26,* 362 - 381.

*Hester, P. P., Kaiser, A. P., Alpert, C. L., & Whiteman, B. (1995). The generalized effects of training trainers to teach parents to implement milieu teaching. *Journal of Early Intervention, 20,* 30 – 51.

Hillman, H. L., & Miller, L. K. (2004). Designing multiple baseline graphs using Microsoft Excel. *The Behavior Analyst Today, 5,* 372 – 380.

Hindson, B., Byrne, B., Fielding-Barnsley, R., Newman, C., Hine, D. W., & Shankweiler, D. (2005). Assessment and early instruction of preschool children at risk for reading disability. *Journal of Educational Psychology, 97,* 687-704.

*Hockenberger, E. H., Goldstein, H., & Hass, L. S. (1999). Effects of commenting during joint book reading by mothers with low SES. *Topics in Early Childhood Special Education, 19,* 15-27.

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71,* 165 – 179.

Howell, J. L., Partridge, H. A., Landrum, T. J., & Invernizzi, M. A. (2003-2004). A look back on seven years of PALS and Virginia's EIRI. *Reading in Virginia: The Library Journal of the Virginia State Reading Association, 26,* 74-77.

Individuals with Disabilities Educational Improvement Act of 2004. Public Law 108 – 446. Retrieved on August 10, 2009 from http://www.copyright.gov/legislation/pl108-446.pdf.

Invernizzi, M., Justice, L., Landrum, T. J., & Booker, K. (2004). Early literacy screening in Kindergarten: Widespread implementation in Virginia. *Journal of Literacy Research, 36,* 479 – 500.

Invernizzi, M., & Meier, J. (1999). PALS and Virginia's Early Intervention Reading Initiative. *Reading in Virginia: The Library Journal of the Virginia State Reading Association, 23,* 21 - 26.

Invernizzi, M., Sullivan, A., Meier, J., & Swank, L. (2004). *Phonological awareness literacy screening-PreK Teacher's Manual.* Charlottesville, VA: University of Virginia Printing and Copying Services.

Jay, J., & Rohl, M. (2005). Constructing a family literacy program: Challenges and successes. *International Journal of Early Childhood, 37,* 57 - 78.

Justice, L. M., Bowles, R. P., Pence, T., Khara, L., & Skibbe, L. E. (2009). School readiness among children with varying histories of language difficulties. *Developmental Psychology, 45,* 460 - 476.

Justice, L. M., Chow, S., Capellini, C., Flanigan, K., & Colton, S. (2003). Emergent literacy intervention for vulnerable preschoolers: Relative effects of two approaches. *American Journal of Speech-Language Pathology, 12,* 320 - 332.

Justice, L. M., & Kaderavek, J. N. (2004). Exploring the continuum of emergent to conventional literacy: Transitioning special learners. *Reading & Writing Quarterly, 20,* 231 - 236.

Justice, L. M., Kaderavek, J., Bowles, R., & Grimm, K. (2005). Language impairment, parent-child shared reading, and phonological awareness: A feasibility study. *Topics in Early Childhood Special Education, 25,* 143 - 156.

Justice, L. M., Mashburn, A. J., Hamre, B. K., & Pianta, R. C. (2008). Quality of language and literacy instruction in preschool classrooms serving at-risk pupils. *Early Childhood Research Quarterly, 23,* 51 - 68.

Kaiser, A. P., Hancock, T. B., Cai, X., Foster, E. M., & Hester, P. P. (2000). Parent-reported behavior problems and language delays in boys and girls enrolled in Head Start classrooms. *Behavioral Disorders, 26,* 26 - 41.

Katz, L. A., Stone, C. A., Carlisle, J. F., Corey, D. L., & Zeng, J. (2008). Initial progress of children with disabilities in Michigan's Reading First Schools. *Exceptional Children, 74,* 235 – 256.

*Kirk, C., & Gillon, G. T. (2007). Longitudinal effects of phonological awareness intervention on morphological awareness in children with speech impairment. *Language, Speech, and Hearing Services in Schools, 38,* 342 - 352.

Konold, T. R., & Pianta, R. C. (2005). Empirically-derived, person-oriented patterns of school readiness in typically-developing children: Description and prediction to first-grade achievement. *Applied Developmental Science, 9,* 174 - 187.

Kozminsky, L., & Kozminsky, E. (1995). The effects of early phonological awareness training on reading success. *Learning & Instruction, 5,* 187 - 201.

Lachner, W., Zevenbergen, A., & Zevenbergen, J. (2008). Parent and child references to letters during alphabet book reading: Relations to child age and letter name knowledge. *Early Education and Development, 19,* 541 - 559.

*Laing, S. P., & Espeland, W. (2005). Low intensity phonological awareness training in a preschool classroom for children with communication impairments. *Journal of Communication Disorders, 38*, 65 -82.

*Landry, S. H., Swank, P. R., Smith, K. E., Assel, M. A., & Gunnewig, S. B. (2006). Enhancing early literacy skills for preschool children: Bringing a professional development model to scale. *Journal of Learning Disabilities, 39,* 306 - 324.

Laski, K. E., Charlop, M. H., & Schreibman, L. (1988). Training parents to use the Natural Language Paradigm to increase their autistic children's speech. *Journal of Applied Behavioral Analysis, 21*, 391 - 400.

Leiberman, I. Y., Shankweiler, D., Fischer, F. W., & Carter, B. (1974). Explicit syllable and phoneme segmentation in the young child. *Journal of Experimental Child Psychology, 18,* 201 - 212.

Lennon, J. E., & Slesinski, C. (1999). Early intervention in reading: Results of a screening and intervention program for kindergarten students. *School Psychology Review, 28,* 353 – 364.

Lindsay, G., & Dockrell, J. E. (2004). Whose job is it? Parents' concerns about the needs of their children with language problems. *The Journal of Special Education, 37,* 225 - 235.

*Lonigan, C. J., Burgess, S. R., Anthony, J. L., & Barker, T. A. (1998). Development of phonological sensitivity in 2- to 5-year-old children. *Journal of Educational Psychology, 90,* 294 - 311.

*Lonigan, C. J., & Whitehurst, G. J. (1998). Relative efficacy of parent and teacher involvment in a shared reading intervention for preschool children from low-income backgrounds. *Early Childhood Research Quarterly, 13,* 263 - 290.

Losardo, A., & Bricker, D. D. (1994). Activity-based intervention and direct instruction: A comparison study. *American Journal on Mental Retardation, 98*, 744 - 765.

Lundberg, I., Frost, J., & Peterson, O. (1988). Effects of an extensive program for stimulating phonological awareness in preschool children. *Reading Research Quarterly, 23,* 263 - 284.

Lyon, G. R. (2002). Reading development, reading difficulties, and reading instruction: Education and Public Health Issues. *Journal of School Psychology, 40,* 3 – 6.

MacLean, M., Bryant, P., & Bradley, L. (1987). Rhymes, nursery rhymes, and reading in early childhood. *Merrill-Palmer Quarterly, 33,* 255 - 281.

Macy, M. (2007). Theory and theory-driven practices of activity based intervention. *Journal of Early and Intensive Behavior Intervention, 4,* 561 - 585.

Mann, V. A., & Foy, J. G. (2007). Speech development patterns and phonological awareness in preschool children. *Annals of Dyslexia, 57*, 51 - 74.

Manset-Williamson, G., St.John, E., Hu, S., & Gordon, D. (2002). Early literacy practices as predictors of reading related outcomes: Test scores, test passing rates, retention, and special education referral. *Exceptionality, 10,* 11 - 28.

Marston, D., Pickart, M., Reschly, A., Heistad, D., Muyskens, P., & Tindal, G. (2007). Early literacy measures for improving student reading achievement: Translating research into practice. *Exceptionality, 15,* 97 - 117.

Marvin, C., & Mirenda, P. (1993). Home literacy experiences of preschoolers enrolled in Head Start and special education programs. *Journal of Early Intervention, 17,* 351 - 367.

Marvin, C., & Wright, D. (1997). Literacy socialization in the homes of preschool children. *Language, Speech, and Hearing Services in Schools, 28*, 154 - 163.

McBride-Chang, C., Wagner, R. K., & Chang, L. (1997). Growth modeling of phonological awareness. *Journal of Educational Psychology, 89,* 621 - 630.

McIntosh, A. S., Graves, A., & Gersten, R. (2007). The effects of response to intervention on literacy development in multiple-language settings. *Learning Disability Quarterly, 30,* 197 – 212.

McLoyd, V. C. (1998). Socioeconomic disadvantage and child development. *American*

Psychologist, 53, 185 – 204.

*McNeill, J. H., & Fowler, S. A. (1999). Let's talk: Encouraging mother-child conversations during storybook reading. *Journal of Early Intervention, 22,* 51 - 69.

Merlo, L. J., Bowman, M., & Barnett, D. (2007). Parental nurturance promotes reading acquisition in low socioeconomic status children. *Early Education and Development, 18,* 51 - 69.

Missall, K. N., & McConnell, S. R. (2004). *Psychometric characteristics of individual growth and development indicators: Picture naming, rhyming, and alliteration.* Minneapolis: University of Minnesota, Center for Early Education and Development.

Missall, K. N., McConnell, S. R., & Cadigan, K. (2006). Early literacy development: Skill growth and relations between classroom variables for preschool children. *Journal of Early Intervention, 29,* 1 - 21.

Mol, S. E., Bus, A. G., de Jong, M. T., & Smeets, D. J. H. (2008). Added value of dialogic parent-child book readings: A meta-analysis. *Early Education and Development, 19,* 7 - 26.

*Molfese, V. J., Modglin, A. A., Beswick, J. L., Neamon, J. D., Berg, S. A., & Berg, C. J. et al. (2006). Letter knowledge, phonological processing, and print knowledge: Skill development in nonreading preschool children. *Journal of Learning Disabilities, 39,* 296 - 305.

Montgomery, J. K. (2008). *Montgomery assessment of vocabulary acquisition.* Greenville, SC: Super Duper Publications.

Morais, J., Cary, L., & Alegria, J., & Bertelson. (1979). Does awareness of speech as a sequence of phones arise spontaneously? *Cognition, 7,* 323 - 331.

Morgan, P. L., & Meier, C. R. (2008). Dialogic reading's potential to improve children's emergent literacy skills and behavior. *Preventing School Failure, 52*(4), 11 - 16.

Nancollis, A., Lawrie, B., & Dodd, B. (2005). Phonological awareness intervention and the acquisition of literacy skills in children from deprived social backgrounds. *Language, Speech, and Hearing Services in Schools, 36*, 325 - 335.

National Institute of Child Health and Human Development. (2000). Report of the National Reading Panel. *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction.* (NIH Publication No. 00-4754). Washington, DC: U. S. Government Printing Office. Retrieved on August 2, 2009 from http://www.nichd.nih.gov/publications/nrp/upload/smallbook_pdf.pdf.

National Institute for Literacy. (2008). *Developing early literacy: Report of the National Literacy Panel. A scientific synthesis for early literacy and implications for intervention.* Jessup, MD: Author. Retrieved on August 10, 2009 from http://www.nifl.gov/publications/pdf/NELPReport09.pdf.

Neisworth, J. T., & Greer, J. G. (1975). Functional similarities of learning disability and mild retardation. *Exceptional Children, 42,* 17 - 21.

Neuman, S. B. (2007). Changing the odds. *Educational Leadership, 65*(2), 16 – 21.

Neuman, S. B., & Celano, D. (2001). Access to print in low-income and middle-income communities: An ecological study of four neighborhoods. *Reading Research Quarterly, 36,* 8 – 26.

Neuman, S. B., Koh, S., & Dwyer, J. (2008). CHELLO: The Child/Home Environmental Language and Literacy Observation. *Early Childhood Research Quarterly, 23*, 159 - 172.

Neuman, S. B., & Roskos, K. (2005). The state of state pre-kindergarten standards. *Early Childhood Research Quarterly, 20*, 125 – 145.

No Child Left Behind Act of 2001. Public Law 107 – 110. Retrieved on August 6, 2009 from http://www.ed.gov/policy/elsec/leg/esea02/107-110.pdf .

North, S., & Allen, N. (2005). A better beginning with books and libraries for Western Australian babies. *Aplis, 18*(4), 132 - 136.

Novick, R. (1993). Activity-based intervention and developmentally appropriate practice: Points of convergence. *Topics in Early Childhood Special Education, 13,* 403 - 418.

Nunnery, J. A., & Ross, S. M. (2007). The effects of the School Renaissance Program on student achievement in reading and mathematics. *Research in the Schools, 14,* 40-59.

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

O'Connor, R. E., Fulmer, D., Harty, K. R., & Bell, K. M. (2005). Layers of reading intervention in kindergarten through third grade: Changes in teaching and student outcomes. *Journal of Learning Disabilities, 38,* 440 - 455.

*O'Connor, R. E., Jenkins, J. R., Leicester, N., & Slocum, T. A. (1993). Teaching phonological awareness to young children with learning disabilities. *Exceptional Children, 59,* 532 - 546.

Odom, S. L., Brantlinger, E., Gersten, R., Horner, R. H., Thompson, B., & Harris, K. R. (2005). Research in special education: Scientific methods and evidence-based practices. *Exceptional Children, 71,* 137 – 148.

Odom, S. L., & Strain, P. S. (2002). Evidence-based practice in early intervention/early childhood special education: Single-subject design research. *Journal of Early Intervention, 25,* 151 – 160.

Odom, S. L., & Wolery, M. (2003). A unified theory of practice in early intervention/early childhood special education: Evidence-based practices. *The Journal of Special Education, 37,* 164 – 173.

Olive, M. L., & Smith, B. W. (2005). Effect size calculations and single subject designs. *Educational Psychology, 25,* 313 – 324.

Wolery, M., & Bailey, D. B. (2002). Early childhood special education research. *Journal of Early Intervention, 25,* 88 – 99.

Parker, R. I., & Hagan-Burke, S. (2007). Useful effect size interpretation for single case research. *Behavior Therapy, 38,* 95 – 105.

Parker, R. I., Hagan-Burke, S., & Vannest, K. (2007). Percentage of all non-overlapping data (PAND): An alternative to PND. *The Journal of Special Education, 40,* 194 – 204.

Parker, R. I., Vannest, K. J., & Brown, L. (2009). The improvement rate difference for single-case research. *Exceptional Children, 75,* 135 – 150.

Perez-Johnson, I., & Maynard, R. (2007). The case for early, targeted, interventions to prevent academic failure. *Peabody Journal of Education, 82*(4), 587 - 616.

Perfetti, C. A. (1984). Reading acquisition and beyond: Decoding includes cognition. *American Journal of Education, 93,* 40 - 60.

Perfetti, C. A., Beck, I. L., & Bell, L. C. (1987). Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children. *Merrill-Palmer Quarterly, 33,* 283 - 319.

Pogorzelski, S., & Wheldall, K. (2005). The importance of phonological processing skills for older low-progress readers. *Educational Psychology in Practice, 21*(1), 1 - 22.

Pufpaff, L. A. (2009). A developmental continuum of phonological sensitivity skills. *Psychology in the Schools, 46,* 679 - 691.

Raver, S. A. (1999). *Intervention strategies for infants and toddlers with special needs: A team approach*. Upper Saddle River, NJ: Merrill.

Raver, S. A. (2005). Using family-based practices for young children with special needs in preschool programs. *Childhood Education, 82,* 9 - 13.

Raver, S. A. (2009). *Early childhood special education, 0 to 8 years: Strategies for positive outcomes*. Upper Saddle River, NJ: Merrill.

Read, K. D., Hresko, W. P., & Hammill, D. D. (2001). *Test of Early Reading Ability (TERA – 3)* (3rd ed.). Austin, TX: Pro-Ed.

Rodriguez, B. L., Hines, R., & Montiel, M. (2009). Mexican American mothers of low and middle socioeconomic status: Communication behaviors and interactive strategies during shared book reading. *Language, Speech, and Hearing Services in Schools, 40,* 271 - 282.

Ross, S. M., Nunnery, J. A., Goldfeder, E., McDonald, A., Rachor, R., & Hornbeck, M., et al. (2004). Using school reform models to improve reading achievement: A longitudinal study of direct instruction and Success For All in an urban district. *Journal of Education for Students Placed at Risk, 9,* 357-388.

*Roth, F. P., Troia, G. A., Worthington, C. K., & Dow, K. A. (2002). Promoting awareness of sounds in speech: An initial report of an early intervention program for children with speech and language impairments. *Applied Psycholinguistics 23,* 535 - 565.

Rush, K. L. (1999). Caregiver-child interactions and early literacy development of preschool children from low-income environments. *Topics in Early Childhood Special Education, 19,* 3 - 14.

Rvachew, S., Ohberg, A., Grawburg, M., & Heyding, J. (2003). Phonological awareness and phonemic perception in 4-year-old children with delayed expressive phonology skills. *American Journal of Speech-Language Pathology, 12*, 463 - 471.

Sawyer, D. (1987). *Test of Awareness of Language Segments (TALS)*. Frederick, MD: Aspen Productions.

Scruggs, T. E., & Mastropieri, M. A. (1998). Synthesizing single subject research: Issues and applications. *Behavior Modification, 22,* 221 – 242.

Scruggs, T. E., & Mastropieri, M. A. (2001). How to summarize single-participant research: Ideas and applications. *Exceptionality, 9,* 227 – 244.

Senechal, M. (1997). The differential effect of storybook reading on preschoolers' acquisition of expressive and receptive vocabulary. *Journal of Child Language, 24*, 123 - 138.

Shankweiler, D., Lundquist, E., Katz, L., Stuebing, K. K., Fletcher, J. M., & Brady, S. et al. (1999). Comprehension and decoding: Patterns of association in children with reading difficulties. *Scientific Studies of Reading, 3,* 69 - 94.

Share, D. L., & Gur, T. (1999). How reading begins: A study of preschoolers' print identification strategies. *Cognition and Instruction, 17;* 177 - 213.

Simmons, D. C., Kame'enui, E. J., Harn, B., Coyne, M. D., Stoolmiller, M., & Santoro, L. E. et al. (2007). Attributes of effective and efficient kindergarten reading intervention: An examination of instructional time and design specificity. *Journal of Learning Disabilities, 40,* 331 - 347.

Simos, P. G., Fletcher, J. M., Bergman, M. D., Breier, J. I., Foorman, B. R., & Castillo, E. M. et al. (2002). Dyslexia-specific brain activation profile becomes normal following successful remedial training. *Neurology, 58,* 1203 - 1213.

Skibbe, L., Behnke, M., & Justice, L. M. (2004). Parental scaffolding of children's phonological awareness skills: Interactions between mothers and their preschoolers with language difficulties. *Communication Disorders Quarterly, 25,* 189 - 203.

Snow, C.E., Burns, M.S., & Griffin, P. (Eds.) (1998). *Preventing reading difficulties in young children* (Report of the Committee on the Prevention of Reading Difficulties in Young Children, National Research Council). Washington, DC: National Academies Press.

Snowling, M. J., Adams, J. W., Bishop, D. V. M., & Stothard, S. E. (2001). Educational attainments of school leavers with a preschool history of speech-language impairments. *International Journal of Communication and Language Disorders, 36,* 173 - 183.

Snowling, M. J., & Hulme, C. (2006). Language skills, learning to read and reading intervention. *London Review of Education, 4,* 63 - 76.

Sodoro, J., Allinder, R. M., & Rankin-Erickson, J. L. (2002). Assessment of phonological awareness: Review of methods and tools. *Educational Psychology Review, 14,* 223 - 260.

Stanovich, K. E. (1993). Romance and reality. *The Reading Teacher, 47,* 280 - 291.

Stanovich, K. E. (1994). Constructivism in reading education. *The Journal of Special Education, 28,* 259 – 274.

Stanovich, K. E., Cunningham, A. E., & Cramer, B. B. (1984). Assessing phonological awareness in kindergarten children: Issues of task comparibility. *Journal of Experimental Child Psychology, 38,* 175 - 190.

Swick, K. J. (2009). Promoting school and life success through early childhood family literacy. *Early Childhood Education Journal, 36,* 403 - 406.

Tannock, R., Girolametto, L., & Siegel, L. S. (1992). Language intervention with children who have developmental delays: Effects of an interactive approach. *American Journal of Mental Retardation, 97,* 145 – 160.

Tawney, J. W., & Gast, D. L. (1984). *Single subject research in special education.* Columbus, OH: Merrill.

Thorndike, E. L. (1917). Reading as reasoning: A study of mistakes in paragraph reading. *Journal of Educational Psychology, 8,* 323 - 332.

Torgesen, J. K. (2000). Individual differences in response to early interventions in reading: The lingering problem of treatment resisters. *Learning Disabilities Research & Practice, 15,* 55 - 64.

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1994). Longitudinal studies of phonological processing and reading. *Journal of Learning Disabilities, 27,* 276 – 286.

Torgesen, J. K. (2002). The prevention of reading difficulties. *Journal of School Psychology, 40,* 7 - 26.

U.S. Department of Education. (2007). *A synopsis of the 2007 Early Reading First project grantees* (CFDA # 84.359B). Washington, DC: Author. Retrieved on August 5, 2009 from http://www.ed.gov/programs/earlyreading/abstractsfinal2007.pdf

U.S. Department of Education. (2008). *Reading First state grants* (CFDA # 85.357). Washington, DC: Author. Retrieved on August 5, 2009 from http://www.ed.gov/programs/readingfirst/gtepreadingfirst.pdf

Virginia Department of Education. (2007). *Virginia's foundation blocks for early learning: Comprehensive standards for four-year-olds.* Richmond, VA: Author. Retrieved on August 5, 2009 from http://www.pen.k12.va.us/VDOE/Instruction/Elem_M/FoundationBlocks.pdf

Walcutt, C. C. (1967). Reading – A professional definition. *The Elementary School Journal, 67,* 363 - 365.

Waldbart, A., Meyers, B., & Meyers, J. (2006). Invitations to families in an early literacy support program. *The Reading Teacher, 59,* 774 - 785.

Weistuch, L., & Lewis, M. (1985). The language interaction intervention project. *Analysis and Intervention in Developmental Disabilities, 5*, 97 – 106.

*Whitehurst, G. J., Arnold, D. S., Epstein, J. N., Angell, A. L., Smith, M., & Fischel, J. E. (1994). A picture book reading intervention in day care and home for children from low-income families. *Developmental Psychology, 30,* 679 – 689.

*Whitehurst, G. J., Falco, F. L., Lonigan, C. J., Fischel, J. E., DeBaryshe, B. D., & Valdez-Menchaca, M. C. et al. (1988). Accelerating language development through picture book reading. *Developmental Psychology, 24,* 552 - 559.

Whitehurst, G. J., & Lonigan, C. J. (2001). *Get ready to read! An early literacy manual: Screening tool, activities, and resources.* Washington, DC: National Center for Learning Disabilities.

*Whitehurst, G. J., Zevenbergen, A. A., Crone, D. A., Schultz, M. D., Velting, O. N., & Fischel, J. E. (1999). Outcomes of an emergent literacy intervention from Head Start through second grade. *Journal of Educational Psychology, 91,* 261 - 272.

Wolery, M., & Bailey, D. B. (2002). Early childhood special education research. *Journal of Early Intervention, 25,* 88 - 99.

*Wolfe, V., Presley, C., & Mesaris, J. (2003, August). The importance of sound identification training in phonological intervention. *American Journal of Speech-Language Pathology, 12*, 282-288.

*Yeh, S. S. (2003). An evaluation of two approaches for phonemic awareness to children in Head Start. *Early Childhood Research Quarterly, 18*, 513 - 529.

Ysseldyke, J. E., Algozzine, B., Shinn, M. R., & McGue, M. (1982). Similarities and differences between low achievers and students classified learning disabled. *The Journal of Special Education, 16,* 73 - 85.

*Zevenbergen, A. A., Whitehurst, G. J., & Zevenbergen, J. A. (2003). Effects of a shared-reading intervention on the inclusion of evaluative devices in narratives of children from low-income families. *Applied Developmental Psychology, 24,* 1 - 15.

Zifcak, M. (1981). Phonological awareness and reading acquisition. *Contemporary Educational Psychology, 6,* 117 - 126.

*Ziolkowski, R. A., & Goldstein, H. (2008). Effects of embedded phonological awareness intervention during repeated book reading on preschool children with language delays. *Journal of Early Intervention, 31,* 67-90.

APPENDICES

Appendix A

Parental Prompt and Child Response Video/Audio Data Collection Form with Code Definitions

Dyad number _____Date of Video/Audio Record________Reading Session duration______Coder______Reliability_____

Frequency Count per Storybook Reading Session (use a forward slash " / " for each fx count)																				
Parental Prompt Codes									**Child Responses: 0 = incorrect, 1 = correct, NR = No Response, NC = No Code**											
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
DET	**END**	**INI**	**PIC**	**PRE**	**REL**	**WHQ**	**RFP**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**	**0**	**1**	**NR**	**NC**
Totals=																				

Parental prompt codes:
DET= details about the story
END = ending sounds
INI = Initial sounds in words
PIC = picture labeling
PRE = predictions
REL = Relates story to experiences: prompts child to relate story events to real life experiences
RFP = Reinforces child's responses and/or provides praise phrases or statements
WHQ = 'wh' questions: prompts child by asking 'who, what, when, where, why, or how' questions
NC = No Code Possible
IMPORTANT NOTES: Code only parent prompts if the parent's behavior demonstrates an attempt to elicit a response from the child. Ignore parent behaviors (e.g., talking, teaching, lecturing, asking a question) when parent does not provide the child with the opportunity to respond. If parent pauses for ≥ 3 seconds between prompts, code as two separate prompts.
Comments:

Parent Prompt Codes, Definitions, and Descriptions

CODE	DEFINITION	DESCRIPTION
DET	Details about the story	Parent prompts the child for any details about story narrative (e.g., words, descriptions of characters, plot, action, feelings, thoughts, and/or setting), or parent prompts child for details by pausing ($\geq$ 3 seconds) for the child to have an opportunity to respond. Examples, "Tell me the color of the icky sticky frog," and "Tell me what happened to the bird."
END	Ending/rhyming sound	Parent prompts the child to complete a word, phase, or sentence with a rhyming sound by modeling an example of a rhyming word sound, or providing the opportunity for the child to fill in the blank with a rhyming word sound. Example, "I need a smart fellow to make all the sounds, who can bark like a dog and bay like the hounds."
INI	Initial/beginning sound	Parent prompts the child to use a correct beginning sound to complete a word, phrase, or sentence. Parent models a beginning sound, and/or pauses to provide the opportunity for the child to fill in the blank with the correct beginning sound (onset), or the correct word. Example, "Boing begins with sound /b/." Or, "'B' makes the /b/ sound in the word boing."
PIC	Picture labeling	Parent prompts the child to label, define, or describe any picture or illustration in the story, including book cover picture. Parent must point to the picture. Note that PIC coding takes precedence over WHQ coding. Example, "Tell me what sort of animal is that," or [pointing to horse] "What is that?"
PRE	Predictions about story	Parent prompts the child to tell what might happen in the story. Note that PRE coding takes precedence over WHQ. Example, "Tell me what you think will happen to the frog," or "What do think will happen next?"
REL	Relates story to experience	Parent prompts the child to relate story narrative or events to real life experience. Note that REL takes precedence over WHQ. Example, "Tell me about a time that you felt sleepy like the bear," or "When did you feel sad like that?"

RFP	**Reinforces or praises verbally**	**Parent encourages the child's responses by verbally providing positive reinforcement or praise. Parent may use a word, a phrase, and/or a sentence. Examples, "good" or "that's right" or "I heard you say the /k-k/." Nonverbal responses (pat on back, smile, wink, nod) are not coded.**
WHQ	**'WH' Question prompts**	**Parent prompts child by questioning 'who, what, when, where, why, or how' type of open-ended questions about the storybook events that elicit more than a one word verbal reply (e.g., more than a Yes or No reply). Example, "What kind of things does the icky, sticky frog like to eat?" Do not code as WHQ if parent asks a question, but does not provide opportunity or time for child to respond.**
NC	**No code possible**	**Parent prompts that do not fit into above categories; describe the parent behaviors briefly in the Comments section on data collection form above. Examples, "Do you want to hold the book?" "Do you want to turn the page?"**

Appendix B

Parent Interventionist Satisfaction Survey for Social Validity

Please respond to the following statements using the following scale:

1- Strongly Agree
2- Agree
3- Neither Agree or Disagree
4- Disagree
5- Strongly Disagree

______ 1. I gained valuable information about improving my child's early reading skills.

______ 2. I gained valuable information about and experience with using the early reading intervention with my child.

______ 3. I am satisfied with the amount of teaching time needed in order to use the early reading intervention with my child.

______ 4. I feel confident that I am able to use the reading intervention when I read with my child in the future.

______ 5. I was able to see a change in my child's skill level in identifying rhyming words in the storybook reading activity, such as saying or pointing to words that rhyme "frog, log."

______ 6. I was able to see a change in my child's skill level in saying rhyming words in the storybook reading activity, such as filling in the blank "frog rhymes with log."

______ 7. I was able to see a change in my child's skill level in blending the beginning and ending sounds of words in the storybook reading activity, such as filling in the blank "/B/" is the beginning sound in bear."

______ 8. I was able to see a change in my child's skill level in segmenting the beginning and ending sounds of words in the storybook reading activity, such as filling in the blank "Bear begins with the sound /b/."

______ 9. I am satisfied with this intervention and feel it is worth my time and effort to use it in a home setting.

______ 10. I would recommend this intervention to other parents for their children, ages 4 – 5 years old.

Open-ended questions:

11. What, if anything, did you like most about using the early reading intervention?

12. What, if anything, about the intervention would you like to see changed or done differently?

12. How, if at all, has the experience of being a parent interventionist changed the way you feel about reading with your child?

Please provide the following information about yourself (optional):

Date of birth (mm/dd/yyyy) ______________________________

Ethnicity _________________________

Highest grade or degree completed in school or college/university________________

Profession or current job position_______________________________________

Used with permission and adapted from:

Ziolkowski, R. A., & Goldstein, H. (2008). Effects of embedded phonological awareness intervention during repeated book reading on preschool children with language delays. *Journal of Early Intervention, 31*, 67-90.

Appendix C

Written Comments on the Parent-Interventionist Satisfaction Survey for Social Validity

"Fun videoing our interactions and having a tool to remind me not to 'just' read the story."

"Some of the books were not as 'cool.' The Giraffe was by far the best and books along these lines for this age range would be great. Pumpkin book great too."

"Changed my reading style to more interactive."

"The new information provided me with extra opportunity to help my child become a better reader."

"Not much has changed. My child comes from a family of strong readers. We read together often."

"[I liked most] seeing the excitement in my child when we read. I also enjoyed watching her put sounds together and learn new words."

"I've always felt that reading is an integral part of growing and developing. I now have more skills and techniques to use as we read."

"[I liked most] learning the strategies. They are simple and easy yet make a big difference."

"We have always enjoyed reading together but now it is enjoyable and serves a valuable purpose."

"It gave me a greater sense of educational purpose when I read with my child."

"With so many books (1 per week) I often felt I wanted more time per skill instruction."

"The time spent every night with him reading stories gave us a closer bond."

"Actually, there is nothing I would do differently."

"It helped me to include him more in the telling of the story instead of me just reading to him."

Appendix D

Child Care Center Daily Schedule

0900 – 0930 Breakfast Time

0930 – 0945 Morning Meeting

0945 – 1100 Work Time

1100 – 1130 Outside Time

1130 – 1215 Lunch

1215 – 1430 Nap Time

1430 – 1500 Reorganize for the Afternoon

1500 – 1530 Snack Time

1530 – 1545 Activity Time

1545 – 1615 Outside Time

1615 – 1730 Activity Time

1730 – 1800 Departure

Appendix E

Parent Interventionists in Phonodialogic Emergent Reading with Preschool Children:

Parent Training Protocol

This protocol was developed by Sabra Gear, MS and Peggy Hester, PhD for the PIPER dissertation research study, Old Dominion University, Norfolk, Virginia.

Table of Contents

Page

Introduction to the Study

Research Design

The study uses a within-subjects multiple-baseline design (Baer, Wolf, & Risley, 1968) across two sets of intervention strategies replicated across six children to investigate the efficacy of embedding explicit phonological awareness strategies in an activity-based intervention on children's rhyming, alliteration, blending, and segmenting skills. The intervention protocol is comprised of phonodialogic reading activities between parent interventionists and their child participants. The duration of the study is planned for nine weeks, a time period that has been demonstrated of sufficient duration to evidence effects in dialogic reading, although not necessarily with parents as interventionists (Briesch et al., 2008; McNeill & Fowler 1999). The study also includes five curriculum-based measurement tests to monitor the ongoing weekly progress of the intervention on the emergent reading skills of preschool children. In addition, embedded in this design are generalization probes of parent and child phonodialogic reading activities at home using the *Adult—Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007), which is administered according to the examiner's manual.

Participants and Inclusion Criteria

Six parent and child dyads were recruited from a local early child care and education center located in a culturally and ethnically diverse urban region. The parent interventionists and child participants met the criteria for inclusion described below and listed in Table 1.

Child participants include six preschool children, ranging in ages from 51 – 62 months. All children are in their final preschool year prior to entering kindergarten. Each child was screened for normal hearing and vision as part of the admission process at the child care center. All child participants have at least one risk factor related to the development of reading disabilities (e.g., socioeconomic disadvantage, developmental delay) as evidenced in the child's developmental or educational history, or as measured by one of the study pre-intervention measures listed in the study procedures (refer to Table 2). Teachers in the early child care and education center have helped to identify children for inclusion in the research project. Based on these recommendations, children and parents who met the designated criteria were selected as participants.

Parent interventionists include six parents. They are at least 18 years of age and provided signed informed consent. All parent interventionists have either corrected vision or no significant deficits affecting their ability to read to their child. Additional child participant and parent interventionist characteristics are assessed as part of the pre- and/or post-intervention measures listed in the study procedures (refer to Table 2).

Table 1. Criteria for Inclusion in Study Participation

Participant Characteristics	Parent Interventionists	Child Participants
Age	At least 18 years of age	48 – 62 months
Sex	Female or Male	Female or Male
Hearing	No significant deficits	No significant deficits
Vision	No significant deficits	No significant deficits
Educational Level	No specific requirement	Final preschool year
Reading risk factor(s)	No specific requirement	1) Eligible for free or reduced lunch, and/or 2) Developmental delay in at least one domain
Informed Consent	Signed informed consent obtained	Verbal agreement to participate offered

Research Study Phases

Research study phases include baseline, two counterbalanced intervention conditions (a rhyming condition-PETER, and an alliteration condition-PIPER), and maintenance of the first intervention condition while the second intervention condition is implemented. A stepwise procedure using a table of random numbers (Mitchell & Jolley, 2007) generated the following random order for the intervention conditions: a) Dyad 1 = PIPER—PETER; b) Dyad 2 = PIPER—PETER; c) Dyad 3 = PETER—PIPER; d) Dyad 4 = PETER—PIPER; e) Dyad 5 = PETER—PIPER; f) Dyad 6 = PIPER—PETER. Then, the first parent who provided written consent to participate and whose child begins the pre-testing process first is designated as Dyad 1. The second parent who provided written consent to participate and whose child is the second to begin the pre-testing process is designated as Dyad 2, and so forth. After the child participants' pre-test measures are collected, the baseline reading sessions commence.

Baseline. The purpose of the baseline sessions is to establish basal measures of parent and child skills prior to the implementation of the phonodialogic reading intervention. The parent-interventionists participates in shared book reading during the baseline condition with their children. To ensure uniformity of the baseline procedures across parent-child dyads, a baseline protocol is used. During the baseline condition, each parent-interventionist is instructed to read the same baseline condition storybook. Parents are instructed to read the entire book with the child as they normally would at home. As the books used during the intervention phase, the baseline book provides opportunities for parents to use rhyming and alliteration strategies. The baseline book differs from the books used during the intervention phase; however, because it does not contain any of the highlighted or underlined letters or word prompts that are provided in the books during intervention. All baseline parent-child reading baseline sessions are video recorded and last approximately 15 minutes.

In addition to the parent-child baseline sessions at the center, parents and children conduct similar reading baseline sessions in their home setting. Parents are asked to read to their children as they normally would. Each parent-child baseline home reading session was also video recorded. Each session is expected to last approximately 15 minutes and is video recorded. All pre-test and baseline measures listed on the assessment schedule in Table 2 are completed prior to implementing the intervention.

Table 2. Assessment Schedule

Measures	Participant	
	Parent	Child
Child/Home Environmental Language and Literacy Observation	Pre/Post	
Early Literacy Parent Questionnaire	Pre/Post	
Interventionist Satisfaction Survey (Social Validity)	Post	
Phonological Awareness Literacy Screening-PreK		Pre/Post
Montgomery Assessment of Vocabulary Acquisition		Pre/Post
Early Literacy Skills Assessment		Pre/Post
Adult/Child Interactive Reading Inventory	Weekly	Weekly
Individual Growth and Development Indicators – Rhyme Identification		Weekly
Rhyme Production		Weekly
Individual Growth and Development Indicators – Alliteration Identification		Weekly
Diagnostic Indicators of Basic Early Literacy Skills – Initial Segmentation [and Blending] *Fluency*		Weekly
Behavior Observations of Parent-Child Dyad Reading Sessions		Weekly

Intervention. Subsequent to the baseline phase, intervention is implemented. During the intervention phase, the parent trainer teaches the parents to implement the intervention strategies at the child care center. The specific structural components of the intervention strategies are outlined in Table 3. All parent training sessions are video recorded and are expected to last approximately 30 minutes, with initial sessions requiring slightly more time (approximately 45 minutes).

There are two intervention conditions, a rhyming condition and an alliteration condition. The child care center's administrator, center personnel, and the research study assistants (e.g., coders, test examiners) are blind to the specific experimental conditions taught to parent-interventionists. Each intervention condition is designed to instruct the parent-interventionist to embed phonological awareness strategies within the dialogic reading activity in the context of the shared storybook reading with her or his child. Children are provided the intervention individually by their parents. Also, children are individually assessed to detect changes from baseline phase to intervention, and to monitor maintenance of treatment effects.

These two intervention conditions are randomly presented across dyads by the parent-interventionists. The order of each intervention condition is counterbalanced based on random assignment (Ziolkowski & Goldstein, 2008). All parent-interventionists are trained to implement both the rhyming condition and the alliteration condition. Only the order of the conditions will be counter-balanced and randomly assigned.

The parent-trainer uses a written protocol to promote consistent content and procedural instruction for each parent-interventionist. In addition, an instructional strategies bookmark combined with a self-checklist is provided to each parent-interventionist to help promote consistent treatment integrity. Based on dialogic reading activity guidelines, two intervention strategies (Ziolkowski & Goldstein, 2008), each with its associated acronym to help promote consistency, is taught to each parent in a randomly assigned counterbalanced fashion.

Rhyming and Alliteration Strategies—PETER-PIPER

3. Intervention strategy: PETER. Each parent is provided with information about the important role of rhyming in phonological awareness. Each parent is introduced to PETER--the rhyming strategy--as follows: (a) P— prompt your child's picture labeling, and predicting about the story by asking your child what the story might be about, and what might happen in the story; (b) E—eavesdrop and evaluate your child's responses, asking your child to help you identify all the rhyming words. For example, point to the word 'trees' and say, "This is the word 'trees.' Trees rhymes with 'knees.'" Pause for at least three seconds to allow your child time to complete the rhyme. If your child does not respond in about three seconds, complete the rhyme for your child and repeat the question again; (c) T—talk about the tale, and relate the story events to your child's true life experiences; (d) E—expand and elaborate on your child's responses, eliciting more details about the story; and (e) R— reinforce your child's right responses with praise statements. Repeat the reading.
4. Intervention strategy: PIPER. Each parent is provided with information about the important role of alliteration in phonological awareness. Each parent is introduced to PIPER-- the alliteration strategy-- as follows: (a) P—prompt your child's picture labeling, and predicting about the story by asking your

child what the story might be about, and what might happen in the story; (b) I— identify initial letter sounds of words by asking your child to help you complete a sentence. For example, say "Beetle begins with the /b/ sound. 'B' makes the /b/ sound in the word_____." Pause for at least three seconds to allow your child time to complete the word or sound. If your child does not respond after three seconds, complete the word for your child and repeat the question again; (c) P—pose purposeful questions such as 'what' 'where' 'when' ' why' 'who,' and 'how' to prompt your child's responses; (d) E—expand and elaborate on your child's responses, eliciting more details about the story; (e) R—reinforce your child's right responses with praise statements and repeat the reading.

The total PETER-PIPER program to include baseline and treatment across intervention conditions is completed in nine weeks. Similar to Skibbe et al. (2004), parent-interventionists are instructed to implement and self-video record the reading activity with their children at home at least four times throughout the week in the baseline, and during each intervention condition.

Table 3. Parent Phonodialogic Intervention Conditions and Strategies

Strategies	Intervention Conditions	
	PETER(rhyming)	PIPER(alliteration)
Prompt picture labeling/story predicting	P	P
Eavesdrop/evaluate; ask child to identify rhyming words; complete sentence with rhyming words	E	
Identify initial sounds; ask the child to complete word or sentence with the initial sound of words		I
Talk about the tale by relating story events to child's experiences	T	
Pose purposeful 'wh' questions about the story events		P
Expand/elaborate on child responses, eliciting the child for more story details	E	E
Reinforce/praise correct responses	R	R

Maintenance. After the parent-child dyad progresses to the second skill set of phonodialogic reading strategy intervention, the first skill set continues to be assessed for maintenance. No further instruction is provided to the parent on the first skill set.

Treatment Fidelity

Treatment fidelity is measured through three forms of data collection sources providing the opportunity to use data triangulation in determining each parent-interventionist's adherence to the intervention protocol. In addition, both procedural and content fidelity is assessed on parent-trainer sessions with the parent.

Parent-child treatment fidelity. First, parent-child dyads are administered *The Adult/Child Interactive Reading Inventory* (ACIRI; DeBruin-Parecki, 2007, 2009; Rodriquez et al., 2009) on a weekly basis (see Table 2) as a simultaneous measure of parent-child interactive reading behaviors and progress monitoring of strategy implementation. This assessment tool has been reported to have a high overall reliability as calculated by an alpha coefficient of .80 (DeBruin-Parecki, 2007). Information from this assessment is used in providing positive feedback, and making suggestions to parent-interventionists about improving the use of the intervention strategies, especially during the parent-interventionist training sessions. Second, parents are instructed to complete the intervention strategy checklist, immediately following each reading session with their children. The checklist provides a self-reported measure of how closely the parent follows the intervention protocol. Third, each parent-child dyad is video recorded at least once per week during a phonodialogic reading session in the child care center.

Sessions are recorded during the baseline, intervention, and maintenance conditions. Parents are also be provided with video and/or audio recording equipment at home, as well as a means for sending the video and/or audio record to the researcher. Parents are instructed to self-record all of the four dialogic reading sessions at home on a weekly basis and transmit the recording to the researcher, or retain the record until it is picked up by the researcher and transferred to the external hard drive at the university. All parent and child data files, including video- and audio records are securely stored in one location. Video and audio records are transcribed, coded, and graphed for analysis of the types and numbers of phonodialogic reading strategy prompts used by the parents during their activity-based reading sessions (e.g., Briesch et al., 2008; Hester et al., 1995). A detailed code with specific examples is used to train graduate research assistants and in the collection of data for treatment fidelity. Descriptions of parent behavior prompts with corresponding codes are listed below in Table 4.

Table 4. Parent Prompt Codes, Definitions, and Descriptions

CODE	DEFINITION	DESCRIPTION
DET	Details about the story	Parent prompts the child for any details about story narrative (e.g., words, descriptions of characters, plot, action, feelings, thoughts, and/or setting), or parent prompts child for details by pausing ($\geq$ 3 seconds) for the child to have an opportunity to respond. Examples, "Tell me the color of the icky sticky frog," and "Tell me what happened to the bird."
END	Ending/rhyming sound	Parent prompts the child to complete a word, phase, or sentence with a rhyming sound by modeling an example of a rhyming word sound, or providing the opportunity for the child to fill in the blank with a rhyming word sound. Example, "I need a smart fellow to make all the sounds, who can bark like a dog and bay like the <u>hounds</u>."
INI	Initial/beginning sound	Parent prompts the child to use a correct beginning sound to complete a word, phrase, or sentence. Parent models a beginning sound, and/or pauses to provide the opportunity for the child to fill in the blank with the correct beginning sound (onset), or the correct word. Example, "Boing begins with sound <u>/b/</u>." Or, "'B' makes the /b/ sound in the word <u>boing</u>."
PIC	Picture labeling	Parent prompts the child to label, define, or describe any picture or illustration in the story, including book cover picture. Parent must point to the picture. Note that PIC coding takes precedence over WHQ coding. Example, "Tell me what sort of animal is that," or [pointing to horse] "What is that?"
PRE	Predictions about story	Parent prompts the child to tell what might happen in the story. Note that PRE coding takes precedence over WHQ. Example, "Tell me what you think will happen to the frog," or "What do you think will happen next?"
REL	Relates story to experience	Parent prompts the child to relate story narrative or events to real life experience. Note that REL takes precedence over WHQ. Example, "Tell me about a time that you felt sleepy like the bear," or "When did you feel sad like that?"
RFP	Reinforces or praises verbally	Parent encourages the child's responses by verbally providing positive reinforcement or praise. Parent may use a word, a phrase, and/or a sentence. Examples, "good" or "that's right" or "I heard you say the /k-k/." Nonverbal responses (pat on back, smile, wink, nod) are not coded.

WHQ	'WH' Question prompts	Parent prompts child by questioning "who, what, when, where, why, or how" type of open-ended questions about the storybook events that elicit more than a one word verbal reply (e.g., more than a Yes or No reply). Example, "What kind of things does the icky, sticky frog like to eat?" Do not code as WHQ if parent asks a question, but does not provide the opportunity or the time (< 3 seconds) for the child to respond.
NC	No code possible	Parent prompts that do not fit into above categories; describe the parent behaviors briefly in the Comments section on data collection form above. Examples, "Are you ready to read?" "Do you want to hold the book?" "Do you want to turn the page?"

Parent trainer procedural and content fidelity. A coder unfamiliar with the study reviews the video recorded parent-trainer and parent-interventionist sessions to assess the fidelity of the parent trainer's implementation of the baseline and intervention protocols. Both procedural and content fidelity is collected during baseline, intervention, and maintenance phases on at least one session in each condition and/or a minimum of 25% of the sessions for each phase. For the procedural and content fidelity checklists that are used for assessing parent-trainer sessions, refer to Table 5 for the baseline procedural fidelity, Table 6 for the intervention procedural fidelity, and Table 7 for the intervention content fidelity.

Table 5. Baseline Procedural Fidelity Checklist for Parent Trainer Sessions

	Not Observed NA	Support Not Provided 0	Support provided 1
Management of session			
Trainer is well prepared for session and room is set up in advance		0	1
Materials (appropriate book) available for parent to read		0	1
Trainer greets parent and thanks parent for coming		0	1
Trainer follows up on initial interview & questionnaire information regarding parents daily schedules & routines & book reading opportunities		0	1
Pre-Baseline Instructions			
Trainer explains purpose of baseline sessions		0	1
Trainer explains length of parent-child book reading baseline session		0	1
Trainer explains purpose of videotaping		0	1
Trainer talks at parent level and gives parent clear instructions to read the book as he/she would normally do at home		0	1
Trainer explains parent may keep book		0	1
Trainer instructs parent in use of flip video-camera		0	1
Baseline Session			
Trainer observes parent & takes notes during session		0	1
Trainer provides specific & positive comments to parent after session		0	1
Trainer reminds parent to read story to child 4 times at home, to videotape each session, & to use self-checklist on bookmark		0	1
Trainer schedules next meeting with parent		0	1
Trainer thanks parent & provides weekly compensation to parent		0	1

Table 6. Intervention Procedural Fidelity Checklist for Parent Trainer Sessions

	Not Observed NA	Support Not Provided 0	Support provided 1
Management of Training Process			
Trainer well prepared for session: room & materials		0	1
Strategies underlined or highlighted in designated book prior to session		0	1
Appropriate reinforcers available (if needed)		0	1
Trainer greets parent & thanks parent for coming		0	1
Trainer provides weekly compensation to parent		0	1
Trainer asks about book reading sessions at home		0	1
Trainer thanks parent for reading at home, recording, & self-monitoring		0	1
Trainer provides parent with new book for week; explains parent may add the book to the child's library		0	1
Trainer video records the entire session from the time the parent arrives until the parent leaves		0	1
Pre-Session Parent Instructions			
Trainer provides parent-focused instructions (avoids jargon)		0	1
Trainer explains how to read the book using PETER or PIPER strategies		0	1
Trainer models use of 5 components: PETER or PIPER		0	1
Parent-Interventionist Phonodialogic Reading Session			
Trainer observes parent & takes notes during session		0	1
Trainer coaches parent during session as needed & reinforces correct use of strategies		0	1
Post-Session Parent Instruction			
Trainer provides specific & positive comments		0	1
Trainer provides reminder to read & video 4 parent-child home sessions		0	1
Trainer schedules next meeting with parent & thanks parent for coming		0	1

Table 7. Intervention Content Fidelity Checklist for Parent Trainer Sessions

	Not Observed NA	Support Not Provided 0	Support provided 1
Modeling of the PETER (rhyming) Set of Intervention Strategies			
Trainer explains and models how to prompt picture labeling in the story		0	1
Trainer explains and models how to prompt predicting story events		0	1
Trainer explains and provides an example of how to eavesdrop and evaluate child's responses		0	1
Trainer models how to point to rhyming words and pause for the child to fill in the rhyming words		0	1
Trainer models how to talk about the tale and how it relates to life experiences		0	1
Trainer models how to expand and elaborate on child's responses		0	1
Trainer models how to reinforce the child's correct responses		0	1
Modeling of the PIPER (alliteration) Set of Intervention Strategies			
Trainer models how to prompt picture labeling in the story		0	1
Trainer models how to prompt predicting story events		0	1
Trainer models how to identify initial letter sounds and pause for the child to complete the word or sound		0	1
Trainer models how to pose purposeful questions 'who, what, when, where, or how' to prompt the child's responses		0	1
Trainer models how to expand and elaborate on child's responses		0	1
Trainer models how to reinforce the child's correct responses		0	1

Reliability

To ensure accuracy and consistency of data, reliability is assessed on each aspect of data collection. These include: a) child responses to assessments; and b) measures of parent prompts and child responses during shared book reading, and c) test administration. The interrater reliability of the testing administration and the child responses on the testing assessments is monitored for at least 25% of the testing sessions at the child care center. Interrater reliability assessments during the weekly curriculum-based measurement test is determined using the standardized instrument checklists published by the test developers (Good, Laimon, Kaminski, & Smith, 2007; Missell & McConnell, 2004). A second graduate research assistant is trained as a test administration observer.

Interrater reliability is measured on 25% of the parent-child shared book reading sessions during baseline, intervention, and maintenance. A second coder uses the video and audio recorded parent and child book reading sessions for all reliability assessments. Interrater agreement is calculated by dividing the number of agreements by the number of disagreements plus the number of agreements, and multiplying by 100 (Tawney & Gast, 1984).

Training Protocol for the Implementation of the Phonodialogic Reading Intervention

Baseline

Prior to intervention, each parent and child participates in a shared storybook reading session at the center that reflects how they normally read a book. This session is to establish baseline measures of parent and child behaviors prior to the implementation of the phonodialogic reading intervention. The parent-trainer reasonably accommodates each parent's daily schedule and routines (e.g., family, work, school responsibilities) in establishing contact (e.g., phone, email, face-to-face) and in scheduling study appointments and conducting baseline activities.

The initial meeting with the parent for the first parent-child reading session takes place at the child care center in a room designated by center staff for use during the research study. Though most of the meetings with the parent at the center lasts only about 30 minutes, the first meeting typically lasts about 45 – 50 minutes. Additional time is needed to provide the parent-interventionist with an in-depth description of the requirements of activities associated with the requirements of study participation and the baseline components.

In addition to the parent-child baseline reading at the center, each parent and child dyad is requested to conduct four similar baseline reading sessions in the home setting. The sessions at home take place where the parent and child normally read together.

Procedures for Baseline Sessions

The specific activities for the parent trainer during the baseline session at the center are delineated as follows.

1. Thank the parent for taking part in the research study.

2. Follow up with the parent's initial interview and questionnaire information (if available) for verification purposes regarding the parent's daily schedules and routines that might influence reading activities with her or his child.
3. Ask, **"When do you usually read with your child? How often during the course of a week's time do you read together? It is important that you are able to incorporate reading this new book with your child during your normal, everyday routines."**
4. Explain the purpose and the importance of the baseline sessions is to see how the parent and child read a story together. In addition, because this is a research study, it is important during baseline to establish the basal (i.e., beginning) uses of different ways that parents read a story to their children and to measure each child's initial early reading skills prior to the implementation of the reading intervention.
5. Explain that all baseline reading sessions – both at the center and at home – are video-recorded and that the parent is given a portable video camera to use at home. Inform the parent that each baseline reading session lasts about 15 minutes. Inform the parent that the books that books used during baseline and during intervention are provided to them and they may keep all of the books for the child's library at home.
6. Give the parent the baseline story book and say, **"This new storybook entitled *Gerald McBoing Boing* by Dr. Seuss (1978) is yours to keep. Today you will do a baseline session at the center with your child. Just read this book as you would normally do at home. It will take about 15 minutes."**

7. Say, **"This and all other storybook reading sessions at the child care center will be video recorded. Each book reading session at the child care center, including the time for you and I to discuss the storybook reading strategies, is expected to last approximately 30 minutes. The storybook reading sessions will take about 15 minutes of this time."**
8. Instruct the parent how to properly use the Flip video-camera, including battery installation and use of the tripod. Provide the parent with extra batteries. Model its use by setting up the video-recording system for use during the baseline reading session. Provide feedback, support, and reinforcement as the parent sets up the camera. Use another camera device as a back-up video recording system.
9. After setting up the video-recording system, invite the child to take part in the storybook reading session.
10. Begin video-recording the reading session and administer the *Adult-Child Interactive Reading Inventory* (ACIRI) during the session. End video-recording after completing the 'Shared feedback' section of the ACIRI inventory form and record (for further explanation see DeBruin-Parecki, 2007).
11. Begin the baseline reading session with the following conversation.

"Today, I am going to watch you read with your child. I will be right behind you. I know you do wonderful things when you read, and I want to write down some of these things as well as others that I can help you improve on so your child can become a successful reader. When you are done, I will share everything I have written" (DeBruin-Parecki, 2007, p. 28). Give the parent the baseline storybook and remind the parent to read the story with her or his child as they usually do. Also remind the parent that the baseline session is to allow us to see how they read a story together.

12. Observe the parent-child interactions during the baseline reading session.

a) Note adult and child behaviors on the ACIRI inventory form and record comments as the reading progresses.

b) Note exact questions or comments made by the parent and child to individualize the sharing of feedback after the assessment is completed.

c) Use tick marks on the observation sheet to count and record the frequency of specific behaviors, such as the number of times a parent asks the child a question.

13. After the reading, briefly study the comments noted on the ACIRI inventory form Discuss the written comments with the parent in a friendly, helpful manner. The trainer's focus is to positively reinforce the parent's use of effective storybook reading practices that were actually observed during the baseline assessment. Because this is a baseline session, the trainer will refrain from introducing new strategies at this time. During this conversation, the child can sit nearby and work on a planned activity provided by the trainer (e.g., putting stickers in a coloring book) or return to the classroom.

14. Say, **"In addition to these sessions at the center, it is important that you have a reading session in your home with the same book we used today. Read the story at least four times during the coming week or until we are scheduled to meet again. This is just to give us an idea of how you and your child read a story together at home. You can have the session anywhere you wish, just as you normally would. Each home session is expected to last about 15 minutes**

and I would like for you to video record each session. Because we need the video camera both here and at home, please bring the video camera with you to your next appointment."

15. Ask, **"Will you be available next week at this same time and place for another appointment? If not, please suggest a convenient day and time to meet."** [Schedule next week's appointment]
16. Provide the parent with the parent-trainer's phone contact information in case there are study-related questions (e.g, camera use, scheduling conflicts).
17. At the end of the session, thank the parent again for taking part in the storybook reading study. At that time, give the parent a $20.00 Wal-Mart gift card as study-related compensation for time and travel.
18. After the parent leaves, numerically score the ACIRI and enter the scores on the Scoring Sheet. Numerical scores are typically used for study evaluation purposes only, because they could be associated with tests and perceived as critical of their performance. However, numerical scores may be graphed to provide the parents with a visual display of their improvement in using intervention strategies, and therefore perceived as supportive of their progress.

Intervention

Goals for parent-training during intervention are for the parents to implement the phonodialogic reading intervention strategies in the context of the shared storybook reading activity with their child, both at the center and at home. For specific strategy steps, see the Rhyming Strategy – PETER and the Alliteration Strategy – PIPER sections on pages ________. In addition to sessions at the center, each parent is instructed to read with his or her child at least four times prior to the next scheduled meeting at the center. The specific activities for the parent-trainer during each intervention session are as follows.

1. Thank the parent for taking part in the storybook reading study and for continuing to take part in the weekly training sessions. Give the $20 Wal-Mart gift card to the parent as compensation for each week of participation.
2. Ask, **"How did it go in the book reading sessions at home this week?"** Encourage the parent to continue to incorporate the storybook reading intervention as a part of daily parent and child routines and activities.
3. At this point, introduce the specific strategies to the parent as outlined in the PETER – PIPER intervention. Let the parent know how much you appreciate her or him bringing the video recorded sessions.
4. Say, **"Now, we are going to talk about some different strategies to use when you read a story with your child. We call these phonodialogic reading strategies. The purpose of these reading intervention sessions is for you to have the opportunity to learn and practice using the shared storybook reading strategies. Phonodialogic reading includes particular behaviors and specific strategies that parents can use to help their children to gain early literacy skills, leading them to become more successful readers in school."**
    1. Say, **"I am going to ask that you read the weekly storybooks provided. These books contain highlighted words and help you identify specific strategies and to use them as you read with your child. There are two**

sets of strategies. After you learn one set, you will then be able to combine it with the second set of strategies. The second set will be introduced at the beginning of the fifth week."

2. Say, **"Remember that the storybook reading sessions with you and your child will be video recorded. Each session at the center is expected to last approximately 30 minutes. When will you be available for the next session?"** [or] **"Will you be available for the next session at the same time next week?"** [Schedule an appointment for the next reading session.]
3. Say, **"It is important that you use the reading strategies in the home setting at least four times over the course of one week. Each home story book reading session is expected to last about 15 minutes and be video recorded."**
4. Thank the parent for remembering to record the sessions at home and for bringing the camera to the session at the center so the data can be downloaded to the external hard drive.
5. For the first parent-interventionist training session, the parent-trainer may say, **"This first session is to introduce the set of reading strategies to you and provide an opportunity for you to ask questions for clarification. We will schedule another session this week, after you have had the opportunity to practice incorporating the new strategies into your everyday storybook reading activities at home. Before you have your session today, I will go through the book with you and**

model how to incorporate the strategies where some of the text is highlighted. At times, I might show you video examples of how different parents use these specific strategies. Also, I might show you graphs of how you are using the strategies. We will practice these strategies so you will feel more comfortable using them. Each session, I will observe you and take notes while you demonstrate using the storybook reading strategies with your child. Then, I will share with you my observations of some of the wonderful things you do while reading with your child. I will offer suggestions that could be useful to you for maximizing the effectiveness of the reading strategies."

6. After setting up the video recording system, invite the child to take part in the intervention reading session.
7. Upon the parent's return, invite the parent to participate in the shared storybook reading session, using the phonodialogic reading strategies. After setting up the video-recording system, invite the child to participate in the intervention reading session.
8. Begin video recording the reading session and administer the *Adult-Child Interactive Reading Inventory* (ACIRI) during the session. End video recording after completing the 'Shared feedback' section of the ACIRI.
9. Begin the session with the following conversation. Say, "**Today, I am going to watch you read with your child… I know you do wonderful things when you read, and I want to write down some of these things as well as others that I can help you improve on so your child can**

become a successful reader. When you are done, I will share everything I have written." (DeBruin-Parecki, 2007, p. 28). **I might also prompt you to use a strategy or reinforce your use of a strategy. I will use quiet phrases, such as "excellent example" or "remember to prompt an initial sound."**

10. Observe the parent-child interactions during the reading intervention session.

a) Note adult and child behaviors on the ACIRI inventory form and record comments as the reading progresses.

b) Note exact questions or comments made by the parent and child to individualize the sharing of feedback after the assessment is completed.

c) Use tick marks on the observation sheet to count and record the frequency of specific behaviors, such as the number of times a parent asks the child a question.

11. After the reading, briefly study the comments noted. Then, discuss the written comments with the parent in a friendly, helpful manner, linking the ACIRI assessment to the reading strategies to provide suggestions for improvement. Use the sandwich strategy by beginning with a positive comment on the parent's reading behavior, sandwiching one or two points for improvement as a suggestion, and ending with another positive comment. When appropriate, show the parent graphs of changes in her or his use of the strategies. During this conversation, the child can sit nearby and work on a planned activity provided by the parent-trainer (e.g.,

selecting stickers to put in a coloring book), or return to the classroom.

12. Thank the parent again and remind him or her that the parent-trainer is available to answer any questions. Add, **"I'll see you again at <u>time</u> on <u>day and date</u>."**

13. After the parent leaves, numerically score the ACIRI and enter the scores on the Scoring Sheet. These scores are primarily used for study evaluation purposes. Since the scores could be perceived by the parent as threatening and associated with testing rather than helpful and supportive, the scores will not be routinely shared with parents. However, once the parent-interventionist achieves criterion levels on aspects of the phonodialogic strategies, parents may be shown graphs of their progress, including strategic areas in which s/he may continue to improve.

Rhyming Strategy—PETER

1. Begin by describing the important role of phonological awareness in learning to read. Since 2008, the National Institute for Literacy has defined phonological awareness as the ability to listen to, attend to, and use the smallest units of sounds that make up words. Words can be broken down into parts from larger segments, such as the syllable that makes up the rhythm of words like 'rab-bit', to smaller segments, such as the onset (the beginning or initial part of a word, such as the /k/ sound in the word 'cat', and the rime (the ending part of a word, such as the /at/ sound in the word 'cat', as well as the smallest units of sound, such as phonemes (the individual sounds, such as the three sounds you hear, /k/, /a/, /t/, when you segment the word 'cat.' Many researchers (Gamse, Jacob, Horst, Boulay, &

Unlu, 2008; Torgesen, 2000, 2002; Ehri, Dreyer, Flugman, & Gross, 2007) agree that children will have difficulty learning to read words, which is also known as decoding, if they do not develop phonological awareness. Thus, the development of phonological awareness is recognized as one of the most important emergent reading skills that young children can learn.

2. Learning to recognize and being able to produce words that rhyme, or have the same ending sound, is one important way that children can develop phonological awareness. Children as young as 3- and 4-years old have learned emerging reading skills, such as picking out words that have the same ending sounds through rhyming.
3. Dialogic reading is a type of interactive or shared storybook reading in which the adult uses questioning, among other strategies, to create a dialogue or conversation with the child about the book.
4. Combining phonological awareness strategies, such as recognizing and producing rhyming words, within a dialogic reading activity, provides the opportunity for parents to embed specific learning objectives for their child within an interactive storybook reading experience.
5. I am going to introduce you to **PETER**, a way to remember the five steps to the rhyming strategy.
6. **P** stands for the first step: **Prompt** your child's **picture** labeling, and **predicting** about the story by asking your child what the story might be about, and what might happen in the story.

7. **E** stands for the second step: **Eavesdrop** and **evaluate** your child's responses, asking your child to help you identify all the rhyming words. For example, point to the word ball and say, "This is the word ball. Ball rhymes with the word _______." Pause for at least three seconds to allow your child time to complete the rhyme. If your child does not respond in three seconds, complete the rhyme for your child and repeat the question again.
8. **T** stands for the third step: **Talk** about the **tale**, asking how the story events relate to your child's **true** life experiences.
9. The other **E** stands for the fourth step: **Expand** and **elaborate** on your child's responses, **eliciting** more details about the story.
10. **R** stands for the remaining step: **Reinforce** your child's **right responses** with positive **remarks** and praise, and **repeat** the **reading** at least once, time permitting.
11. There you have it! **PETER** is the set of phonodialogic reading strategies that focuses on identifying and producing **rhyming** words. Each book has rhyming words highlighted and a bookmark with the PETER rhyming strategy steps.

Alliteration Strategy—PIPER [include # 1 if this is the first strategy trained]

1. Begin by describing the important role of phonological awareness in learning to read. Since 2008, the National Institute for Literacy has defined phonological awareness as the ability to listen to, attend to, and use the smallest units of sounds that make up words. Words can be broken down into parts from larger segments, such as syllable that makes up the rhythm of words like 'rab-bit', to smaller segments, such as the onset (the beginning or initial part of a word, such as the /k/

sound in the word 'cat', and the rime (the ending part of a word, such as the /at/ sound in the word 'cat', as well as the smallest units of sound, such as phonemes (the individual sounds, such as the three sounds you hear, /k/, /a/, /t/, when you segment the word 'cat.' Many researchers (Gamse, Jacob, Horst, Boulay, & Unlu, 2008; Torgesen, 2000, 2002; Ehri, Dreyer, Flugman, & Gross, 2007) agree that children will have difficulty learning to read words, which is also known as decoding, if they do not develop phonological awareness. Thus, the development of phonological awareness is recognized as one of the most important emergent reading skills that young children can learn.

2. Learning to recognize and being able to produce words that have the same initial sounds, called alliteration, is one important way that children can develop phonological awareness. Children as young as 3- and 4-years old have learned emerging reading skills, such as picking out words that have the same initial sounds through alliteration.
3. Dialogic reading is a type of interactive or shared storybook reading in which the adult uses questioning, among other strategies, to create a dialogue or conversation with the child about the book.
4. Combining phonological awareness strategies, such alliteration or recognizing and producing words that have the same initial sound, within a dialogic reading activity, provides the opportunity for parents to embed specific learning objectives for their child within an interactive storybook reading experience.
5. I am going to introduce you to **PIPER**, a way to remember the five steps to the alliteration strategy.

6. **P** stands for the first step: **Prompt** your child's **picture** labeling, and **predicting** about the story by asking your child what the story might be about, and what might happen in the story.
7. **I** stands for the second step: **Identify initial** letter sounds of words by asking your child to help you complete a sentence. For example, say "Ball begins with the /b/ sound. 'B' makes the /b/ sound in the word_____." Pause for at least three seconds to allow your child time to complete the word or sound. If your child does not respond after three seconds, complete the word for your child and repeat the question again.
8. The other **P** stands for the third step: **Pose purposeful questions,** such as 'who,' 'what,' 'when,' 'where,' 'why,' and 'how,' to prompt your child's responses.
9. The **E** stands for the fourth step: **Expand** and **elaborate** on your child's responses, **eliciting** more details about the story.
10. **R** stands for the remaining step: **Reinforce** your child's **right responses** with positive **remarks** and praise, and **repeat** the **reading** at least once, time permitting.
11. There you have it! **PIPER** is the set of phonodialogic reading strategies that focuses on identifying and producing words that have the same initial sound. Each book has initial sound letters highlighted and a bookmark with the **PIPER** alliteration strategy steps.

References

Baer, D., Wolf, M., & Risley, T. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91 -97.

Briesch, A. M., Chafouleas, S. M., Lebel, T. J., & Blom-Hoffman, J. A. (2008). Impact of videotaped instruction in dialogic reading strategies: An investigation of caregiver implementation integrity. *Psychology in the Schools, 45,* 978 – 993.

DeBruin-Parecki, A. (2009). Establishing a family literacy program with a focus on interactive book reading: The role of research and accountability. *Early Childhood Education Journal, 36,* 385 - 392.

DeBruin-Parecki, A. (2007). *Let's read together: Improving literacy outcomes with the adult-child interactive reading inventory (ACIRI)*. Baltimore: Brookes Publishing.

Ehri, L. C., Dreyer, L. G., Flugman, B., & Gross, A. (2007). Reading rescue: An effective tutoring intervention model for language minority students who are struggling readers in first grade. *American Educational Research Association, 44,* 414 - 448.

Gamse, B. C., Jacob, R. T., Horst, M., Boulay, B., & Unlu, R. (2008). *Reading first impact study final report* (NCEE 2009-4038). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U. S. Department of Education.

Good, R. H., Laimon, D., Kaminski, R. A., & Smith, S. (2007). Initial sound fluency. In R. H. Good & R. A. Kaminski (Eds.), *Dynamic indicators of basic early literacy skills* (6th ed.). Eugene, OR: Institute for Development of Educational Achievement. Retrieved on November 29, 2009 from http://dibels.uoregon.edu/

Hester, P. P., Kaiser, A. P., Alpert, C. L., & Whiteman, B. (1995). The generalized effects of training trainers to teach parents to implement milieu teaching. *Journal of Early Intervention, 20,* 30 – 51.

McNeill, J. H., & Fowler, S. A. (1999). Let's talk: Encouraging mother-child conversations during storybook reading. *Journal of Early Intervention, 22,* 51 - 69.

Missall, K. N., & McConnell, S. R. (2004). *Psychometric characteristics of individual growth and development indicators: Picture naming, rhyming, and alliteration.* Minneapolis: University of Minnesota, Center for Early Education and Development.

Mitchell, M. L., & Jolley, J. M. (2007). *Research design explained.* Belmont, CA: Thomson/Wadsworth.

National Institute for Literacy. (2008). *Developing early literacy: Report of the National Literacy Panel. A scientific synthesis for early literacy and implications for intervention.* Jessup, MD: Author. Retrieved on August 10, 2009 from http://www.nifl.gov/publications/pdf/NELPReport09.pdf.

Rodriguez, B. L., Hines, R., & Montiel, M. (2009). Mexican American mothers of low and middle socioeconomic status: Communication behaviors and interactive strategies during shared book reading. *Language, Speech, and Hearing Services in Schools, 40,* 271 - 282.

Skibbe, L., Behnke, M., & Justice, L. M. (2004). Parental scaffolding of children's phonological awareness skills: Interactions between mothers and their preschoolers with language difficulties. *Communication Disorders Quarterly, 25,* 189 - 203.

Tawney, J. W., & Gast, D. L. (1984). *Single subject research in special education.* Columbus, OH: Merrill.

Torgesen, J. K. (2002). The prevention of reading difficulties. *Journal of School Psychology, 40,* 7 - 26.

Torgesen, J. K. (2000). Individual differences in response to early interventions in reading: The lingering problem of treatment resisters. *Learning Disabilities Research & Practice, 15,* 55 - 64.

Ziolkowski, R. A., & Goldstein, H. (2008). Effects of embedded phonological awareness intervention during repeated book reading on preschool children with language delays. *Journal of Early Intervention, 31,* 67-90.

Parent Training Protocol Appendix

Counterbalanced - Random Assignment to PETER PIPER Intervention Conditions
(Mitchell & Jolley, 2007, p. 282)

Step 1. Roll of die determines Column 6 will be used to assign random numbers to participating parent and child dyads.

Step 2. Assign the first number in the column to the first parent-child dyad space under the PETER Intervention, the second number to the second parent-child dyad space, and the third number to the third parent-child dyad space. Assign the fourth number in the column to the first parent-child dyad space under PIPER Intervention, the second number to the second parent-child dyad space, and the third number to the third parent-child dyad space. Thus, all six parent-child dyad spaces will be equally assigned to PETER and PIPER Interventions.

Step 3. List random numbers. 69179 PETER, 89198 PETER, 64809 PETER, 16376 PIPER, 91782 PIPER, 53498 PIPER.

Step 4. Rank numbers from lowest to highest. 16376 PIPER, 53498 PIPER, 64809 PETER, 69179 PETER, 89198 PETER, 91782 PIPER

Step 5. Drop the random numbers and label the first "Dyad 1," the second "Dyad 2," and so forth.

Dyad 1 = PIPER—PETER

Dyad 2 = PIPER—PETER

Dyad 3 = PETER—PIPER

Dyad 4 = PETER—PIPER

Dyad 5 = PETER—PIPER

Dyad 6 = PIPER—PETER

Children's Book Selections with Authors, Rhyme, and Letter/Sound Targets

Andreade, G., & Parker-Rees. (1999). *Giraffes can't dance.* New York: Orchard Books.

Rhyme Targets: trees/knees, sad/bad, rolled/bold, feel/reel, sneered/ weird, home/alone, on/song, you/to, ground/round, everywhere/air, dream/seen, above/love

Letter/Sound Targets: l, g, d, s, b

Bentley, D. (2000). *The icky sticky anteater.* Atlanta, GA: Piggy Toes Press.

Rhyme Targets: ants/plants, rest/digest, disgust/must; snout/about, hole/mole, lake/snake, habit/rabbit, quickly/tickly, okay/way, night/sight

Letter/Sound Targets: d, t, s, h, p

Bentley, D. (2001). *The icky sticky chameleon.* Atlanta, GA: Piggy Toes Press.

Rhyme Targets: sea/me, swing/anything, you/two, rope/scope, tree/me, oar/shore, tight/sight, tongue/from, green/seen, think/pink

Letter/Sound Targets: b, s, h, t, r

Bentley, D. (2003). *The icky sticky frog.* Atlanta, GA: Piggy Toes Press.

Rhyme Targets: log/frog, sound/around, fly/by, fly/butterfly

Letter/Sound Targets: b, c, f, g, s

Casanova, M. (2003). *One-dog canoe*

Rhyme Targets: canoe/too, two/you, flap/lap, dew/too, do/too, rack/back, crew/too, plop/flop, dry/goodbye, grew/canoe, you/canoe, thump/kawump

Letter/Sound Targets: r, m, f, w, p

Dr. Seuss. (1978). *Gerald McBoing Boing.* New York: Golden Books.

Baseline reading book, no targets.

Kirk, D. (1999). *Little Miss Spider.* New York: Scholastic/Calloway.

Rhyme Targets: egg/leg, cover/mother, tree/be, clue/you, sky/by, pig/big, snack/black, straw/saw, cried/wide, sight/tight, tree/me, fast/last

Letter/Sound Targets: l, s, m, b, f

Lewis, K. (2003). *The runaway pumpkin.* New York: Scholastic.

Rhyme Targets: fine/vine, seen/Halloween, faster/disaster, round, ground thumpin/bumpin, sped/bread, head/bed, crowd/ proud, pumpkin/something, pie/eye

Letter/Sound Targets: f, r, g, s, b

Lund, D. (2003). *Dinosailors.* Orlando, FL: Harcourt.

Rhyme Targets: dinocleats/ sheets, dinosails/tails, me/sea, sails/rails, up/cup, churn/turn, weep/sleep, land/stand, miss/kiss, cry/goodbye, breeze/knees, around/ground

Letter/Sound Targets: d, b, h, g, s

Wilson, K., & Chapman, J. (2002). *Bear Snores On.* New York: Little Simon

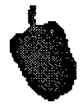
Rhyme Targets: howl/growl, tip-toe/snow, pip-pop/stop, see/tea, grin/in, floor/door, sneezes/freezes, gnarls/snarls, moans/groans, delight/night, munch/crunch, slurps/burps

Letter/Sound Targets: b, s, m, h, r

Wilson, K., & Chapman, J. (2003). *Bear Wants More*. New York: Little Simon.

Rhyme Targets: around/ground, papil/vail, back/snack, Hare/Bear, me/tree, pole/hole, den/wren, blows/nose, tight/might, cakes/ aches

Letter/Sound Targets: b, s, m, h, t


PETER (rhyming)


Prompt picture labeling
and **predicting** events.
□□□□□□□□□□□□□□□□□

Eavesdrop and **evaluate**
your child's responses.
Point to the **rhyming words**.
Pause for your child to
fill in the rhymes.
□□□□□□□□□□□□□□□□□

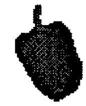
Talk about the **tale**
and how story **relates**
to life experiences.
□□□□□□□□□□□□□□□□□

Expand and **elaborate**
on your child's responses.
Elicit more **details**
about the story.
□□□□□□□□□□□□□□□□□

Reinforce your child's
right responses with **positive**
remarks and **praise**.
Repeat the reading.
□□□□□□□□□□□□□□□□□

My next appt is:

____


PETER (rhyming)


Prompt picture labeling
and **predicting** events.
□□□□□□□□□□□□□□□□□

Eavesdrop and **evaluate**
your child's responses.
Point to the **rhyming words**.
Pause for your child to
fill in the rhymes.
□□□□□□□□□□□□□□□□□

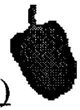
Talk about the **tale**
and how story **relates**
life experiences.
□□□□□□□□□□□□□□□□□

Expand and **elaborate**
on your child's responses
Elicit more **details**
about the story.
□□□□□□□□□□□□□□□□□

Reinforce your child's
right responses with **positive**
remarks and **praise.**
Repeat the reading.
□□□□□□□□□□□□□□□□□

My next appt is:

____


PIPER (alliteration)


Prompt picture labeling
and **predicting** events.
□□□□□□□□□□□□□□□□□

Identify initial letter sounds
Pause for your child to
complete the word or sound.
□□□□□□□□□□□□□□□□□

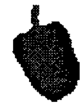
Pose purposeful questions
'who, what, when, where,
why, and how' to **prompt**
your child's responses.
□□□□□□□□□□□□□□□□□

Expand and **elaborate**
on your child's responses.
Elicit more **details**
about the story.
□□□□□□□□□□□□□□□□□

Reinforce your child's
right responses with **positive**
remarks and **praise**.
Repeat the reading.
□□□□□□□□□□□□□□□□□

My next appt is:

____


PIPER (alliteration)


Prompt picture labeling
and **predicting** events.
□□□□□□□□□□□□□□□□□

Identify initial letter sounds
Pause for your child to
complete the word or sound.
□□□□□□□□□□□□□□□□□

Pose purposeful questions
'who, what, when, where,
why and how' to **prompt**
your child's responses.
□□□□□□□□□□□□□□□□□

Expand and **elaborate**
on your child's responses
Elicit more **details**
about the story.
□□□□□□□□□□□□□□□□□

Reinforce your child's
right responses with **positive**
remarks and **praise.**
Repeat the reading.
□□□□□□□□□□□□□□□□□

My next appt is:

____

Vita

Ms. Sabra B. Gear
Old Dominion University
Communication Disorders and Special Education
(757) 368-4124
Email: sgear@odu.edu

Education

MS, Old Dominion University, 2006
Major: Special Education
Supporting Areas of Emphasis: Learning Disabilities, Emotional Disturbance

BA, Mary Baldwin College, 1997
Major: Psychology
Supporting Areas of Emphasis: Health psychology
Dissertation Title: Level of Education and Patient Compliance in Cardiac Rehabilitation

AAS, Southside Community College, 1994
Major: Education
Supporting Areas of Emphasis: Psychology

PhD, Old Dominion University, August 2010
Major: Special Education
Supporting Areas of Emphasis: Mild Disabilities

Professional Positions

Academic

Lecturer, Special Education, Old Dominion University (June 2008 - Present)

Adjunct Instructor, BA, MS, Southside Virginia Community College (May 2004 - Present)

Graduate Teaching Assistant, MS, Old Dominion University (August 2006 - June 2008)

Professional

Special Education Teacher, BA, MS, Centra Health, Rivermont School (February 2004 - August 2006)

Teacher of Special Education, General Education, Adult Basic Education, Home-based Instruction, Mecklenburg County Public Schools (August 2001 - August 2006)

Clinical Research Coordinator, BA, Duke University Medical Center (May 1996 - December 1997)

Non-Invasive Cardiac Technologist, RDCS, AAS, South Hill Internal Medicine Associates (January 1983 - May 1996)

Respiratory Therapy Technician, CRTT, Community Memorial Health Center (February 1979 - January 1983)

Licensures and Certifications

Virginia Postgraduate Professional Teaching License, Virginia Department of Education (June 2006 - June 2011)

Rider Coach Certification, Virginia Rider Training Program, Department of Motor Vehicles, and Motorcycle Safety Foundation (April 2004 - April 2012)

Professional Memberships

Member, Council for Exceptional Children (August 2006 to Present)

Member, Division for Developmental Disabilities (June 2007 - Present)

Member, Division for Early Childhood (June 2007 - Present)

Faculty Advisor, Student Council for Exceptional Children (August 2006 - Present)

Member, Council for Learning Disabilities (June 2008 - Present)

Member, Association for Teacher Educators (June 2006 - Present)

Member, Phi Kappa Phi, Old Dominion University Chapter (April 2006 - Present)

RESEARCH

Book Chapter

Watson, S. R., Raver-Lampman, S., Bobzien, J. L., Gear, S. B. (2008). In Sharon A. Raver (Ed.), *Techniques for teaching infants, preschoolers, and primary-aged children with mild learning and behavior problems* (pp. 225-253). Upper Saddle River, NJ: Merrill/Pearson.

Referred Journal Article

Gear, S., Bobzien, J., Judge, S., & Raver, S. A. (2011, in press). Teaching social skills to enhance work performance in a childcare setting. *Education and Training in Developmental Disabilities.*

Presentations Given

Gear, S. B., & Bobzien, J. L. Annual Conference of the Teacher Education Division, "Teaching social skills to enhance work performance: Daycare center case study," Teacher Education Division of the Council for Exceptional Children, Dallas, Texas. (November 7, 2008).

Gear, S. B., & Bobzien, J. L. Association of Teacher Educators Summer Conference, "De-mystify the RTI triangle: Responsive early literacy intervention," Association of Teacher Educators, Washington, DC. (August 4, 2008).

Bobzien, J. L., & Gear, S. B. Annual Conference of the Virginia Council for Exceptional Children, "Predictors of Childhood Obesity: Evidence from Early Childhood Longitudinal Study," Virginia CEC, Charlottesville, VA. (October 16, 2007).

Awards and Honors

Kimberly Gail Hughes Research Award, Old Dominion University (2009 – 2010 Academic Year)

Phi Kappa Phi Honorary Society, Old Dominion University (April 2006)

Baccalaureate Magna cum Laude with Distinction, Mary Baldwin College (May 1997)

Outstanding Adult Degree Program Graduate, Mary Baldwin College (May 1997)

Who's Who Among America's College Students (April 1997)

Psi Chi Honorary Society, Mary Baldwin College (April 1996)

SERVICE

University Service

Faculty Advisor, Student Council for Exceptional Children. (August 2008 - Present)

Member, Sarah E. Armstrong Scholarship Selection Committee. (April 14, 2009 - April 23, 2009)

Member, Special Education Faculty Search Committee (March – April 2010)

Public Service

Officer, Secretary, Fairmount Park Civic League, Norfolk, Virginia. (June 2009 - Present)