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Literacy plays a critical role to the life of students with Autism Spectrum Disorders (ASD). Although it is evident that individuals with ASD need effective literacy strategies for their school and post-secondary success, research shows that teachers who have students with ASD feel unprepared to use the effective literacy strategies at classroom (e.g., Garland, Vince, Vasquez, 2013). One way to help the teachers to use the effective strategy at classroom is to provide professional development and ongoing support.

Dialogic reading, an evidence-based practice (EBP), has been frequently used to improve oral language skills and listening comprehension of students with language impairment (Whitehurst & Lonigan, 1998). With this method, the adult reader encourages the child to become an active storyteller by incorporating systematic questions types and instructional sequence (Whitehurst & Lonigan; NELP, 2008). However, to meet the unique needs of students with ASD, literature indicates the need for considering their unique cognitive profile (e.g., systematic instruction, visual support). In response, Whalon and colleagues (2015) designed the modified dialogic reading, incorporating with visual supports and systematic instruction.

This multiple-baseline across participants' design of a single case design investigated the effects of professional development on one special education teacher's use of the modified dialogic reading and its subsequent impact on the listening

comprehension and initiation of young children with ASD. One special education and four young children with ASD participated in this study. The setting was a resource room of a private elementary school in the Southeast. Dependent variables included the rate of teacher fidelity of implementation, the rate of the students' correct responses to fact- and inference-based questions and the frequency of students' initiation.

Results of this study indicated that the professional development plus ongoing coaching was effective in increasing and maintaining teacher fidelity of implementation. Findings also revealed that the modified dialogic reading was an effective way to promote listening comprehension and initiation of young children with ASD. Limitations, implications, and future directions are discussed.

EFFECTS OF MODIFIED DIALOGIC READING ON LISTENING
COMPREHENSION AND INITIATION SKILLS TO
STUDENTS WITH AUTISM SPECTRUM
DISORDERS

by

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CHAPTER I

INTRODUCTION

Autism spectrum disorders (ASD) refers to an umbrella neurodevelopmental disorder spectrum, including Autistic Disorder, Asperger's Disorder, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified (PDD-NOS) (American Psychiatric Association [APA], 2013). The individuals on the spectrum are defined by similar differences such as impairments in social communication and presence in restricted interests and repetitive behaviors, but the severities on the spectrum are varied. According to the most recent estimate of prevalence of students with ASD, 1 in 68 children were diagnosed with ASD in 2012 (Centers for Disease Control and Prevention [CDC], n. d.). This estimate is two times higher than the previous estimate in 2000 (CDC). Although the increase in the number of students with ASD could have resulted from changes in definitions, the increased prevalence of ASD has intensified the demands for effective strategies for students with ASD in the classroom. Strategies need to include interventions that address the defining characteristics of ASD (e.g., language profile, cognitive profiles, communication skills) and academic skills (e.g., reading comprehension skills, emergent reading skills).

Increased attention to standards-based instruction and achievement outcomes underscore the need for educators to use the most effective evidence-based practices (EBPs) with this student population (Knight & Sartini, 2014). EBPs refer to instructional

practices that are empirically validated as effective for improving student outcomes (Cook & Cook, 2011; Mesibov & Shea, 2011; Odom, Cox, Brock, & National Professional Development Center on Autism Spectrum Disorder [NPDCA], 2013). The criteria for EBPs is an evaluation of research design and effectiveness of implementation (Odom et al., 2010). Without the use of these practices, students with ASD are less likely to receive the most effective interventions (Mayton, Mendez, Wheeler, & Zhang, 2010).

Dialogic reading is an EBP reading method that has been frequently used to improve oral language skills of students with language impairment (Whitehurst & Lonigan, 1998). With this method, the adult reader encourages the child to become an active storyteller by providing systematic questions and feedback (Whitehurst & Lonigan; NELP, 2008). This is underpinned by the sociocultural theory that young children learn oral language through social interactions with others, and adult readers play an important role of facilitating children's development in language and literacy (Vygotsky, 1978). The reading method demonstrated its effectiveness on language comprehension, especially for vocabulary and print knowledge (Dickinson & Smith, 1994; NELP). Given such effectiveness, dialogic reading has helped other populations with language needs, including young children, second language learners, and deaf education.

Dialogic reading needs to be modified to support the unique needs of students who have ASD characteristics, in particular, those with difficulties related to attentional focus, executive functioning, and interpreting others' thoughts and actions (Carnahan & Williamson, 2010; Williamson, Carnahan, & Jacobs, 2012). Whalon, Martinez, Shannon,

Butcher, and Hanline (2015) modified the existing dialogic reading method by integrating systematic instruction (i.e., least to most prompting), intentional pause, initiation questions and visual supports to increase students' academic skills and attention). Their findings demonstrated that modifying the intervention to include systematic instruction significantly affected listening comprehension and initiation skills of young children with ASD. The study of Fluery and Schwartz (2016) also demonstrated the consistent outcomes of dialogic reading on oral language skills only of students with ASD.

Thus, modified dialogic reading has shown promise for improving listening comprehension and initiation skills among students with ASD. However, dialogic reading has not satisfied the standards of becoming recognized as an EBP, as it has not meet the criterion of multi-study, multi-researcher implementation. In addition, practitioners' knowledge of how to implement EBPs directly influences student outcomes; however, neither study used teachers as the implementer of the intervention. This indicates that there is a gap in the field of preparing teachers on how to use the modified dialogic reading to students with ASD. Therefore, the purpose of this study is twofold: (a) to investigate the effects of professional development on how to use the modified dialogic reading on teacher's use of it during the reading sessions and (b) to investigate the effects of teacher's use of the modified dialogic reading on the improvement of oral language skills (e.g., initiation) and listening comprehension of students with ASD.

Literacy Development

Oral language skills form the basis for later development of conventional literacy skills, especially comprehension. Emergent literacy skills, or early literacy skills before formal literacy instruction, are moderately to strongly correlated with later school achievement (Lonigan, Purpura, Wilson, Walker, & Clancy-Menchetti, 2013). Emergent skills are categorized into two domains: code-related and meaning-related (National Institute of Child Health and Human Development [NICHD], 2005; Pullen & Justice, 2003). Code-related skills allow emergent readers to successfully acquire alphabetic principles, phonological awareness, letter knowledge, print concepts, early name writing, and letter reading skills, which help readers improve reading accuracy and fluency.

Meaning-related skills primarily facilitate readers' comprehension of the text that is already being decoded. Language comprehension occurs through the complex process of integrating prior knowledge with the text to fully and accurately understand the meaning (Fisher & Frey, 2014; Kintsh & Kintsh, 2005). For young children, successful language comprehension is essential to reading comprehension given that spoken language is a predominant input for them. On the other hand, the lack of language comprehension in early age could augment reading difficulty in later years (Catts, Hogan, & Adolf, 2005).

For better reading comprehension to develop later, children need to know how to use meaning-related oral language skills (e.g., vocabulary, inference making, predictions, and grammar) (Hogan, Cain, & Sittner, 2013; Lonigan & Shanahan, 2010). Hogan and colleagues (2011) conceptualized oral language skills as lower and higher level skills.

For example, vocabulary and grammar are considered as lower-level skills, and inference making, monitoring, analysis, and comprehension are higher-level skills. Lower-level skills function as foundational skills to the higher-level skills; however, higher-level skills could influence lower-level skills. For example, well-developed vocabulary and grammar are helpful to easily make inferences through language comprehension. Accurate and fluent inference making could impact vocabulary. For harmonious development of oral language skills, therefore, both lower and higher level skills need to be well developed.

Early Intervention in Oral Language

Oral language skills are typically developed at an early age. Students who show weakness in oral language prior to school entry face at increased risk for reading comprehension difficulties (Catts, Bridges, Little, & Tomblin, 2008). Given that oral language skills are moderately correlated with their later conventional literacy skills - including decoding, oral reading fluency, reading comprehension, writing, and spelling - it is not surprising that students with language impairments show continuous and significant long-term deficits in reading comprehension compared to typically developing peers (Hogan et al., 2013; Justin et al., 2011; NELP, 2008; Scarborough, 1998; Whitehurst & Lonigain, 1988). According to the longitudinal study conducted by Catts, Fey, Zhang, and Tomblin (1999), 70% of kindergartners who had poor language skills ended up having significant deficits in reading comprehension when they became second graders. Therefore, it is important to give our attention to students' language related skills.

Literacy for Students with ASD

For students with ASD, literacy means more than just reading and writing. These skills allow students to access the school curriculum and to participate in social relationships and community activities (Carnahan & Williamson, 2010). Furthermore, literacy plays the critical roles of functional and pragmatic communication, and listening comprehension (Browder, Treta, & Jimenez, 2007; Mirenda, 2003). Therefore, the lack of literacy skills could bring a wide range of negative impacts over the lifespan of students with ASD (Ricketts, Jones, Happ, & Charman, 2013).

Although heterogeneity exists on the ASD spectrum, students on the spectrum may have difficulty using literacy skills, especially in reading comprehension (Attwood, 1998; Carnahan & Williamson, 2013; Nation et al., 2006; O'Connor & Klein, 2004; Williamson, Carnahan, & Jacobs, 2012; Williamson et al., 2013). For example, while many of these students showed relative strengths in decoding and word recognition, they showed greater difficulty in reading comprehension (Asberg, Kopp, Berg-Kelly, & Gillberg, 2010; Calhoun, 2001; Chiang & Lin, 2007; Frith, 2003; Jones et al., 2009; Lord & Paul, 1997; Nation, Clarke, Wright, & Williams, 2006; Smith-Myles, Hilgenfeld, Barnhill, Griswold, Hagiwara, & Simpson, 2002; Whalon & Hart, 2011). The quantitative study of Mayes and Cahlhoun (2003a, 2003b), with featured 280 participants with ASD, also supports this by showing that most participants demonstrated consistent difficulties in reading comprehension despite various abilities decoding.

Williamson and colleagues (2012) investigated factors involved in the reading comprehension difficulties of students with ASD. The authors found the reading

comprehension difficulties are explained by individual differences (e.g. joint attention, theory of mind [ToM], executive functioning), text characteristics, and reading action strategies. These factors influence interactions between readers and explain three reading comprehension profiles of individuals with ASD: text bound, strategic, and imaginative. Text bound comprehenders rely heavily upon the text and do not draw upon relevant experiences for comprehension. Imaginative comprehenders rely heavily upon their background knowledge with little consideration of what the text says. Individuals with strategic reading profiles make inferences, as they are able to integrate their relevant background knowledge with the text. Understanding how to make these connections likely begins well before children begin reading.

Oral Language Skills for Students with ASD

Lindgren, Folstein, Tomblin, and Tager-Flusberg (2009) examined group differences in reading achievement among students with autism language impaired (ALI), autism language normal (ALN), and speech language impairment (SLI). The results suggest that language impairments make a significant negative impact on student reading achievement. Furthermore, Norbury and Nation (2011) examined the direct relationship between oral language comprehension and reading achievement of 27 male adolescents with ASD (ALI=13, ALN=14) and 19 typically developing peers. To investigate the association between oral language skills and reading achievement, the authors used books with reading levels of seven- or eight-years old with high number of pages with the intention of controlling decoding. The result shows that oral language comprehension is a significant predictor of reading comprehension in a heterogeneous group of adolescents

(N = 46) both with and without an ASD diagnosis. In other words, being diagnosed with or without ASD did not affect their reading comprehension. Rather, findings allow us to understand the association of oral language and reading comprehension for students with ASD. Therefore, the intricate relationship between language development and reading comprehension along with the complexity of ASD needs to be better understood (Whalon & Hart, 2011).

Indeed, impairment in comprehension for students with ASD can be traced to weakness in oral language skills. According to Nation and colleagues (2006), students with deficits in reading comprehension showed impairments in vocabulary and less sophisticated oral language comprehension compared to the group with comparable IQs. Whalon and colleagues (2015) also posit that deficits in oral language development affect understanding higher levels of discourse and reading comprehension. In fact, such difficulties in reading comprehension are intensified when the purpose of their learning switches from learning to read to reading to learn (Hogan et al., 2013). These difficulties become worse without a solid foundation in reading. Since the ability for future reading is based upon their current oral language development (Lonigan & Shanahan, 2010), it is clear that those students need to receive interventions with explicit listening comprehension strategies at earlier ages.

Shared Reading Interventions

The overall purpose of shared reading is (a) to provide children with extensive reading experience, (b) to teach children reading processes and strategies, and (c) to model those skills in order to help them to grow as skillful and proficient readers (Parkes,

2000). During shared reading, the teacher reads aloud the text and children are required to follow along. To improve student understanding, the teacher asks questions about the text and vocabulary, as well as questions that require inferences (e.g., predictions) and explanations based on student responses (Morrow, 2009). In addition, the teacher uses interactive questions and responses to invite students to the conversation. Shared reading is an effective reading strategy to improve language comprehension (Pollard-Durodola et al., 2011), language development (Justice, McGinty, Piasta, & Kadervek, 2010; Mason, Kerr, Sinha, & McCormick, 1990), alphabets (Lamb, 1986), general reading achievement, reader confidence, and vocabulary (Holdway, 1979).

However, shared reading has been criticized for several reasons. First, its effects have not demonstrated within a comparison group experiment format. In addition, it does not provide children with optimal opportunities to interact with others and practice their oral language skills. Children gain more vocabulary within the interactive environment while listening and using the vocabulary in the extended discussion (Kamei & Catts, 2012; Hogan et al., 2011; NELP, 2008). Simply reading books aloud might not allow children to enhance vocabulary and oral language skills (Huebner & Melzoff, 2005; Mol et al., 2009; WWC, 2015). Therefore, book reading should be more interactive and systematic like the dialogic reading.

Dialogic Reading

Dialogic reading, or interactive shared reading, is a specific type of shared book reading between an adult and a group of children (Whitehurst & Lonigan, 1989; What Works Clearinghouse [WWC], 2007). As compared to shared reading discussed earlier,

in dialogic reading, children are expected to be an active storyteller by listening and answering to systematically intended questions and prompts from the adult reader (Whitehurst & Lonigan, 1998; NELP, 2009). When implementing dialogic reading, adults illicit children's talk using specific question types denoted by CROWD (completion, recall, open-ended, wh-questions, and distancing) and prompting/elaborations denoted by PEER (prompt, evaluate, expand, and repeat) to facilitate children's language use. These prompts are helpful to elicit information about picture descriptions and character labels (Reese et al., 2003). Likewise, dialogic reading has been known as an effective intervention to enhance print knowledge, and language comprehension, especially for vocabulary (Penimonti & Justice, 2010). Such interactive strategy demonstrates larger effects on children's language outcomes, compared to non-interactive shared reading approaches (Dickinson & Smith, 1994; NELP, 2008). In addition, children have the opportunity to learn emergent literacy skills while participating in literacy activities and to expand their spoken language by observing how adults use language and receiving feedback from adults (Fleury, Miramontez, Hudson, & Schwartz, 2014). Indeed, dialogic reading is an EBP that has been frequently used to improve oral language skills of students with language impairment (Whitehurst & Lonigan, 1989; WWC, 2007).

Modified Dialogic Reading for Students with ASD

To facilitate the effectiveness of dialogic reading for students with ASD, interventions that could resolve the unique cognitive complexities of students with ASD - joint attention, executive functioning, and theory of mind - should be supplemented

(Hogan et al., 2013; Whalon & Hart, 2011). Kadervek and Rabidoux (2004) proposed the interactive to independent literacy model to show the transition of students with communication disorders from emergent to conventional literacy development. In this model, the authors seek to provide appropriate support at each level to support children with communication disorders could transit to the next level toward independent reader. Specifically, Kadervek and Rabidoux posit that the adult reader needs to provide meaningful supports (e.g., visual supports, reminders) to secure students' joint attention (level 1). This enables the child to engage in communicative literacy activities (level 2). This helps the child to transit to the next level.

According to the comprehensive literature review of comprehension strategies conducted by Knight and Sartini (2014), prompting and visual supports have been used as effective strategies to increase academic skills in content areas. Prompting that has been used broadly combined with time delay and task analysis to support students with moderate and severe disabilities. In addition, visual support as an EBP facilitates communication and comprehension of those students.

Whalon and colleagues (2015) modified the existing dialogic reading by integrating systematic instruction with the hierarchy level of prompting and visual supports, which showed significant and positive differences in supporting communication and comprehension of children with ASD. Fluery and colleagues (2016) replicated a part of Whalon et al. (2015) and showed consistent results of dialogic reading on student engagements of students with ASD. The case study conducted by Whalon and colleague

(2016) show that the modified dialogic is effective in increasing correct responses of young children ASD to fact-based, inference-based, and open-ended questions.

Although dialogic reading was found to be effective for children with ASD in three studies, it is not yet recognized as an EBP for students with ASD. This is because the new reading method does not satisfy the criteria for multiple replications by five different research teams from different geographical locations. In addition, Fluery (2015) and Whalon et al. (2016) replicated only part of the Whalon et al. (2015) study. Thus, to make progress toward identifying dialogic reading as an EBP, additional researchers need to replicate Whalon and colleagues (2015) with fidelity.

It is also evident that special education teachers need to understand how to select and implement EBPs (Marder & DeBettencourt, 2015; Torres et al., 2012). Additionally, implementing the selected EBP with fidelity is necessary to achieve the best outcome.

However, educators do not have enough training or guidance to use EBPs within their classrooms (Garland, Vince Garland, & Vasquez, 2013; Stahmer, Collings, & Palinkas, 2005; Odom et al., 2010). This gives us an urgency to prepare teachers to implement EBPs with fidelity.

Significance of the Study

The effects of emergent literacy skills on the later development of conventional literacy skills, and noted differences in these areas among children with ASD, suggests the need to examine interventions that improve oral language skills and comprehension skills of young children with ASD. This study used the modified dialogic reading intervention to investigate its effects on oral language skills and comprehension skills of

young children with ASD. Because securing attention, interpreting implicit meanings, and self-regulation are known as core challenges for individuals with ASD, carefully designing interventions that incorporate evidence-based instructional strategies known to have positive effects for this student population. In addition, special education teachers need to know how to implement EBPs with fidelity to meet their student needs.

This study demonstrates three significances to professional development and outcomes of students with ASD. First, this study will add the rationale of professional development on the implementation of fidelity to students with ASD. Given that teachers report feel uncomfortable with using effective strategies, professional development play a critical role in supporting correct implementation of EBPs in fidelity (NRC, 2001).

Second, this dissertation study will contribute to establishing modified dialogic reading for students with ASD as an evidence-based practice. In addition, this study will provide significant guidance to educators in the classroom (including general and special educators) as well as related service providers to effectively implement the dialogic intervention beneficial to students with and without disabilities.

Purpose of the Study

The purpose of this study was to investigate the effects of professional development on a special education teacher as she used the modified dialogic reading intervention to students with ASD. Additionally, this dissertation study investigated the effects of teacher implementation of the modified dialogic reading on the student outcomes, including listening comprehension and initiation skills. The following research questions guided this study:

- How does teacher training in teacher-implemented modified dialogic reading interventions (i.e., prompting strategies, instructional sequence, hierarchical prompting) affect the teacher implementation during the modified dialogic reading sessions with students with ASD?
- How do the modified dialogic reading interventions affect the correct and spontaneous responses to fact- and inference-based questions of children with ASD?
- How do the modified dialogic reading interventions affect initiations of children with ASD?

CHAPTER II

LITERATURE REVIEW

The purpose of this chapter is to discuss the effectiveness of dialogic reading intervention on the development of oral language skills and comprehension of students with ASD. This chapter consists of five sections: characteristics of individuals with ASD, evidence-based practices (EBPs), shared reading, dialogic reading, and modified dialogic reading.

Characteristics of Individuals with ASD

Autism spectrum disorders (ASD) refers to an umbrella neurodevelopmental disorder spectrum (American Psychiatric Association [APA], 2013). Individuals on the spectrum are defined by impairments in social communication and the presence of restricted interests and repetitive behaviors, but their severities are varied. According to the most recent estimate of prevalence of students with ASD, 1 in 68 children were diagnosed with ASD in 2012 (Centers for Disease Control and Prevention [CDC], n. d.). This estimate is two times higher than the previous estimate in 2000 (CDC). Although the increase in the number of students with ASD could have resulted from changes in definitions or the sensitive awareness of professional groups towards ASD (Hill, Zuckerman, & Fombonne, 2013), the increased prevalence of ASD coupled with the current attention in student outcomes has intensified a better understanding of this population. The most recent diagnostic criteria (Diagnostic and Statistical Manual of

Mental Disorders-V [DSM-V]) created a single spectrum, eliminating specific subcategory autistic disorders. DSM-V states that in order for a child to be diagnosed, the child must meet (a) social communication criteria, and (b) multiple criteria regarding repetitive behaviors (APA, 2013; Baker, 2013).

Cognitive Profiles of Students with ASD

Individuals with ASD are defined as having difficulties in using appropriate social and communication skills (APA, 2013). In addition, their unregulated, repetitive behaviors do not allow them to participate in normal social and learning experiences. A body of research finds that unique cognitive profiles, including lacking joint attention, executive dysfunction, and difficulty in employing theory of mind (ToM), are responsible for their difficulties. Accordingly, the profiles are used as active foci to understand the learning process of students with ASD. This section explains each area of the profile, and discusses how their unique cognitive profiles influence their learning experience.

Joint attention. Joint attention refers to the ability to coordinate one's attention between people and objects. As a key precursor of understanding what is being said (Tomasello, 1995), joint attention enables one to understand the topic of the conversation and the converser's intention (Wetherby, Prizant & Schuler, 2000). Furthermore, following the attention of the topic during conversation scaffolds the communication development of typically developing children (Baker & Nelson, 1984), which positively influences their growth in vocabulary and pragmatic competencies (Butterworth & Grover, 1990). This is because inputs from adult utterances complement children's existing vocabulary and language skills (Conti-Ramsden, 1990). However, students with

autism show atypical behaviors of not being able to coordinate their attention on multiple stimuli, displayed as being obsessed by certain objects (Quill, 2000; Reed & Gibson, 2005). As a result, these individuals end up using limited vocabulary and rote language. Additionally, their obsessive attention results in a difficulty initiating conversation, taking turns, and sustaining communication.

Furthermore, development in pragmatic language is affected by the disjointed attention (Prizant & Wetherby, 1978; Eales, 1993). The obsession with specific objects inhibits individuals from understanding objects in terms of global concepts (Frith, 2008) and from connecting details with the bigger picture. Failure to use joint attention skills is considered a “core feature” of and “core challenge” for children with ASD (American Speech-Language-Heritage Association, 2006, p. 119). Given that securing attention is vital for learning, students with ASD need additional supports for this area.

Theory of mind (ToM). ToM refers to the ability to interpret others' mental states (Premack & Woodruff, 1978). Lacking the ability to infer others' intentions, emotions, or thoughts causes difficulty in sustaining communication and interaction with others. Students with ASD show difficulty perceiving others' perspectives and emotions, which results in difficulties in social areas (Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, Tager-Flusberg & Cohen, 2000; Southhall & Campbell, 2015). Impaired ToM hinders individuals with ASD from engaging in social network activities and sharing experiences.

When applied to comprehension, ToM explains the difficulty students with ASD have in making inferences for hidden meanings in a story (Carnahan & Williamson,

2010; Carnahan, Williamson, & Christman, 2011; Williamson, Carnahan, & Jacobs, 2012) and taking perspectives of characters in narrative texts (Garcia-Perez, Hobson, & Lee, 2008). Such difficulties continue in oral language development and result in challenges understanding and using figurative language, including metaphors, idioms, irony (Baron-Cohen et al., 1985; Dennis, Lazenby, & Lockyer, 2001; Dodd et al., 2011; Mackay & Shaw, 2004; Norbury, 2005; Rundblad & Annaz, 2010) and pragmatic language (Williamson et al., 2015). Although the review conducted by Southhall and Campbell (2015) states that perspective taking skills could be integrated through systematic instruction, group interventions, and technology, how to generalize those skills is still debatable.

Executive functioning (EF). EF refers to a list of self-regulated behaviors or actions used to achieve and maintain goals despite disruptions (Fisher & Happe, 2005). As a cluster of neuropsychological skills, EF consists of overarching cognitive skills, including attention, planning, organization, integration, behavioral regulation, inhibition of impulses, flexibility, and fast set shifting (Hill, 2004; Swanson, 2005). In other words, the lack of EF interrupts generating higher levels of thinking and achieving goals (Frith & Frith, 2008; Swanson, 2005) and causes comprehension and monitoring problems (Westby, 2004). Volkmar (2007) used the weak central coherence (WCC) hypothesis to explain why individuals with ASD are not able to employ EF. The lack of central coherence impairs the ability to integrate a part of a concept into the whole. Individuals with ASD process new inputs as fragments and focus on isolated information, lacking coherence, rather than an integrated or whole context (Frith, 1989). Ineffective EF (e.g.,

difficulty in being flexible and planning) is considered to be one of the defining characteristics of individuals with ASD, and this influences their overall communication and learning experience.

In summary, students with ASD are defined as having difficulties with social communication and self-regulated behaviors despite the various degree of symptoms on the spectrum. In addition, their unique cognitive profiles seem to influence their language and learning experiences. Combined with the increasing prevalence of ASD, it is evident that there is a need for practitioners to use effective interventions, reflecting the unique needs of students with ASD. The following section will review the need of EBPs that have been used for students with disabilities, especially for students with ASD.

Theoretical Framework of the Study

In addition to considerations of the theories that underscore the cognitive profile of individuals with ASD, this study is grounded in two additional theories, including the sociocultural theory of learning (Vygotsky, 1978), and the interactive to independent model of literacy development (Kadervek & Rabidoux, 2004). The sociocultural theory explains the importance of interactions between students and more knowledgeable adults, while the interactive to independent model explains the kinds of support that are needed for individuals with significant learning needs to develop communication and literacy skills.

Sociocultural Theory

At its core, shared reading is an interaction between adults and children. Vygotsky's sociocultural theory originates from Piaget's cognitive theory. Piaget

postulates children's learning occurs according to the pre-determined developmental structures, including deduction, induction, understanding and evaluation of notions about the world, interpretation, and mastering of the learning. Slavin (1997) described Piaget's postulation, as "specific cognitive structures [which] need to develop before certain types of learning can take place" (p.46). Every learner goes through the same developmental process in a series of stages, which means the development of internal learning stage precedes learning (Slavin, 1997). There is no external influence involved in the learning process. On the other hand, Vygotsky's theory (1978) dictates that every function in the child's development occurs through two levels: social and individual. In other words, the child's learning is initiated through interaction with others, and then the learning is internalized. At the social level, child and adult readers interact, and the child receives questions and feedback. Then the child internalizes new learning by using the cognitive process, and retains and reproduces the new skills for further learning.

Vygotsky (1978) contends that interactions facilitate the learning development process, and it internalizes the learning. However, children benefit from the interactions only when the appropriate support is given at "the ideal level of task difficulty to facilitate learning" (Tracy & Morrow, 2012, p.128). Vygotsky explains the appropriate level of support by using the concept of "zone of proximal development" (ZPD). ZPD is defined as the rudimentary level with potential for further development. In other words, it means the gap between the child's actual development and potential developmental level. Only with the appropriate level of scaffolding from adults within the ZPD does learning occur. Therefore, scaffolding challenges and guides children to the extent that

they can perform independently. Whether educators or caregivers thoughtfully estimate the ZPD based on their current status opens the door for another learning opportunity.

Interactive-to-Independent Literacy Model

The development of oral language helps the child grow from emergent to conventional literacy levels. Without interactive support, books cannot be the source to learn new vocabulary (Mol et al., 2009). In addition, adult inputs facilitate children's active participation that plays a critical role in the development of oral language skills (Pullen & Justice, 2003). Given that the contribution of verbal interaction to reading development is significant (Huebner & Melzoff, 2005), the interactive theory needs to be examined. However, it should be noted that students with ASD need additional supports. In addition, any barriers to the language development of children with communication disorders need to be eliminated.

Thus, the interactive to independent literacy model (Kadervek & Rabidoux, 2004) is most relevant to this research because this study focuses on the (a) social interaction between children and an adult or teacher when engaging in reading, (b) role of adults who facilitate children's development in language and literacy, and (c) need to maintain joint attention of children with ASD. In addition, the literacy model highlights the importance of scaffolding in learning. Therefore, the literacy model of Kadervek and Rabidoux (2004) provides an ideal theoretical background for understanding the progression of language skills as well as the adult's role in teaching young children with ASD.

The interactive to independent literacy model shows the transition of students with communication disorders from emergent to conventional literacy development. The

sociocultural model influences this model. The sociocultural model states every child needs to engage in social interaction as literacy activities (Vygotsky, 1978). The participation model states that some children might not be able to develop their language toward independent level as typically developing children do. Beukelman and Mirenda (1998) posit that the appropriate level of literacy environment should be provided. In particular, any barriers that interrupt the language development of those children should be eliminated. Instead, facilitation that supports their language development should be provided. The model indicates that the adult readers or service providers need to set intervention goals so that children could develop their language competency (Duchan, Hewitt, & Sonnenmeier, 1994). Kadervek and Rabidoux (2004) combine these models and state that literacy development should be made within socially constructive and communicative practices. The person who interacts with the child needs to provide the appropriate level of support so that the child could engage in the literacy activities. However, the researchers highlight that any level of language development should be valued even when independent level is not yet achieved. This is because literacy development cannot be explained as a linear process.

Kadervek and Rabidoux (2004) categorized the literacy development of children with communication disorders into five hierarchic levels: attention and responsiveness during literacy interactions, “communicativeness” of literacy interaction, symbolic understanding of written forms, conventional literacy supported by social interaction, and conventional literacy at an independent level. This model shows that the literacy

transition of children from the emergent to the conventional stage is a spiral along with an overlapping series of interpersonal and intrapersonal events.

In the case of students with ASD, the interactive to independent literacy model suggests that the literacy interventions to students with ASD should meet their needs. In particular, students with ASD have unique cognitive profiles, lacking joint attention, executive function and ToM. That students with ASD lack the joint attention conveys the important message. Literacy experience starts with a focus on artifacts (e.g., family pictures) and joint attention on a story book with caretakers (Bruner, 1981). However, the lack of joint attention is one of the biggest barriers against the literacy development of students with ASD. The critical role of the joint attention implies the need for intensive intervention in this area (Kadervek & Rabidoux, 2004). Kadervek and Rabidoux call for intensive intervention to maintain joint attention. The researchers emphasize using “attention recruiting behaviors” (p.246) to improve children’s interest and then increasing the length of readings. Through the use of these techniques, it is expected that students with ASD will more likely be able to maintain their attention to literacy activities, decrease off-task behaviors, and take turns during shared story book reading. Once the focused attention is maintained, the literacy development level of children moves to the next level, communicative literacy interactions. In other words, the child is ready to take turns and interact with others. Next, I discuss the use of evidence-based practices for instruction.

Evidence-based Practices and Instruction

No Child Left Behind (NCLB, 2001) and the Individuals with Disabilities Education Act (IDEA, 2004) mandated that practitioners use effective research-based or scientifically-based practices for educational decision making. In response to the call for more rigorous and effective practices for students with disabilities, the field started differentiating EBPs from research-based practices and emphasized the use of EBPs (Cook & Cook, 2011). EBPs refer to instructional strategies that are empirically validated that result in positive student outcomes in consistent ways (Cook & Cook, 2012; Meibov & Shea, 2011; Odom, Cox, Brock, & National Professional Development Center on Autism Spectrum Disorder [NPDC], 2013). Referred to as "practices that are supported by high quality studies that utilize research designs from which causality can be inferred and that demonstrate meaningful effects on student outcome" (Cook & Cook, 2011, p.3), EBPs identify highly effective practices and bridge gaps between research and practice.

However, identifying EBPs in special education is not easy because of the heterogeneity of participants and educational settings. Furthermore, the lack of consensus on the criteria for EBPs adds to the challenge (Cook & Odom, 2013). Despite such challenges, there are several reasons why practitioners need to use practices based on high quality research that includes rigorous methodology. First, EBPs must be deployed when teaching students with ASD, as ineffective interventions could endanger the students and their families (Mayton, et al., 2010). In addition, there is a growing

concern for improving the academic skills of students with students with ASD in core content areas (Knight & Santini, 2014).

To ensure researchers deploy rigorous research designs, Gerstern, Fuchs, Compton, Coyne, Greenwood, and Innocenti (2005) and Horner et al. (2005) developed quality indicators. Quality indicators include criteria to assess the quality of the research design, quantity of available research studies, and magnitude of effects to establish EBPs. This section delineates EBP criteria, describes how EBPs are used for students with ASD, and existing evidence-based instructional strategies for students with ASD are reviewed.

Quality Indicators and EBP Standards

EBPs must be based on recent, trustworthy research that is supported by sound methodological rigor (Cook & Cook, 2011; Council of Exceptional Children [CEC], 2005; Gersten, Fuchs, Compton, Coyne, Greenwood, & Innocenti, 2005; Horner, Carr, Halle, McGee, Odom, & Wolery, 2005; NCDPA, 2013). In defining EBPs, four elements are used: research designs, quality of research, quantity of research, and magnitude of effect.

Research design. Division of Research states that EBPs must be based on experimental and high quality research that demonstrates meaningful effects on student outcomes across studies (Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2004). High quality and experimental studies, experimental and quasi-experimental group designs, and single subject designs were selected as eligible designs for EBPs (Gersten et al., 2005; Horner et al., 2005) because these designs are able to demonstrate systematic effects of practices on student outcomes (Odom et al., 2004). CEC (2014)

employs both group comparison research design and single subject research design in categorizing EBPs.

Experimental group designs require random trials while quasi-experimental group designs require group comparisons based on pretest measures and demographic measures. However, in special education, experimental group design is difficult to conduct because of the heterogeneous characteristics of students with disabilities and the different educational settings that they belong to. In addition, the limited number of participants (e.g., students with ASD, students with low incidence disabilities) influences recruitment difficulties. This could cause negative impressions on the effectiveness of special education research and practice.

On the other hand, the single subject research design includes relatively small sizes of participants (between three and eight), but still provides a level of rigor that uses experimental methodology and addresses the causal consequence relationships (Horner et al., 2005). In this specific design, the researcher systematically manipulates the independent variable and replicates the variable across time or participants. In addition, the single subject design uses an individual student as an analysis unit (Odom et al., 2004).

Quality of research. EBPs need to meet the prescribed standards of methodological rigor (Cook & Cook, 2011). Without the correct implementation, practices are hardly effective even if they are grounded with high quality research. The effectiveness of a practice is demonstrated only when the implementation of the practice is conducted based on sound methodology. To identify methodological soundness, a list

of researchers has created criteria and quality indicators. Gersten et al. (2005) proposes 10 quality indicators for experimental and quasi-experimental group designs. For single subject designs in terms of study components, Horner and colleagues (2005) propose 21 quality indicators, including descriptions of participants and settings, dependent variables, independent variables, baseline, experimental control, internal validity, and social validity.

Quantity of research. EBPs are documented only when they demonstrate reliable student outcomes in multiple studies (Cook & Cook, 2011). Practices in group or quasi-experimental group design need to be supported by at least two high quality or four acceptable quality studies to be documented as EBPs (Gersten et al., 2005). Horner and colleagues (2005) set a series of guidelines for the practices using single subject design. First, the practice must be implemented with fidelity in more than five single subject design studies. Second, those studies must be published in peer-reviewed journals. Third, those studies must have been conducted by three different researchers or research teams from three different geographical locations. Fourth, the studies must include at least 20 participants.

CEC (2013) also categorizes EBPs as evidence-based practices, potential evidence based practices, mixed effects, insufficient evidence, or negative effects by using their own EBP standards. To be classified as EBPs, the practice must (a) be supported by at least two methodologically sound group comparison studies with unit analysis aligned with unit assignment and at least 60 total participants across studies; or four methodologically sound group comparisons with unit analysis not aligned with unit

of assignment, and at least 120 participants across studies; or five methodologically sound single-subject studies and at least 20 total participants across studies, or (b) meet at least 50% of criteria for two or more of the study designs described in (a), and (c) include no methodologically sound studies conducted with negative effects and at least 3:1 ratio of methodologically sound studies with positive effects to methodologically sound studies with neutral/mixed effects.

Magnitude of effect. EBPs should have positive effects on student outcomes. Gersten and colleagues (2005) used effect size to indicate the positive effect of group or quasi-group experimental studies. Horner and colleagues (2005) used social validity to indicate the magnitude of single subject studies.

According to CEC EBP standards (2014), group comparison studies are categorized as having positive effects ($d \geq .40$), neutral or mixed effects ($-.40 < d < .40$), and negative effects ($d \leq -.40$). Likewise, CEC standards categorizes the single case study design into having positive effects, neutral or mixed effects, and negative effects. The practice is considered as having positive effects only when at least 75% of cases demonstrate a functional relationship between intervention and targeting behaviors.

Evidence-based Instructional Practices for Students with ASD

The National Professional Development Center on ASD (NPDCA) conducted a literature review with studies published between 1997 and 2007 and identified 24 EBPs for individual instructional practices by using quality indicators suggested by Gersten et al. (2005) and Horner et al. (2005). These 24 EBPs, identified by Odom and colleagues, were known to lead to positive outcomes for students with ASD. Wong and colleagues

(2014) expanded the review to literature published between 1990 and 2011 and updated the previous report, identifying 27 EBPs by using the following criteria. For experimental or quasi-experimental group design studies, the practice must have been conducted by two high quality studies by at least two different researchers or research teams. For single subject design, the practice must have been conducted by five high quality single subject designs by three different investigators or research groups. Additionally, the studies should have at least 20 participants across studies. If the study designs are combined, one high quality experimental or quasi-experimental study and at least three high - quality single subject design studies must be conducted by three different research groups. The 27 EBPs were identified as a result of this review process, and includes prompting, reinforcement, self-management, social skills training, task analysis, time delay, and visual support. These 27 practices have been used as instructional practices to promote learning outcomes for students with ASD. For younger children with ASD, up to the age of five, twelve strategies were identified as effective: discrete trial teaching, exercise, functional behavior analysis, modeling, naturalistic intervention, parent-implemented intervention, reinforcement, self-management, social narrative, time delay, video modeling, and visual support (Wong et al., 2015).

Preparing Teachers to Use Evidence-based Practices

Although effective strategies are available for students with ASD, teachers reported feel uncomfortable with using the strategies (Odom, Cox, Brock, & NPDCA, 2013). Furthermore, a considerable number of teachers who responded to the survey showed disinterest in using EBPs for their students. Some researchers agreed that the

lack of confidence is resulted from the lack of professional development opportunity (Alexander et al., 2015; Brock et al., 2014). One way to help teachers is to provide professional development because it plays a critical role in supporting correct implementation of EBPs in fidelity (NRC, 2001). However, one-time professional development showed limited effects on supporting teachers using EBPs (e.g., Hall, Grundon, Pope & Romero, 2010). Including Kretlow and Bartholomew (2010) and Fixsen et al. (2005), several researchers highlighted providing ongoing support besides one-time professional development in order for teachers to sustain their skills.

In summary, EBPs have been used not only for educational decisions but also for interventional strategies to improve the academic skills of students with ASD. So far, evidence based instructional strategies to teach academic contents have been investigated. However, for young children with ASD, language development plays a critical role in emergent literacy development. Lacking language development impacts their conventional literacy development in negative ways. This guides us to investigate more language based instructional strategies. In addition, most studies show that these instructional strategies were used not by researchers, but by practitioners. Given that the ultimate goal of EBPs is for practitioners to make educational decisions, this must be noted. Therefore, preparing teachers to be proficient in using EBPs at classroom via professional development and ongoing support needs to be considered.

Evidence-based Reading Interventions for Stories

Shared Book Reading

Shared book reading interventions is an EBP for oral language development (WWC, 2015). Shared reading is an effective reading strategy to improve listening comprehension (Pollard-Durodola et al., 2011), language development (Justice, McGinty, Piasta, & Kadervek, 2010; Mason, Kerr, Sinha, & McCormick, 1990), alphabets (Lamb, 1986), general reading achievement, reader confidence, and vocabulary (Holdway, 1979). The overall purpose of shared reading is (a) to provide children with extensive reading experience, (b) to teach children reading process and strategies, and (c) to model those skills to help them to grow as skillful and proficient readers (Parkes, 2000). During shared reading, the teacher reads aloud the text and the children are required to read along. To improve print awareness, the teacher points out the picture and asks text related questions while using inferences or predictions (Morrow, 2009). In the meantime, the teacher uses interactive questions and responses, which invites students to the conversation.

Shared reading and students with ASD. The effects of shared reading on student engagement, listening comprehension, and oral language skills of students with ASD were examined in several studies (Bellon, Ogletree, & Harn, 2000; Carnahan, Musti-Rao, & Bailey, 2009; Mims, Hudson, & Browder, 2012; Mucchetti, 2013). Carnahan and colleagues (2009) conducted ABCAC reversal design study to evaluate the effects of interactive reading materials using visual cues and music on the engagement

behavior of six elementary students with autism. Findings shows that using interactive books and music contributed to the increase in student engagement.

Mucchetti (2013) examined the effects of adapted shared reading with student modified text, tactical objects and visual supports on student engagement and listening comprehension. In this multiple-baseline across participants of single subject design, all students showed improvements on listening comprehension and student engagement.

Mims and colleagues (2012) used least intrusive prompts to examine the effects of shared reading on the listening comprehension of four adolescences with autism and intellectual disabilities. In this multiple probe design across students, teacher and students read biographies and used graphic organizers to better sequence the story. Students had an opportunity to hear the sections of biography and were guided to answer eight wh-questions and three sequencing questions using graphic organizers. For one student who had low baseline performance on listening comprehension, a modification was made. After the two-week intervention, all students showed improvement in listening comprehension and maintained the skills two weeks after the intervention.

Bellon and colleagues (2000) used repeated story book reading as a language intervention for three-year-old children with high functioning autism. To facilitate language use, verbal scaffolding was provided. Scaffolding consisted of cloze procedures, binary choices, expansions, and constituent questions. The results showed that repeated story reading combined with the verbal scaffolding contributed to the spontaneous responding of the participating children.

Despite such positive effects, shared reading has been criticized for several reasons. First, shared reading does not provide children enough opportunities to interact with the adult readers who have more quality vocabulary (Kamhi & Catts, 2012; Hogan et al., 2011; NELP, 2008). Children gain more vocabulary within the interactive environment while they are listening and using the vocabulary in an extended discussion with an adult model (Kamhi & Catts, 2012; Hogan et al., 2011; NELP, 2008). Simply reading books aloud, or typical shared reading, might not allow children opportunities to enhance vocabulary and oral language skills (Huebner & Melzoff, 2005; Mol et al., 2009; WWC, 2015). Instead, dialogic reading incorporates systematic questions to optimize opportunities for students to practice their oral language skills and to interact with others. According to the meta-analysis of 16 studies conducted by Mol and colleagues (2009), the dialogic reading intervention showed higher effect sizes compared to shared reading. In particular, dialogic reading demonstrated a moderate effect size (Cohen's $d=.59$, $p<.01$) while shared reading demonstrated a small effect size ($d=.22$, $p<.001$). Taken together, this suggests that book reading should be interactive like dialogic reading.

Dialogic Reading

Dialogic reading, or interactive shared reading, is a specific type of shared book reading between an adult and a group of children (Whitehurst & Lonigan, 1998; WWC, 2007). As compared to shared reading discussed earlier, in dialogic reading children are expected to be active storytellers by listening to and responding to systematic questions and prompts from the adult reader (Whitehurst & Lonigan, 1998; NELP, 2008). In implementing dialogic reading, questions (i.e., CROWD: completion, recall, open-ended,

wh-questions, and distancing) and prompts or elaborations (i.e., PEER: prompt, evaluate, expand, and repeat) are used to facilitate children's language use. Both strategies are generally used together and are helpful to elicit the information about picture descriptions and character labels (Reese et al., 2003).

For example, CROWD could be applied for the first step of PEER. First, the adult *prompts* the child to talk about the story, following the format of CROWD. After the child responds to the prompts, the adult *evaluates* the child's responses, *expands* the responses, and then *repeats* what is expanded.

Dialogic reading has been recognized as an EBP that improves oral language skills of students with language impairments (Whitehurst & Lonigan, 1998). In addition, children learn emergent literacy skills while participating in literacy activities and to expand their spoken language by observing how adults use language and receiving feedback from adults (Fleury, Miramontez, Hudson, & Schwartz, 2014). Furthermore, dialogic reading has been known as an effective intervention to enhance print knowledge, and listening comprehension, especially for vocabulary (Penimonti & Justice, 2010).

Dialogic reading is underpinned by sociocultural theory that states an important role of young adult readers in facilitating children's development in language and literacy (Vygotsky, 1978). This reading method demonstrates its effectiveness on listening comprehension, especially for vocabulary, and print knowledge (Dickinson & Smith, 1994; NELP, 2008). Given such effectiveness, dialogic reading has been used for the populations who need language learning, including typically developing young children

and children who have SLI. This section discusses the effectiveness of dialogic reading along with its underpinning theory.

Adult input. Since dialogic reading is underpinned by the sociocultural theory, it is not surprising that inputs from adult readers affect children's development in language and literacy skills. 14 studies discuss adult inputs within the context of dialogic reading (Crain-Thoreson & Dale, 1999; Desmarais, Nadeau, Trudeau, Filiatrault-Veilleux, & Maxès-Fournier, 2013; Dale, Crain-Thoreson, Notari-Syverson, & Cole, 1996; Fieldling-Barnsley & Purdie, 2003; Hargrave & Senechal, 2000; Lever & Sénéchal, 2010; Lonigan, Purpura, Wilson, Walker, & Clancy-Menchetti, 2013; Mol et al., 2009; Pillinger & Wood, 2014; Rodriguez, Hines, Montiel, 2009; Sim & Berthelsen, 2014; Whitehurst et al., 1994; Zucker, Cabell, Justice, Pentimonti, & Kadervek, 2013). Factors related to adult input include input sources, input features, effects of adult input on children's reading behaviors and factors that interrupt systematic implementation by adults.

Input sources. Input sources refer to the person who implemented dialogic reading sessions. Reviewing 14 studies found three main input sources: teacher, parent, or other educational personnel. Six studies had teacher inputs (Crain-Thoreson & Dale, 1999; Hargrave & Senechal, 2000; Lever et al., 2010; Lonigan et al., 2013; Whitehurst et al., 1994; Zucker et al., 2013), and nine studies had parent inputs (Crain-Thoreson & Dale, 1999, Dale et al., 1996; Fieldling-Barnsley & Purdie, 2003; Hargrave & Senechal, 2000; Mol et al., 2009; Pillinger et al., 2014; Rodriguez et al., 2009; Sim & Berthelsen, 2014; Whitehurst et al., 1994). Among these studies, three studies (Crain-Thoreson & Dale, 1999; Hargrave & Senechal, 2000; Whitehurst et al., 1994) had both parent and

teacher inputs. In addition, two studies had inputs from other educational personnel, a language therapist (Desmarais et al., 2013) and interventionists (Lonigan et al., 2013).

Input features. In two studies, extratextual talk was highlighted to examine features from teacher or parent input. First, Rodriguez et al. (2009) investigated features of extratextual talk of 20 Mexican American mothers, focusing on interactive aspects of the participating mothers' extratextual talk. According to the analyses on the frequency of extratextual talk, interactive behaviors were rarely found. For example, description was the most observed format of extratextual talk, followed by positive feedback (M=52.1), and yes or no questions (M=51.8). Mothers seldom paused for responding (M=1.5), which was the least observed during the reading sessions. The only interactive behaviors observed were enhancing attention to text (M=2.36), promoting interactive reading (M=1.09), and supporting children's listening comprehension (M=1.09). Besides, literacy strategies, such as soliciting predictions, elaborating children's ideas, and asking to recall the information from the story were hardly observed (M=.49).

Zucker and colleagues (2013) found that the quality of teachers' extratextual talk during the reading sessions determined the extent of its impact on the development of children's receptive vocabulary growth ($p=.01$). Moreover, the features of this talk mattered more to student literacy skill development. Although dialogic reading is intended to have more systematic hierarchical teacher input (e.g., three-tier) (Lonigan et al., 2013), not every teacher's talk provides a higher level of talk (Zucker et al.). For example, 57% of teacher talk (M=30.62) was coded as literal level and 32% of the talk (M=17.31) consists of inferential talk. About 11% of teachers' extratextual talk

(M=6.17) focused on print or phonological targets. On the literal level, noun labeling (M=13.77) was the most frequently occurring feature, while vocabulary definition was the least occurring (M=0.65).

In summary, examining the feature of adult input shows that some studies lacked important elements in implementing dialogic reading sessions: interactive characteristics and higher level literacy strategies. Nine out of 14 studies described that teachers as implementers of the dialogic reading. However, the teacher talk during the implementation remained at the lower level (e.g., literal level, phonological targeting level). Since extratextual talk is known to impact literacy and language development of children (Zucker et al., 2013), these findings suggest that adult readers need to make an intentional plan before implementing dialogic reading, and use strategic implementation strategies. Changes in adult inputs result in child behaviors because the dialogic reading is underpinned by sociocultural theory.

Effects of adult inputs on children's reading behaviors. Two studies show that the changes in adult reading behaviors caused changes in children's reading behaviors (Crain-Thoreson & Dale, 1999; Dale et al., 1996). Dale and colleagues (1996) conducted a group experimental study to investigate the effects of dialogic reading on children with language impairments. Thirty-three parents and children dyads were divided into two groups: dialogic group training program (DRTP) and clinical literacy training program (CLTP). The parent group using the dialogic reading program showed significant increase in using wh-questions, imitation, and open-ended questions. In addition, parents allowed more wait time for student responses. Those changes in parent behaviors

contributed to the significant increase of children's verbal responses to adult questions. In addition, children were observed using more expressive vocabulary after having dialogic sessions.

Similarly, Crain-Thoreson and Dale (1999) measured changes in adult behaviors during sessions to examine the effectiveness of the interventions on children's vocabulary knowledge. According to the comparison of parent utterances before and after interventions, via video observations, parents used more acknowledgments, expansions, open-ended questions, and who / what questions, but less verbatim reading, information statements, and insufficient time for response. These changes showed positive correlations with children's vocabulary pretest and posttest scores. Children showed significantly increased mean length of utterances (MLU) and use of different words. In other words, significant changes in children's linguistic performance were associated with parents' reading behavior changes. Specifically, changes included providing more acknowledgments of children's utterances, more wait time for their responses, and less informational statements.

Factors that interrupt systematic implementation. Although dialogic reading sets a goal to make a child an active storyteller, this would not be possible without the systematic implementation of the reading session. Two specific factors that interrupted adult readers from implementing effective dialogic reading interventions were found, including the lack of training and lack of fidelity.

Lack of training. The premise of dialogic reading is systematic implementation based on students' current level and needs (Mol et al, 2009; Whitehurst et al., 1994). The

lack of knowledge about dialogic reading could lead to ineffective implementation (Mol et al.). Eight out of 14 studies included training for those who implemented dialogic reading sessions (Crain-Thoreson & Dale, 1999; Dale et al., 1996; Fieldling-Barnsley & Purdie, 2003; Hargrave & Senechal, 2010; Lonigan et al., 2013; Pillinger et al., 2014; Sim & Berthelsen, 2014; Whitehurst et al.). Training included video descriptions and models, feedback, role play, didactic presentation, and hands-on practice. While all studies provided adults with training, three studies suggested the need for more intensive training (Mol et al.; Sim & Berthelsen, 2014; Zucker et al., 2013) given that dialogic reading is not "a self-evident phenomenon" (Mol et al., p.21).

For students with disabilities, the importance of training was even more emphasized. Mol et al. (2009) found that children with language impairments did not take advantage of dialogic reading. The authors explained that parents lacked sophisticated reading skills and mismatched the present level and support level needed by their child, which is the key of dialogic reading. For example, at risk children may not benefit from an inference making strategy, if the support they receive is beyond their present ability levels. This suggests the need for more intensive training for adult implementers, which includes explicit descriptions of details needed to implement the intervention.

Lack of fidelity. Despite intensive training, a lack of fidelity to the method could interrupt the effective implementations of dialogic reading. Although four out 14 studies recorded implementation fidelity, three studies checked the number of observations (Hargrave & Senechal, 2000) or reading sessions (Pillinger et al., 2014; Whitehurst et al.,

2014) instead of checking fidelity. Compared to these studies, Lever and colleagues (2010) showed more systematic implementation fidelity by controlling the number of observation and intervention sessions, and the replication of effects from previous dialogic reading sessions.

Taken together, a review of these 14 studies suggests that dialogic reading is underpinned by sociocultural theory, demonstrating the associations of adult reader behavior changes with children reading behavior changes. When dialogic reading is implemented with fidelity, it is most effective. Attention to fidelity is best achieved through training.

Effects of Dialogic Reading on Oral Language

Research shows that dialogic reading is an effective language intervention for young children. According to NELP study (2008) that analyzed five studies, including 300 preschool children on language interventions, dialogic reading has a stronger effect size ($d=.59$) as compared to non-dialogic reading interventions ($d=.42$). Similarly, Mol and colleagues (2009) conducted a meta-analysis with 16 eligible studies (626 participants) including NELP (2008), and found that dialogic reading showed stronger gains in children's vocabulary outcomes (Cohen's $d = .42$, $p < .001$) compared to typical shared reading.

Dialogic reading has positive effects on developing oral language skills, especially for expressive vocabulary (Dale et al., 1996; Hargrave & Senechal, 2000; Mol et al., 2009; NELP, 2008; Whitehurst et al., 1994, Zucker et al., 2013). Mol et al. (2009) found that dialogic reading showed moderate effect size in developing expressive

vocabulary (Cohen's $d=.59$, $p<.001$) whereas it had smaller effect size for receptive vocabulary (Cohen's $d=.22$, $p<.01$). Furthermore, Whitehurst and colleagues (1994) conducted a randomized control study with 73 three-year-old children from five daycare centers in New York. The hypothesis of this study was that children who had dialogic reading sessions at school would show higher improvements in oral language abilities compared to those who did not have such reading sessions. At the pretest with the Early One Word Picture Vocabulary-Revised (EOWPV-R) and the Peabody Picture Vocabulary Test- Revised (PPVT-R), the participating children showed one standard deviation below the norm for both expressive and receptive vocabulary, earning average scores of 81.9 and 84.5 respectively. After six weeks of intervention, children in the dialogic reading conditions (school reading condition and school plus home reading conditions) gained the highest in expressive vocabulary scores, 97, and maintained this gain even after six months. According to EOWPV-R results, there were several items that were sometimes labeled correctly by children in the reading conditions (seahorse, telescope, oar, and calendar) but were never labeled correctly by any child in the control condition. On the other hand, some items (e.g., violin, chalk, and washing) were labeled correctly at over twice the rate in the reading conditions as in the control condition. The exceptional gains in vocabulary could be observed through labeling differences between control and dialogic reading groups.

Two studies (Dale et al., 1996; Hargrave et al., 2000) showed that dialogic reading is beneficial for children with limited language skills. Dale and colleagues (1996) used MLU and total number of words to demonstrate positive effects of dialogic

reading on children's expressive language skills. Thirty-three children with language impairments and parent dyads participated in this study. In the experimental study, both dialogic reading and non-dialogic reading groups showed increase in the number of words used and MLU, but the significant increase in the number of words used and MLU was observed only in the dialogic reading group ($p < .05$). Hargrave and Senechal (2000) also found significantly larger gains in vocabulary compared to those participants who were in traditional shared book reading sessions. This study was done with 36 children whose expressive vocabulary lagged about 13 months on average behind their chronological peers. Eight children were assigned to one of two groups: a regular shared reading group or a dialogic reading group. Both groups read the same books twice. Children in the dialogic reading group outperformed the other group on vocabulary, especially for expressive language measures. Taken together, these researchers demonstrated that dialogic reading sessions facilitated the development of language of children with limited language skills and vocabularies.

The effects of dialogic reading on children's oral language outcomes relate to several variables: the frequency of dialogic reading sessions, home literacy environment, parents' attitude towards literacy, and children's current language level. First, the frequency of dialogic reading sessions is correlated with children's oral language skills. There are significant correlations between the frequency of dialogic reading sessions and children's oral language skills ($p < .05$) as Whitehurst et al. (1994) observed. For example, Zucker and colleagues (2013) found that the frequency of interactive shared reading had positive and significant impact on children's receptive vocabulary

development ($p=0.15$). The quality of the session was found to be a significant factor in the development of children's oral language because the frequency of shared reading did not predict the improvement in oral language (NELP, 2008; Mol et al., 2009; Zucker et al., 2013).

Second, home literacy environments (e.g., the number of books at home) could affect children's vocabulary outcome, particularly those participants who came from low-income families. One third of these participating children had never frequented libraries (Whitehurst et al., 1994). Additionally, fathers did not have strong impact on children's oral language. For example, there were unclear correlations including fathers' education level and attitude (Whitehurst et al., 1994).

Third, Whitehurst and colleagues (1994) studied children's attitude toward literacy. It was found that children with strong interests in reading had positive outcomes in language development. Fourth, the current language skills of children moderate the effects of dialogic reading on their further language development (Mol et al., 2009; Zucker et al., 2013). Mol et al. (2009) postulated that at-risk children do not benefit from making inference strategies because the skill is beyond their ability. Zucker et al. (2013) also demonstrated that dialogic reading did not enhance the oral language of children with identified developmental disabilities (Zucker et al., 2013).

In conclusion, dialogic reading is an effective intervention to improve oral language skills (Dale et al., 1996; Hargrave et al., 2000; Mol et al., 2009; NELP, 2008; Whitehurst et al., 1994; Zucker et al., 2013). In particular, two studies (Dale et al., 1996; Hargrave et al., 2000) demonstrated the effects of dialogic reading on students with

language impairments. Furthermore, such effectiveness of dialogic reading could be accelerated by the frequency and quality of the session besides the reader's literacy attitude and current language skills. These findings are critical given that the development of oral language skills affects listening comprehension.

Effects of dialogic reading on listening comprehension. The effectiveness of dialogic reading on improving comprehension of young children was demonstrated in several studies. According to the meta-analysis conducted by Swanson and colleagues (2011), dialogic reading showed a greater effect size ($d=.60$, $p<.01$) on improving listening comprehension of at-risk students in reading compared to other reading interventions (e.g., computer assisted program, repeated reading).

Providing appropriate scaffolding is highlighted in three studies (Desmarais et al., 2013; Lever & Senechal, 2011). Desmarais and colleagues (2013) investigated the effects of dialogic reading intervention to improve inferential comprehension of 16 four- to six-year old students with SLI. The researchers defined inferential comprehension skills as those required to understand the hidden meaning, character's intention, and internal response. To determine its effectiveness, they used predetermined questions and cues in conjunction with dialogic reading tasks as an intervention for 10 weeks. Each session started with shared reading, and within the session, dialogic reading interventions occurred for 15 to 20 minutes. To support children's listening comprehension, four tiers of scaffolding were provided: syntactic cue, semantic cue, phonemic cue, and repetition. Findings indicated that participating children in this study showed improvements in inferential comprehension across the time from pre- to post-intervention. Repeated

measure polynominal ANOVA revealed that participating children showed continuous improvements in comprehension scores throughout study schedules, including pretest, intervention, and posttest. In particular, their comprehension scores significantly differed between pretest and posttest ($p < .01$). T-test on Preschool Language Assessment Instrument (PLAI) also showed that these kindergarten students with SLI made significant growth on inferential comprehension ability across dialogic interventions and posttest.

In the group experimental study, Lever and Senechal (2011) found that dialogic reading intervention improved kindergartners' narrative comprehension skills. Two 20-minute dialogic reading interventions were conducted with 20 five-year-old children in Canada once a week for 8 weeks. Another 20 peers received regular reading sessions. The narrative comprehension skills were measured by the extent of producing narratives and retelling tasks. After the intervention, children in the dialogic reading group showed significantly enhanced narrative production and retelling skills compared to the other group. Children in the dialogic reading group frequently incorporated story grammar elements in retelling fictional narratives. For example, they identified and referenced all the characters and main details adequately. For students who could not decontextualize the story, scaffolding from teachers helped them contextualize the story and retell the story in more coherent ways.

In conclusion, three studies showed that dialogic reading is an effective intervention to improve listening comprehension of children, including at-risk students (Desmariais et al., 2013; Lever & Senechal, 2011; Swanson et al., 2011). In particular,

two studies highlighted the critical role of the teacher scaffolding in improving listening comprehension on narrative texts and making inferences (Desmarias et al.; Lever & Senechal).

Summary

Taken together, dialogic reading has proved effective at improving oral language skills and listening comprehension across a diverse group of learners. The analysis of related studies clearly shows positive effects occur only when appropriate levels of interactions between adult readers and children exist. This suggests that adult input plays a central role in effective dialogic reading. In addition, existing studies show that when appropriate training and fidelity are omitted during implementation, a decrease in the quality of dialogic reading intervention leads to less successful language and literacy development of students.

Modified Dialogic Reading for Students with ASD

For dialogic reading to be effective for students with ASD, it is evident that existing dialogic reading must be modified for several reasons. First, students with ASD have unique cognitive profiles. The interactive to independent literacy model posited by Kaderavek and Rabidoux (2004) suggests an appropriate level of support that eliminates barriers is needed to develop literacy and language skills of students with communication disorders. In particular, students with ASD need additional support to facilitate their joint attention. However, existing dialogic reading used for typically developing children does not provide the tools for students with ASD to hold their disjointed attention. Second, the effectiveness of dialogic reading for students with ASD has not been recognized as an

EBP for language development. The original dialogic reading intervention was found to be effective on oral language (What Works Clearinghouse [WWC], 2007). Overall, five studies of dialogic reading met the evidence standards of WWC, showing its effectiveness on oral language development.

Its effectiveness has been recognized as an EBP through multiple implementations by different research teams in different locations for students with SLI. Each of these two components were recognized as EBPs. For example, the evidence based instructional strategies that are part of dialogic reading (e.g., prompting, visual supports, task analysis) were recognized as effective for students with ASD by the National Professional Development Center on ASD (Wong et al., 2014). However, the effectiveness of the combination of these two practices, the modified dialogic reading for students with ASD, is hard to generalize yet. Documenting EBPs requires multiple implementations across research teams. However, there are only three existing studies regarding the modified dialogic reading for students with ASD. This does not meet the EBP standards. Therefore, the need in the field is clear. The modified dialogic reading needs to be replicated based on the existing studies in the field. This section starts with the theoretical framework for the modified dialogic reading. This section continues to discuss the effectiveness of modified dialogic reading and its replications.

Effectiveness of Dialogic Reading on Oral Language Development for Students with ASD

The lack of language skills is the one of the defining characteristics of students with ASD. Four studies (Fluery et al., 2014, 2016; Whalon et al., 2015, 2016) reported

that dialogic reading has positive effects on improving oral language skills of participating children. Among these studies, three studies used the modified dialogic reading (Fluery et al., 2016, Whalon et al., 2015, 2016).

In the multiple baseline single subject design, Fluery and colleagues (2014) measured the duration and frequency of verbal participation during reading sessions. To measure the duration of student-to-student verbal participation, the researchers used momentary sampling with 10 second intervals. The data were collected until the student did not pay attention to the session or to the teacher. Compared to the baseline, dialogic reading intervention sessions lasted longer for all three participants. The average baseline reading session lasted 2.75 minutes (within a range of 2.30 to 4.17 minutes) whereas the average duration of dialogic reading sessions was 4.48 minutes (within a range of 2.83 to 6.67 minutes).

In addition, Fluery and colleagues (2014) calculated the verbal participation rate of the preschoolers with ASD. To make sure that the length of the reading session did not impact verbal participation measurement and to compare on-task behavior across phases, researchers calculated verbal participation as the number of verbalizations per minute. Compared to the baseline book readings, dialogic reading demonstrated an immediate increased level of child verbal participation. The baseline level of verbal participation across participants ranged between 0.11 and 0.98 per minute; however, the level of verbal participation, ranging from 1.56 to 3.18 verbalizations per minute, was changed immediately once the intervention was introduced. These findings revealed that dialogic reading positively influences students' verbal participation, to an extent.

However, the researchers did not clearly state whether dialogic reading is helpful for young children with ASD to improve verbal and nonverbal initiations. Fleury and colleagues also admitted that the study did not show whether the intervention impacted students' spontaneous language use.

In the multiple baseline study across participants, however, Whalon et al. (2015) showed increases in verbal and nonverbal initiations of four children with ASD when adaptations were made to the existing dialogic reading. Whalon and colleagues incorporated visual supports and systematic instruction to dialogic reading. The researchers defined initiation as a child comment, question, or request related to the book that is not contingent on an adult utterance.

Verbal initiations were recorded when a child spontaneously made comments or asked questions that did not rely on comments from others; nonverbal initiation was recorded when the child made attempts to show or share information about the book to others. To facilitate student participation, three cues were intentionally given: secure attention, intentional pause, and initiation question cards. Among these, initiation question cards were used once the children started responding to visual prompts. The findings revealed that three out of four participating students showed an increase in the frequency of spontaneous verbal initiation. Although one student did not show improvements in initiating during the dialogic reading sessions, his initiations were already at the higher level at the baseline. However, the visual analysis of data showed such increases did not occur immediately with the introduction of dialogic reading. In addition, dialogic reading intervention did not include teaching initiation skills although

cues were given. Furthermore, Tau-U effect size were extremely low for nonverbal initiation skills. In summary, Whalon and colleagues successfully showed the effect of the intervention on student verbal participation, but its effects on initiation skills still are not clear.

To examine the effect on verbal participation of dialogic reading intervention, Fluery and colleagues (2016) replicated a part of Whalon et al.'s (2015) aforementioned study. In this replication study, Fluery and colleagues confirmed that dialogic reading was helpful to improve verbal participation. Specifically, the level of verbal participation was changed immediately once the intervention was introduced. Tau-U effect size was marked as significant (Tau-U=0.80-1.25, $p<.01$). However, there was no functional relationship observed between the given intervention and children's initiation skills (Tau-U=-0.20 to 0.32).

In the study of Fluery and colleagues (2016), five paraeducators were instructed to use more questions, especially for wh-questions, during dialogic reading sessions. This pattern consistently occurred across all severities of ASD groups. The change of children's response level was made to a large to a very large range of mean level differences between baseline and intervention (1.31 to 4.35 responses per minute to intervention) (Tau-U: .80-1.25, $p<.01$) right after the introduction of the intervention. However, these changes did not have a moderate to large effect on children's initiating comments or posing questions.

Vocabulary. In the multiple baseline design across severity groups of children with ASD, Fluery and colleagues (2016) confirmed dialogic reading intervention brought

positive and significant gains in the knowledge of book-specific vocabulary of students with ASD ($p=.008$). Dialogic reading sessions occurred with nine children with ASD and five paraeducators for four times a week for five weeks. According to the pre- and post-assessment results with researcher-developed expressive vocabulary measures, participating children with ASD learned an average of 1.7 words during dialogic reading sessions while they learned 0.5 words on average with regular shared reading sessions. The same patterns were observed across all groups of students with ASD (mild, medium, severe).

In summary, two of three studies on dialogic reading interventions with students with ASD used systematic prompting and visual supports. Fleury et al. (2016) and Whalon et al. (2015) also demonstrated that evidence based instructional strategies showed effectiveness in oral language skills (e.g., vocabulary learning). Furthermore, these two studies demonstrated functional relationships between the dialogic reading intervention and initiation skills of students with ASD. This confirms that those strategies were helpful for improving secured attention and verbal participation of students with ASD (Fleury et al., Whalon et al.).

Effectiveness of Modified Dialogic Reading on Listening Comprehension for Students with ASD

Whalon and colleagues (2015) specifically used systematic scaffolding to improve listening comprehension ability of students with ASD. Specifically, they targeted increasing correct responses to fact- and inference-based questions of 4 four- to six-years-old children with diagnoses of ASD and speech language disorders. To do this,

the researchers used four-tiered prompts in addition to PEER and CROWD: three visual responses, binary choice, direct model, and physical pointing to the answer and repeating the statement. All these prompts reflect the cognitive complexity of students with ASD (e.g., the lack of joint attention and difficulty in inferential comprehension). Once the intervention started, the frequency of incorrect or nonresponses immediately decreased, while the frequency of correct responses to unprompted fact- and inference-based questions regarding the storybook increased. This confirmed that dialogic reading can improve listening comprehension of students with ASD.

To examine the effect of the modified dialogic reading on listening comprehension, Whalon and colleagues (2016) replicated part of Whalon et al.'s (2015). In the replication study, a caregiver was instructed to use the modified dialogic reading to her son. This study confirmed that the modified dialogic reading was helpful to improve correct responses of a young child with ASD to fact-, inference- based, and open-ended questions.

In conclusion, only two studies showed how dialogic reading better supports listening comprehension of students with ASD. In addition, using hierarchically tiered prompts showed significant and positive differences in terms of fact- and inference-focused comprehension of children with ASD. Moreover, EBPs are expected to make continuous positive impacts on student academic and behavioral outcomes (Cook & Cook; Cook, Tankersley, & Landrum, 2009). Given this, to verify the reliable outcomes of modified dialogic reading on listening comprehension of students with ASD, the original study of Whalon and colleagues (2015) needs to be replicated.

Implementation of Modified Dialogic Reading for Students with ASD

In the four identified studies conducted on students with ASD, either researchers, parents, or paraeducators provided dialogic reading interventions (Fluery et al., 2015, 2016; Whalon et al., 2015, 2016). Fluery et al. (2016) and Whalon et al. (2015) studies used multiple-baseline across participants of single subject research design. Whalon et al. (2016) used a case study. All three studies included fidelity checks to investigate the treatment integrity.

In the study of Fluery and colleagues (2014), the researchers examined the effects of dialogic reading on student engagement and student response depending on dialogic reading prompts. To investigate whether specific prompts elicited verbal responses of the child, the researchers needed to use dialogic reading prompts during each book reading sessions. The researcher in this study used fidelity check to measure the associations of specific types of prompts and child verbal responses. The researchers considered that they met the fidelity criteria if they used more than twice of each dialogic prompt. The researchers used the point-by-point method to check which types of dialogic reading prompts were used and reached 100% agreement.

In the study of Whalon et al. (2015), two coders checked treatment integrity while watching video clips from baseline and intervention phases. This was to determine whether dialogic prompts and the hierarchy level of prompts were delivered correctly and consistently. The first coder watched randomly selected 30% of video clips, and the fidelity check showed the implementation of the intervention was delivered in fidelity.

The second coder watched 30% of randomly selected videos from the baseline and the intervention phases and it showed 100% of agreement.

Fluery and colleagues (2016) observed the interventions of paraeducators to nine students with ASD and measured procedural fidelity to investigate paraeducators' compliance with the intervention procedures. A randomly selected 30% of sessions were coded for fidelity check using the research-team developed checklist. Procedural fidelity was calculated by dividing the number of correct paraeducator behaviors by the total number of items and multiplying by 100. Interobserver agreement on procedural fidelity was assessed in 33% of the reliability observation. Estimates of procedural fidelity was about 95% (range = 78%-100%). Interobserver agreement on procedural fidelity assessment showed 90% agreement (range = 78%-100%).

Whalon and colleagues (2016) observed the intervention of a caregiver with a preschooler with ASD and measured treatment fidelity. His caregiver showed an average of 93% implementation fidelity (range = 75% and 100%). Interobserver agreement on treatment fidelity was 97% (range = 89%-100%).

Problem Statement

The purpose of this study is to investigate the effectiveness of modified dialogic reading on students with ASD. This literature review shows that the modified dialogic reading warrants future research, as indicated by the many benefits research has shown. Specifically, dialogic reading has shown effectiveness for the development of oral language skills and listening comprehension of diverse students. In addition, this review

shows the evidence that dialogic reading is underpinned by sociocultural theory, indicating the critical role of adult inputs on children's behavior changes in a variety of ways.

Given that dialogic reading for students with ASD requires additional supports to meet their needs, three studies used modified dialogic reading (Fleury et al., 2016; Whalon et al., 2015, Whalon et al., 2016) Those studies show positive effects of the modified dialogic reading in gaining vocabulary knowledge and verbal response rates of students with ASD. However, its effectiveness on verbal initiations was not consistent across studies. In addition, there are only two studies that provided modified dialogic reading sessions that considered the complex cognitive characteristics of children with ASD. Whalon et al. (2015, 2016) used tiered prompting system and demonstrated significant effects on listening comprehension of students with ASD. Specifically, using hierarchical prompting generated positive differences in question answering for fact- and inference-focused comprehension questions. Although these studies demonstrate the effectiveness of the modified dialogic reading for students with ASD, its effectiveness is hard to generalize because of the lack of replications. To verify its reliability, the approach used by Whalon and colleagues (2015) needs to be replicated.

Taken together, the limited research on modified dialogic reading call for more need of in-depth investigation on dialogic reading for students with ASD. Furthermore, it is imperative to confirm the effectiveness of combining evidence based instructional strategies into the dialogic reading to meet the need of students with ASD. Given these rationales, the current study will replicate Whalon et al. (2015) to show functional

relationship between dialogic reading and language development and listening comprehension of students with ASD.

The purpose of this study is twofold: investigating the effects of the teacher training on how to use the modified dialogic reading intervention on teacher's correct use of it and the subsequent changes in outcomes (i.e., improving listening comprehension and oral language skills) of young children with ASD. The research questions for this study are:

1. How does teacher training in teacher-implemented modified dialogic reading interventions (i.e., prompting strategies, instructional sequence, hierarchical prompting) affect the teacher implementation during the modified dialogic reading sessions with students with ASD?
2. How do the modified dialogic reading interventions affect the correct and spontaneous responses to fact- and inference-based questions of children with ASD?
3. How do the modified dialogic reading interventions affect the initiation skills of children with ASD?

CHAPTER III

METHODOLOGY

The Institutional Review Board (IRB) of the University of North Carolina at Greensboro approved this study. The setting was a small private school that did not require additional IRB approval. Data collection took place in the spring semester. One special education teacher and students and four students with ASD were the study participants. To recruit participants, convenience sampling and purposeful sampling were used. These sampling methods were used mainly because of the access to participants in this study. For example, convenience sampling was used for my ease of access (e.g., proximity) to the research site. Additionally, purposeful sampling was used because of the limited targeting population in the field.

Once the teacher consented, she recruited student participants according to the IRB approval. Student participants were selected based on the following inclusive criteria: (a) primary medical diagnosis of ASD, (b) students aged between four and eight, and (c) English as their first language. All of the experimental phases in this study were conducted in the resource room where reading was typically taught. All sessions were video recorded for analysis, and participants were given pseudonyms to protect their identities.

Setting and Participants

The school had approximately 250 students in grades pre-k through 8. The school offered a special education program for students with ASD. The resource room had two teachers who were fully licensed to teach students with ASD. These teachers were responsible for different students: one for pre-K through 1st grade and the other for 2nd through 5th grade. Students in this program took math, science, and specials (e.g., music, art, PE, guidance) in general classrooms and attended several courses (e.g., reading, ABA) in the resource room. Depending on the daily schedule, they were able to work with an individual or small group.

Sara, a female special education teacher at the elementary school, was recruited for this study. When she expressed her interest in this dissertation study, I visited the classroom and described this study and obtained her written consent. Sara answered questions regarding demographic information, educational and professional history, and her current literacy practices. Sara was a licensed special education teacher. She was born in Peru and she moved to the United States at the age of 25, after she finished her undergraduate and master's degree. She earned her undergraduate in elementary education and master's degree in speech therapy. At the time of the study, she was 43 years old. She had worked as a special education teacher in kindergarten and lower grades for the last ten years. Sara worked at the school for two years. Because student enrollment was not high enough for school administrators to hire her as a teacher, Sara

worked as a paraprofessional in this classroom during her first year at the school. The year of the study, program enrollments increased and the school hired Sara as a special education teacher.

Sara recruited participating students for this study. Originally, five students between the ages of four and eight diagnosed with ASD provided their assent and parent consent to participate in this study. However, one student participant changed placements in the middle of this study. As a result, her participation in this study was terminated. Thus, a total of four students (three boys, one girl) participated in this study. The average age of participants was six years and three months (range of four years old and seven years old and six months) at the date of recruitment. Prior to participation, I reviewed the available student information including demographics and related evaluation data to see current literacy level of students.

Tell was a 6.2-year-old African American boy. Tell was diagnosed with ASD at the age of three. He was assessed with the Bayley scale of infant development, third edition (Bayley-3) and his cognitive composite equivalent was 8. His Vineland-II communication score was 81. Tell received speech therapy services. He showed behavior difficulties in class, so he had the color-coded behavior management plan at the time of this study.

Gi just turned four years old when the participant recruitment started. She was an Hispanic girl. She was diagnosed with ASD at the age of three. Her score on Bracken Basic Concept Scale (BBCS) was 68th percentile with an age equivalent. She received

speech therapy. She demonstrated difficulty using expressive communication, interpersonal relationships, pragmatic language, as well as turn taking.

Kern was a Caucasian boy and his age was 7.4 years. He was diagnosed with ASD at the age of 4. His Vineland Adaptive Behavior scores were 74, or the 4th percentile. On the differential ability scale II, his score was 81 on the general conceptual ability, or below average. His preschool language scale was 64, or the 1st percentile. The VABSII survey was completed by his parents, and his composite score was 74, or moderately low, while the teacher composite score was 65, or in the low range.

Lamp was a 7-year-old Caucasian boy diagnosed with autism at the age of four. Lamp has limited attention, concentration, social skills and comprehension in abstract concepts. In addition, he showed difficulties in staying on task, in particular when multi-level directions were given. According to General Conceptual Ability (GCA), his verbal ability was ranked as 5th percentile compared to his same age peers, which means low. His vocabulary development and verbal concept formation were also in the Low range. He is on tier 2 of Response to Intervention (RTI).

Materials

Prior to the data collection, the teacher participant and I met to select the books that would be used during the intervention and maintenance phases. The selection criteria for the books for this study were if they (a) included age-appropriate topics for student participants, (b) would help to enhance emergent literacy skills (phonological awareness, alphabetic knowledge, listening comprehension strategies [retelling, answering questions], oral language skills, and vocabulary outcomes), (c) were easy to

obtain, (d) had colored illustrations on each page, (e) and had new vocabulary (Hargrave & Senechal, 2000; Lonigan, 2013). Based on the criteria, popular trade books (i.e., Pigeon books, *A Color of Mine*, *Pete the Cat*) were selected for this study. Those books include a comparable number of pages and words. In addition, they were not previously used in the classroom before. See Table 1 for a part of lists of books used for this study.

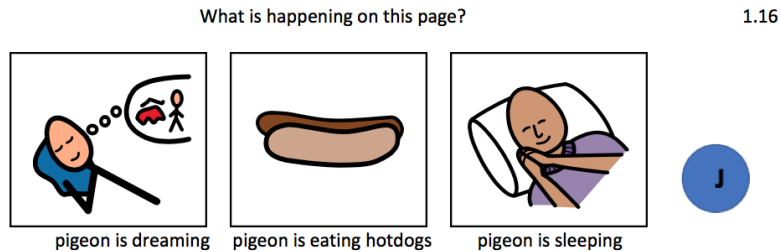
At the beginning of each week, I provided the teacher participants with books and question cards that would be used for the week. Each book had two or three question card sets, which meant each book was read two or three times. Each question card set had comparable fact- and inference-based questions. Some question cards were the same cards used by Whalon et al. (2015) for their study. Due to the length of the study, I developed additional question cards modeled after the originals.

Each page of question cards included a scripted question, three responses, and colored dots (optional). An example of a question card is found in Figure 1. First, scripted questions were formatted using CROWD. Second, three possible choices consisted of pictures from board maker software and corresponding letters. Third, small dots in three different colors were intended to guide the teacher. The red dots marked with *I* indicated the time to use intentional pause. The yellow dots marked with *Q* indicated the time to let students use question cards. The blue dots marked with *J* indicated the time to get children's joint attention.

Table 1. Books Used for Intervention and Maintenance Phases

	Title	Authors	page	TELL	PARKER	LAMP	GI
1	A color of His Own	Leo Lionni		X			X
2	The Grouchy Ladybug	Eric Carle	21	X	X	X	
3	Bear snores on	Karma Wilson Jane Chapman	16	X	X	X	X
4	Don't let the pigeon stay up late		16	X	X	X	X
5	It's mine	Leo Lionni		X	X		X
6	When Sophie Gets Angry		17	X	X	X	
7	Don't let the Pigeon Drive the Bus	Mo Williems	15	X	X		X
8	BOY + BOT	Ame Dyckman		X	X	X	
9	Pete the Cat I Love My White Shoes	Eric Litwin	16				X
10	The Pigeon Finds a Hot Dog	Mo Williems	16	X	X	X	
11	Pete the Cat and his four Groovy buttons		16				X
12	I don't want to be a frog	Dev Petty	12	X	X	X	
13	Five Little Monkeys Wash the Car	Eileen Christelow	16	X	X	X	X

Figure 1. Example of Question Card (Adopted from Whalon et al., 2015)



Independent Variable

The independent variable for this study was a professional development package. The professional development package was intended to teach how to use the modified dialogic reading intervention (i.e., how to incorporate the instructional sequence and dialogic reading prompts, and how to use attention securing prompts). It consisted of an initial teacher training and booster sessions. The following sections describe the independent variable.

Initial Teacher Training

During the initial teacher training, the teacher participant received direct instruction on how to use the modified dialogic reading: dialogic prompts (CROWD), instructional sequence (PEER), systematic instruction, attention prompts, and intentional pause. First, the teacher learned how to use the dialogic prompts, including CROWD, wh- inferencing, and emotion. CROWD refers to Complete, Recall, Open-ended questions, wh-questions, and distancing. Second, the teacher learned how to use the systematic instructional sequence of modified dialogic reading (PEEP). PEEP refers to Prompts, Evaluate student response, Expand the response, and Praise. Third, the teacher

was also informed about how to implement systematic instruction, using least to most prompting. The whole training took less than two hours. I modeled how to implement each component and the teacher practiced these skills five times each to enhance knowledge transfer of prompts into practice. A visual map that incorporated each component of modified dialogic reading was given to the teacher participant (Appendix A).

Additionally, the participating teacher was asked to describe the procedures for implementing the dialogic reading intervention based on CROWD, PEEP, systematic instruction, attention prompts, and intentional pause in the correct sequence. Training criteria was three consecutive sessions of 100% completion of all steps listed (Appendix B). Next, the teacher demonstrated how to provide the dialogic reading instructional sequence to non-participants. This was to strengthen external validity. Finally, I completed the fidelity checklist (Appendix B). If the teacher's implementation deviated, I coached her in the correct procedures. When the fidelity checklist reached 100% correct implementation, the training was over.

Booster Sessions

In addition, 4 booster sessions were held during the intervention. Booster sessions were held when observations indicated potential problems with teacher implementation. Sessions consisted of reviewing selected video clips and discussing the teacher's use of modified dialogic reading lessons. Each session started with positive statements about teacher performance. Next, the teacher and I together reviewed selected videos, and I provided specific positive and corrective feedback about implementation. I

asked open-ended questions to solicit the teacher's opinions and questions. During 3 of the 4 booster sessions, power point slides from the initial PD were reviewed. At the end of each session, I provided the teacher with encouragement to continue to use the strategy during the reading session.

Design

For the teacher, a multiple baseline across behaviors was used to examine teacher implementation. This design was selected since there was 1 participant and multiple components. This enabled me to examine the teacher's implementation of each component of the intervention. For students, a multiple baseline across participants' design was used. This was selected to examine the effects of the teacher's implementation on student outcomes. Taken together, this design enabled me to address my research questions in a school setting. All sessions during all three phases were video recorded for analysis.

Dependent Variables

Three dependent variables were used – one at the teacher level (i.e., implementation fidelity) and two at the student level (i.e., listening comprehension and initiation).

Teacher Dependent Variables

The purpose of measuring fidelity treatment is to determine if the interventions was implemented as it was intended, which enhances the internal and external validity of the intervention. Given that the fidelity of implementation maximizes the effectiveness of the effective strategy (Cook & Cook, 2013), this study investigated if the teacher

training on the modified dialogic reading was functionally related to the teacher implementation while using this reading strategy. In this study, fidelity treatment was used as the teacher dependent variable. It was measured across baseline, intervention, and maintenance phases.

To measure fidelity treatment, each component of the modified dialogic reading was collected as data. Teacher use of scripted questions, expanded student responses, praise for student participation, attention prompts, and intentional pause were documented. Systematic instruction needed more attention to document the teacher's implementation. The teacher participant was directed to start using systematic instruction when student participants did not correctly respond to the teacher's question within 5 seconds. The prompting hierarchy was least to most. In other words, teacher first provided three answer choices, then two answer choices, modeling, and then physical guidance. Because systematic instruction was expected to be used when the student responded incorrectly to questions, the frequency of incorrect responses was the proxy for use of systematic instruction. Given this, the rate of accurate use of systematic instruction was calculated by dividing correct implementation of systematic instruction by the total opportunities for systematic instruction (i.e., Rate of correct implementation of SI = $\frac{\text{frequency of correct implementation of SI}}{\text{total opportunity of SI}} * 100$). The frequency of correct implementation was counted only when teacher implemented systematic instruction correctly.

Student Dependent Variables

The first student dependent variable was the percentage of accurate responses to fact- and inference-based questions. Fact-based questions required students to answer from the book. Inference-based questions required students to use their background knowledge to answer to the teacher. Example questions are presented in Table 2.

Table 2. Examples of Fact-based and Inference-based Questions

Fact-based Questions	Inference-based Questions
What is this story about?	How do you think the little frog is feeling?
About what is the frog reading?	Why can't a little frog be a rabbit?
What does the frog want to be this time?	The frog wants to be a pig. What would
He cannot be a pig because he does not	you want to be?
have a curly _____.	What do you think the frog are feeling?

The second student dependent variable was the frequency of initiation attempts. Initiation was defined as child comments, questions, or requests related to the book that was not contingent upon an adult utterance. Therefore, no responses to adult utterances were considered as initiations. Frequency was counted when the student asked questions or shared his/her ideas with peers or the teacher.

Intervention Procedures

Baseline Procedures

Two levels of data were collected across baseline (i.e., teacher and student). Baseline consisted of five data points, as required by quality standards (Horner et al., 2005; Krotchwill et al., 2013). During the baseline phase, the teacher continued her typical read aloud instruction. This included first reading aloud an entire trade book without stopping. Next, the teacher went back through the book and asked a question about each page. For students who correctly responded to each question, the teacher confirmed and expanded the answer. For students who responded incorrectly, the teacher said the correct answer. Based on the implementation checklist for baseline, she did not need to do anything else (e.g., using scripted questions, attention prompts, intentional pause) besides her typical read aloud instruction.

During baseline, data on teacher and student participants were collected. Regarding teacher data, the teacher's use of dialogic reading prompts (e.g., prompt type), instructional sequence (expanding student answers, praise for correct answer), and hierarchical level of prompts were collected. Regarding student data, frequency of unprompted correct responses, prompted correct responses, and initiation attempts (e.g., asking questions, adding comments) were collected.

Prior to the first student's entrance into the intervention phase, professional development was provided to the teacher participant. Training included how to use the modified dialogic reading by incorporating dialogic reading prompts (i.e., CROWD and PEEP), least-to-most prompts of hierarchy, and visual supports. Training included four

steps. First, the importance of using the modified dialogic reading for students with ASD was discussed, connecting with unique cognitive profiles of students with ASD and their needs of oral language and literacy development. Second, the teacher received direct instruction on details of modified dialogic reading (e.g., components, procedures). Third, I modeled how to use the modified dialogic reading, incorporating with the hierarchy level prompts and visual supports. To help the teacher, a visual that shows the sequence of implementation was given (see Appendix A). Fourth, the participating teacher was asked to describe the procedures of implementing the modified dialogic reading. Additionally, the participating teacher practiced these skills five times each, and corrective feedback was provided. The fidelity checklist was completed while she practiced this strategy altogether. Training was over when the teacher reached 100% completion of all steps listed across three sessions (see Appendix B). When one student showed stable five data points at the baseline, the intervention phase started.

Intervention Procedures

Data on teacher fidelity of implementation were collected to examine the procedural fidelity of the teacher's implementation. Correct implementation during the intervention was documented as percentage and reported in the fidelity table and narrative. As noted earlier, the teacher was provided booster sessions when observations of her teaching indicated potential issues with implementation (e.g., the teacher started showing the question card while she was asking the scripted questions, missed opportunity to use intentional pause and question cards to facilitate joint attention). In

addition, the teacher also asked questions whenever she was uncertain as needed throughout the intervention (e.g., remind her of the three components after the school resumed from spring break).

Multiple-baseline across participants of SCD requires defining a criterion for staggering the intervention (Gast & Ledford, 2010). After the first student participant demonstrated five consistent data points during the intervention phase, the second student participant entered to the intervention phase. This process was repeated until all participants have entered the intervention phase (Gast, 2010).

During the intervention phase, the teacher implemented the modified dialogic reading, incorporating with visual supports and systematic instruction. To meet the needs of students of ASD, students received additional prompts, wh-inferences and emotions besides well-known dialogic prompts (e.g., CROWD). Wh- inference questions were used to encourage students to make inferences. Before turning each page, the teacher asked, “what will happen next?” To support students to better understand feeling of characters, for example, the teacher asked the child, saying, “why did he feel sad?” With these prompts, all participating students had opportunities to respond to fact- and inference-based questions.

When the child failed to correctly respond to CROWD prompts within five seconds, the teacher initiated the four-level prompting hierarchy using the least to most prompts (e.g., triad of visual choices, binary choice, or direct model). Incorrect or modeled responses were coded when the child failed to respond. For any correct responses delivered within five seconds, the teacher expanded upon the answer by

elaborating the child's response with additional information. Then the teacher provided positive feedback on the correct answer. For children who respond incorrectly, the teacher provided further support with three visual response options. If the child did not respond correctly within five seconds, one choice was eliminated, and the teacher presented two choices. If the child still did not respond within five seconds, the teacher pointed to and said the answer, and the child was asked to repeat after the teacher. Last, the child who did not respond to the modeling stage was guided to the correct answer using physical prompts.

Visual supports were intended to secure students' joint attention (Whalon et al., 2015). To establish joint attention, the teacher used attention prompts at least four times a session (e.g., look at this, wow). While giving such prompts, the teacher pointed to the letters or pictures in the book. Scripted questions cards included blue sticker dots written with "J" for joint attention to help remind the teacher to initiate those prompts.

To encourage students' interactive participation, the teacher used intentional pauses. Question cards with a red sticker dot written with "I" indicated instances to use an intentional pause. This signaled the teacher to stop reading before and after turning a page for three to five seconds. The teacher passed out the cards. These cards prompted students to ask questions to peers. For students who cannot make initiation by page five of each book, the teacher showed "Q", meaning to quit using initiation cards.

Maintenance Procedures

Once the last student participant demonstrated six consecutive data points, the teacher participant entered the maintenance phase. During the maintenance phase, no

components from professional development package were provided to the teacher and no booster sessions. During the maintenance phase, dependent measures data were collected on the teacher and students as was collected during intervention.

Measures

Teacher Fidelity of Implementation

In this study, the teacher participant's fidelity of implementation was documented on the fidelity checklist (see appendix B). In the checklist, I marked the following areas of teacher behaviors, including whether the teacher (a) asked listed questions before turning pages, (b) expanded the children's answers, (c) used systematic instruction for incorrect answers, (d) praised correct student responses, (e) used secure attention prompts, (f) paused intentionally, and (g) used visuals (e.g. the pictures/ text) as necessary throughout the reading sessions. Percentage of agreement for teacher fidelity was calculated at 100% across all phases.

Student Measures

This study included two student measures: (a) correct responses to fact- and inference-based questions and (b) initiation attempts. Questions in the intervention and maintenance phases were given through a variety of dialogic reading prompt formats (e.g., complete, recall [wh-, open-ended], distancing, emotion, wh-inferences, emotion). These questions were categorized into fact-based and inference-based questions. Fact-based questions require students to answer, using the information from the book. Complete and recall question formats belong to this. Inference-based questions require

students to use their background knowledge to answer to the teacher. Questions including distancing, wh-inferences, emotion belong to this.

Student responses to listening comprehension questions (RQ2) were marked as correct or incorrect. Student responses were counted for coding only when each child responded to the teacher's question within a 5 second interval. In addition, only when the response was related to the book, it was counted as correct. If a student response was incorrect, the teacher started using systematic, hierarchy prompts. The prompts started from the triad of visual choices to binary choices, direct model, and physical guidance. Regarding students' responses to listening comprehension questions, prompting hierarchy, question types, and response accuracy were coded. First, the question type (e.g., Completion, Recall, Open-ended, Wh- questions, distancing, emotion, and wh-inference questions) were documented. If the question was applicable to multiple question types at a time, double coding was allowed. Second, the level of hierarchy of prompts were documented. If a student correctly responded to the triad of visual choices, it was marked as triad and correct. If the child did not correctly respond to the binary choices, binary and incorrect were documented at the excel sheet. Then student responses to teacher modeling were documented. Depending on the student response, it was marked as modeling and either correct or incorrect. This set repeated until the student responded correctly.

The frequency of verbal and nonverbal initiations was also collected. The total of initiations was calculated by adding the frequency of verbal and nonverbal initiations. Regarding initiation attempts (RQ3), each child's initiations were coded when the child

made spontaneous questions or comments related to the book; the utterances made to either the teacher or peers were counted as initiation attempts.

Social Validity Measures

To investigate teacher participant's perceptions on this study, the teacher participant completed a 10, 5-point Likert-type (1 = strongly disagree, 2=disagree, 3=neither disagree or agree, 4=agree, 5=strongly agree) researcher created social validity survey upon the completion of this study. In particular, the teacher was asked about: (a) the impact of the use of the modified dialogic reading on student participants' listening comprehension, (b) the impact of the use of the modified dialogic reading on student participants' use of initiation skills, (c) the impact of this study on teacher knowledge and instructional skills, and (d) the feasibility of this intervention (see Appendix E). Before completing the survey, the teacher was guided to watch video clips on all phases: baseline, beginning and final interventions, and maintenance. Then she received the survey link (<https://docs.google.com/a/uncg.edu/forms/d/1S65jv5iA4tDZQP0nVs2w5dOk2YP6H7zckisSc2L8u9k/edit>) via email and completed it. The survey questions are also available in Appendix E.

Data Analysis

This study included three dependent measures: teacher participant's fidelity of implementation of the modified dialogic reading and the children outcomes on listening

comprehension and initiation skills. All dependent measures were visually analyzed, and the mean, standard deviation, and Tau-U were calculated across phases to determine effect sizes.

Teacher implementation of the modified dialogic reading with fidelity. To implement modified dialogic reading with fidelity, the teacher was expected to (a) follow the correct cycle of prompting and elaboration (i.e., use **P**rompt, **E**valuate, **E**xpand, **P**raise (PEEP), (b) include visuals, and (c) use systematic instruction. First, the number of cycles of modified dialogic reading per session, including, and visual effects and systematic instruction, was calculated. Based on the instructional sequence of the modified dialogic reading, the teacher participant started each cycle of the reading strategy from the moment when the teacher asked questions, and ended the cycle when the teacher praised student participation. The number of cycles of modified dialogic reading was used as the total opportunity when the teacher implemented components of the modified dialogic reading.

Second, I conducted a frequency count on the teacher's use of modified dialogic reading components: (a) teacher's use of scripted questions, (b) teacher's expansion to student responses, (c) teacher's praise to student participation, (d) teacher's use of systematic instruction, (e) teacher's use of joint attention, and (f) teacher's use of intentional pause. Given that the lengths of each reading session were varied (range= 6 min - 35 min), frequency of each component was converted into a percentage. These data were considered as the actual frequency of teacher implementation for each component.

To calculate the percentage of teacher's use of modified dialogic reading component, I divided the frequency of each instructional component by the total number of the modified dialogic reading cycles. Then I multiplied by 100 (see table 3 for the details). The following sections include the detailed of how I calculated the percentage of teacher implementation with fidelity for each component.

Teacher Fidelity of Implementation

To examine if the teacher participant implemented the modified dialogic reading as she was prepared in the training, several steps were enacted. First, the number of cycles of modified dialogic reading per session, including using **P**rompt, **E**valuate, **E**xpand, **P**raise (PEEP), and visual effects and systematic instruction, was calculated. Based on the instructional sequence of the modified dialogic reading, the teacher participant started each cycle of the reading strategy from the moment when the teacher asked questions, and ended the cycle when the teacher praised student participation. The number of cycles of modified dialogic reading was used as the total opportunity where teacher implemented components of the modified dialogic reading.

Second, I conducted a frequency check on teacher's use of modified dialogic reading components: (a) teacher's use of scripted questions, (b) teacher's expansion to student responses, (c) teacher's praise to student participation, (d) teacher's use of systematic instruction, (e) teacher's use of joint attention, and (f) teacher's use of intentional pause. Given that the various lengths of each reading session, frequency of each component was converted into a percentage. These data were considered as the actual frequency of teacher implementation regarding each component.

To calculate the percentage of teacher's use of modified dialogic reading component, I divided the frequency of each instructional component by the total number of the modified dialogic reading cycles. Then I multiplied by 100. The following sections include the detailed for each section. The same procedure was calculated over scripted questions, expanded student response, praise student participation.

Teacher fidelity in using scripted questions. The percentage of the teacher's use of scripted questions was calculated each session. Scripted questions were located on the question cards after the introduction of professional development. To determine the rate of the teacher's use of scripted questions, the frequency of the teacher's use of scripted questions was divided by the total number of available teacher questions, and then multiplied by 100.

Teacher fidelity in expanding student responses. To examine the effects of PD on the teacher's use of expansion to student responses (i.e., asking questions, restating student answer, adding additional information to student responses), I coded whether the teacher expanded student responses. To determine the percentage of teacher's expansion to student responses, I counted (a) the frequency of opportunities for teachers to expand student responses, and (b) the frequency of teacher's expansion to student response. To calculate the percentage of teacher's use of expansion to student participation, I divided the frequency of occurred teacher expansion by the total number of modified reading cycle, and then multiplied by 100. Table 3 represents the teacher participant's

implementation data (i.e., mean percentage of the teacher's use of expansion to student statements) with four young children. Figure 2 illustrates teacher implementation across the participants.

Teacher fidelity in praising student participation. To examine the effects of PD on the teacher's use of praise for student participation, I coded whether teacher explicitly praised student(s) for their participation. To determine the percentage of teacher's praise to student responses, I counted (a) the frequency of opportunities for teachers to give praise to each student, and (b) the frequency of the teacher's praise given to each student. To calculate the percentage of the teacher's use of praise for student participation, I divided the frequency of teacher praise by the total number of opportunities for the teacher to praise students, and then multiplied by 100.

Teacher fidelity in using systematic instruction. To examine the effects of PD on the teacher's use of systematic instruction, I coded whether or not the teacher explicitly used systematic instruction. This is to analyze if the teacher participant used hierarchy of prompts correctly after incorrect answers or the lack of response. To do this, the teacher participant was observed using systematic instruction when students did not respond correctly to teacher questions within 5 seconds across phases. To determine the percentage of teacher's use of systematic instruction, I counted the frequency of the teacher's use of systematic instruction for each student. To calculate the percentage of teacher's use of systematic instruction to student participation each session, I divided the frequency of teacher's use of systematic instruction by three, and then multiplied by 100.

Teacher fidelity in using joint attention. To examine the effects of PD on teacher's use of joint attention skills, I coded whether or not the teacher participant used joint attention skills marked on the storybook. While being observed, the teacher participant was expected to use the skills when they saw **J** on the book, which was highlighted during the 2-hr professional development. The teacher made efforts to get joint attention of students by saying "Look, what is this?" To determine the percentage of teacher's use of joint attention skills, the frequency of the teacher's use of joint attention skills to each student was calculated. To calculate the percentage of teacher's use of joint attention skills to student participation a session, I divided the frequency of teacher's use of attention prompts by three, and then multiplied by 100.

Teacher fidelity in using intentional pause. To examine the effects of PD on teacher's use of intentional pause, I coded whether or not the teacher intentionally paused after looking at **I** on the question card. The teacher was supposed to pause for three to five seconds before asking the questions on the card. To determine the percentage of the teacher's use of intentional pause, the frequency of the teacher's use of intentional pause for each student was counted. To calculate the percentage of teacher's use of intentional pause each session, I divided the number of the teacher's use of intentional pause by three, and then multiplied by 100.

Student Correct Responses to Teacher Questions

The second purpose of this study was to determine the effects of the teacher's use of modified dialogic reading strategy on the responses of young children with ASD to fact- and inference-based questions. To investigate how the teacher's use of the modified

dialogic reading impacted listening comprehension for young children with ASD, the frequency of (a) correct responses to teacher questions, (b) correct responses to fact-based questions, and (c) correct responses to inference-based questions. Given that the length of each reading session varied, the frequency of accurate responses of each student across sessions was converted to the percentage of correct responses.

Each student's responses to reading questions were coded as correct or incorrect across phases. To determine the rate of accuracy of the responses of each student to teacher questions, the frequency of student's correct answers was counted. The number of correct answers were divided by the total number of questions being asked and then multiplied by 100.

In the line graph of listening comprehension outcome, data were marked as unprompted correct responses, incorrect responses, prompted correct responses. Percentage of unprompted or prompted correct responses were shown. Prompted responses refers to teacher modeling or physical guidance. The prompt level was calculated as percentage and marked across sessions in the bar graph. This specific format was known as being good for comparing discrete data (Lane & Gast, 2014). Student initiation skill outcomes was also graphed in the line graph.

Responses to fact-based questions. To examine the effects of the teacher's use of modified dialogic reading on students' correct responses to fact-based questions, I coded whether or not each student correctly responded to fact-based questions. To do this, I calculated (a) the number of fact-based questions asked to each student per session and (b) the number of correct student responses to these fact-based questions. Depending

on small group dynamics, the number of fact-based questions for each student varied. I used percent of students' correct responses to fact-based questions by dividing the total number of correct responses by the total number of questions given, and then multiplying by 100.

Responses to inference-based questions. To examine the effects of the teacher's use of modified dialogic reading on students' correct responses to inference-based questions, I coded whether or not student correctly responded to inference-based questions (e.g., wh-inference questions, distancing). To do this, I calculated (a) the number of inference-based questions given to each student per session and (b) the number of correct responses of each student. Depending on small group dynamics, the number of inference-based questions for each student varied. To better compare results among student participants, I converted the frequency of correct response of each student into percentages. To do this, I divided the total number of correct responses by the total number of questions given, and then multiplied by 100.

Student Initiation

To investigate functional relationship of these variables, the frequency of student initiation attempts was counted. Initiation was defined as child comments, questions, or requests related to the book that was not contingent on an adult utterance. Any comments, questions, requests following an adult was not considered as an initiation, but a response to the question.

Visual Analysis

Visual analysis was conducted to investigate the treatment effects of the modified dialogic reading on students with ASD. The visual analysis was analyzed into two levels: within-condition and between-condition analyses.

Within-condition analysis. Within-condition analysis started with calculating mean, median, range, stability envelop data of each condition. The analysis was conducted through three aspects: level, trend, and variability (Tankersley et al., 2008). According to Gast (2005), level refers to “magnitude of the data”, trend refers to “process over time”, and stability refers to ‘bounce’ of the data (pp.1596-1597). To change the level change, the difference between first and last data points within the same condition was calculated. To calculate the trend, I used split-middle method (Wolery & Harris, YEAR 1985). I looked at the variability of data points each condition and I waited for extra sessions in that condition until the data was stable (Lane & Gast, 2014). Lane and Gast advised to wait until clear pattern is observed to strengthen external validity because several factors could cause the change of trend and stability.

Between-condition analysis. To conduct between-condition analysis, data points in each phase were compared with the ones from the adjacent phase (e.g., baseline phase to intervention phase, intervention phase to maintenance phase) to see if there is any immediacy of the effect (immediate change in level and trend), overlap, and consistency of the data upon the introduction of the independent variables. This study was expected to demonstrate increasing trend in therapeutic direction as well as increase in level and stability. Information from a variety aspects listed above was gathered and compared

whether all data meets standard. As Gast and Spriggs (2010) suggested, the list of analytic procedures above was repeated across four participants. This is to better demonstrate the functional relationship between the independent variables and dependent measures (Gast & Spriggs, 2010).

Tau-U. To compare the effects of the independent variable - professional development plus ongoing coaching - on dependent variables, such as teacher implementation on fidelity and students' listening comprehension and using initiation skills, across phases (e.g., baseline, intervention, maintenance), I used Tau-U calculator (<http://www.singlecaseresearch.org/calculators>) (Vannest et al., 2016). I chose Tau-U for the following reasons. First, Tau-U is known as effective in controlling the positive baseline trend and strong growth in intervention (Parker, Vannest, & Davis, 2011). Second, I wanted to compare the effect size of this study with Whalon et al. (2015). Their effect size was presented by using Tau-U, the effect size of Tau-U ranged as a larger or strong effect (93%-100%), a medium to high effect (66-92%), and a weak or small effect (0%-65%). Table 2, 3, and 4 include the results of Tau-U analysis in this study.

Between-cases analysis. To make clear the effect size of the intervention applied, Shadish and colleagues (2016) provide more evidence to readers about (a) whether the targeting intervention demonstrates the functional relationship, (b) the collected data supports the functional relationship, and (c) the data examines social validity. Shadish and colleagues (2016) emphasize to calculate between-cases analysis of SCD. Although replication studies strengthen internal analysis, how to combine results

from different SCDs on similar questions, how to compare results from SCDs to results from other experimental methods, or how to combine SCD results with other experimental methods has been issue for the field. Standardized Effect size should be cited in demonstrating effects of treatments.

Inter-Observer Agreement (IOA)

The purpose of calculating IOA is to objectively examine the dependent variables based on their definitions (Schlosser, 2003). Calculating the rates of agreements in coding between two raters shows if they code the targeting variables in consistent and accurate ways. The rationales of collecting IOA are located in several scholarly studies. For example, Kratochwill and colleagues (2012) state that each variable must be measured over time by more than one researcher to meet *Evidence Standards*. The quality indicators suggested by Horner et al. (2005) also indicate that each dependent variable needs to collect on the reliability or IOA. IOA must be calculated for at least 20% of the data points within each condition. To calculate IOA, the total number of agreements was divided by the total number of agreements plus disagreements, which will be multiplied by 100 (Cooper, Heron, & Heward, 2007). Reliability scores for IOA across baseline, intervention and maintenance phases were calculated across dependent variables and participants. Minimum acceptable values of IOA is at the range of 0.80 to 0.90 (Hartmann, 2004; Horner et al.; Kratochwill et al., 2012).

In this study, IOA was calculated across all participants for the dependent variables: teacher use of the modified dialogic reading and children use of listening comprehension and initiation skills across the baseline, intervention, and maintenance

phases. To do this, a doctoral student who enrolled in UNCG' special education program was recruited as a second coder. She and I practiced coding sample video recorded dialogic reading sessions and coded the occurrences and nonoccurrence independently. Then we compared each other's code and negotiate differences. The practice coding continued until the agreements for targeting behaviors reach 80%. When 80% of agreements were consecutively observed, video clips recorded for this study started to be coded. We coded 20% of the videotaped sessions randomly selected from each phase (O'Neil, McDonnell, Billingsley, & Jenson, 2011). To select the videos for IOA, I created the list of videos collected each phase and marked every third video for coding. To calculate IOA, the total number of agreements was divided by the total number of agreements plus disagreements, which was multiplied by 100 (Cooper, Heron, & Heward, 2007). 80% of agreements was the acceptable criteria for this study.

CHAPTER IV

RESULTS

The purpose of this study was to investigate the effects of professional development of the modified dialogic reading on teacher implementation and teacher implementation on the listening comprehension and initiation skills of students with ASD. Findings are organized by research questions. To examine the effects of professional development on teacher implementation (RQ1), fidelity of teacher implementation during reading sessions across phases were presented. Student outcomes, including percentage of correct response to listening comprehension questions (RQ 2) and the frequency of using initiation skills (RQ 3) were presented by each student participant, both within and between phases (e.g., baseline, intervention, and maintenance) of this study. Interobserver agreement was presented to verify the reliability of coding based on the code definitions. Finally, social validity was presented to show the feasibility and usability of modified dialogic reading from the teacher participant.

Research Question 1

How does teacher training in teacher-implemented modified dialogic reading interventions (i.e., prompting strategies, instructional sequence, hierarchical prompting) affect the teacher implementation during the modified dialogic reading sessions with students with ASD?

The first purpose of this study was to determine the effects of professional development package (2-hr professional development plus ongoing coaching) on teacher fidelity of implementation of modified dialogic reading while the teacher provided reading lessons to students with ASD. Data analyses showed that the number of teacher implementation cycles decreased across phases (ranged = 3-33). At the baseline phase, the teacher asked 14.15 questions a session at average (range= 3-33). At the intervention phase, the teacher asked 12.52 questions a session at average (range= 4-23). At the maintenance phase, the teacher asked 9.6 questions a session at average (range=3-22).

During the data collection, the teacher participant led 78 reading sessions. Tell participated in 32 sessions, Gi participated in 28 sessions, Kern participated in 29 sessions, and Lamp participated in 23 sessions. Depending on student schedules, Tell, Kern and Lamp had individual or small group reading sessions. Table 3 includes means, standard deviations, and Tau-U effect sizes to explain teacher fidelity of implementation.

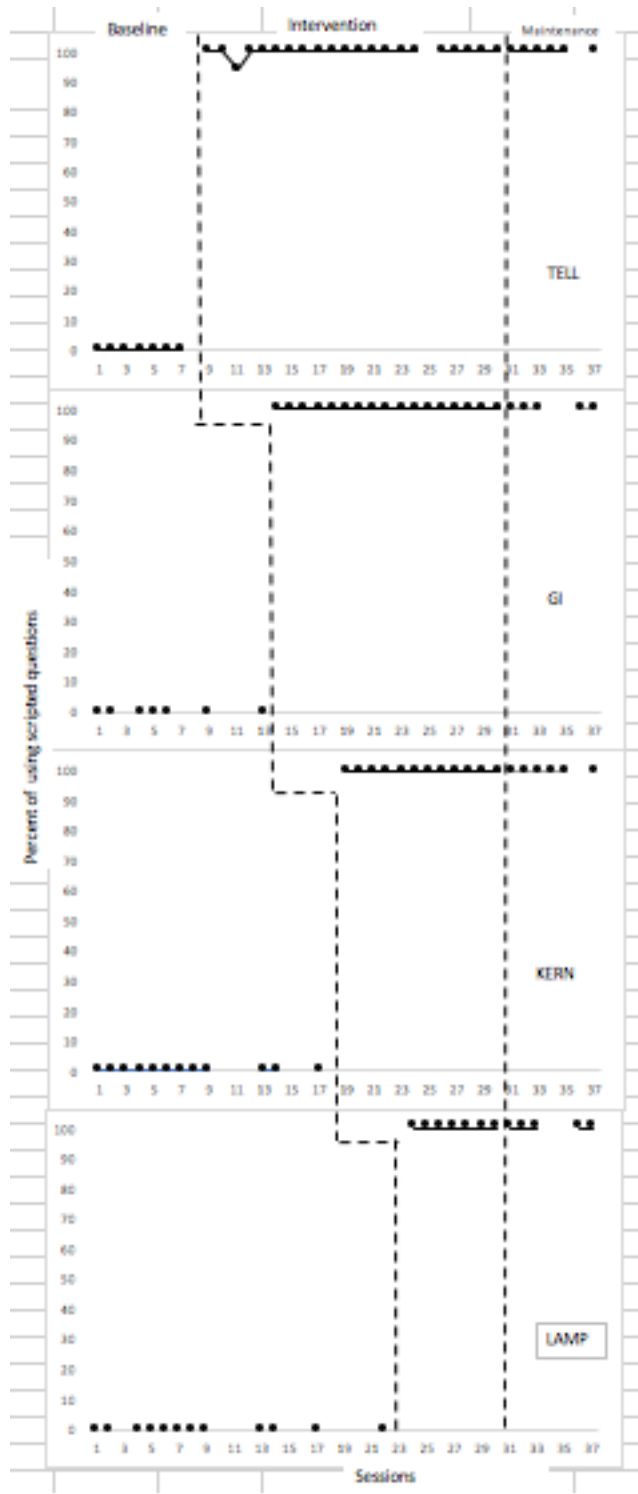
Table 3. Means, Standard Deviations, and Tau-U Across Phases for Teacher Fidelity of Implementation

Participant/ Phase	Percent of Using Scripted Questions		Percent of Expanding Student Response		Percent of Praise		Percent of Systematic Instruction		Percent of Attention Prompts		Percent of Intentional Pause	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
TELL												
Baseline	0	0	55.4	20.5	26.2	39.8	10.0	14.9	19.9	18.2	0	0
			8	3		4	6	3	8	4		
Intervention	99.7	1.31	84.3	16.0	86.9	14.4	92.1	26.5	98.2	17.9	95.1	15.4
	1		9	7	5	9	8		3	9	4	3
Tau-U	100		65.7		81		96		100		100	
Maintenance	100	0	98.4	2.46	83.2	5.31	88.8	20.2	100	0	100	0
			2		3		3					
Tau-U	100		100		60		100		100		100	
GI												
Baseline	0	0	63.8	33.1	17.8	16.9	10.0	12.5	22.2	27.3	11.1	27.3
			2	5	3		1	7	7	2	7	5
Intervention	100	0	94.8	8.13	87.0	12.5	91.0	16.7	101.	6.06	96.2	31.3
			7		8	2	2	1	4		9	8
Tau-U	100		87.3		100		100		100		92.1	
											6	
Maintenance	100	0	94.6	6.54	89.0	6.09	82.2	11.8	113.	29.9	100	0
			2		6		4	4	4	6		
Tau-U	100		93.3		100		100		100		100	
KERN												
Baseline	0	0	57.4	22.9	25.9	21.6	8.36	14.1	9.99	16.0	0	0
			8	2	5	9		7		9		
Intervention	100	0	94.1	6.64	86.1	13.9	61.6	29.1	106.	28.0	92.4	13.8
						6	1	4	7	7	2	6
Tau-U	100		84.1		98		91.6		100		100	
			7				7					
Maintenance	100	0	96.6	6.06	82.3	4.46	79.1	29.7	100	0	100	0
			7				7					
Tau-U	100		86.6		100		92		100		100	
			7									
LAMP												
Baseline	0	0	57.4	22.9	30.4	20.7	5.59	11.8	11.1	16.6	0	0
			8	2	6	1				5		
Intervention	100	0	91.1	7.4	77.6	18.3	55.6	30.9	97.1	23.6	100	0
					3	5	1	2	4			
Tau-U	100		82.9		89.6		92		100		100	
Maintenance	100	0	92.8	7.85	83.6		91	13.7	100	0	100	0
								7				
Tau-U	100		84		96.4		100		100		100	

Teacher's Use of Scripted Questions

After a 2-hour professional development, the teacher consistently used the scripted questions while using the modified dialogic reading. The teacher showed an immediate increase in using scripted questions from baseline to intervention (see Figure 2). The teacher participant consistently showed an increase in the mean percent of using scripted questions ranged and in averaged from 0% in baseline to 100% in intervention. The teacher participant also maintained her mean percent of 100% in maintenance. Tau-U for the teacher's use of scripted questions was 100%, indicating that the intervention was effective for the teacher to use the scripted questions and maintain the skills. Table 3 represents the teacher participant's implementation data across four students (i.e., mean percentage of teacher use of scripted questions to student participation). Figure 1 visualizes the teacher's use of scripted questions across student participants.

Figure 2. Percentage of Teacher's Use of Scripted Questions



Teacher's Expansion to Student Responses

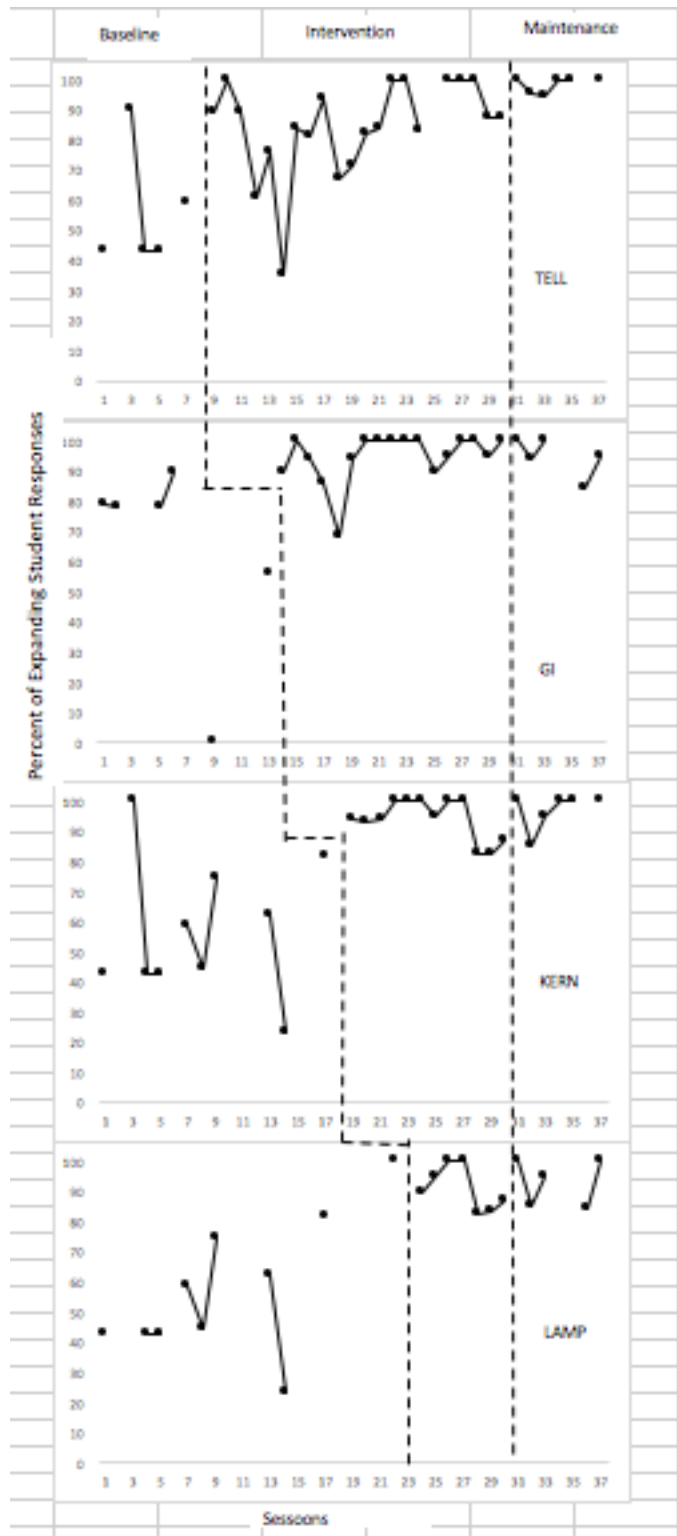
The teacher participant showed an increase in expanding student responses from baseline to intervention across participants. In addition, the teacher participant successfully maintained the skill across participants (see Figure 3). From baseline to intervention across all students, immediate increases in the mean percentage of expanding student responses was observed. The teacher showed an increase in mean percentage of expanding the response of TELL from 55.48% (range= 23.1% - 100%) in baseline to 84.39% (range=82.4% - 100%) in intervention. The teacher also showed an increase in the mean percent of expanding the student's response from 84.39% (range= 82.4% - 100%) intervention to 99.66% (range= 85% - 100%) in maintenance. Tau-U for the teacher implementation of this skill showed a medium effect at 66.57% in intervention and a strong effect at 100% in maintenance.

Similarly, the teacher showed an increase in mean percentage of expanding the responses of Gi from 62.82% (range= 0-79.4) in baseline to 94.87% (range=68.4-100) in intervention; Kern from 57.48% (range= 23.1% - 81.05%) in baseline to 94.1%(range=82.4% - 100%) in intervention; Lamp from 57.57% (range = 42.8% - 100%) in baseline to 91.1% (range= 82.4% -100%) in intervention. Tau-U for Gi, Kern, and Lamp showed medium to high effect during the intervention, showing at 87.3%, 84,17%, and 82.9%, respectively.

The teacher also showed a relative increase in the mean percentage of expanding the responses of Tell from intervention to maintenance, but the mean percentages of expanding responses of Gi, Kern, and Lamp remained almost the same. The mean

percentage of expanding the responses of Tell increased from 84.39% (range= 82.4-100) in intervention to 98.42% (range= 85-100) in maintenance. The mean percentage of expanding the responses of Gi slightly dropped from 94.87% (range=68.4-100) in intervention to 94.62% (range=84-100) in maintenance. The mean percentage of expanding the responses of Kern slightly increased from 94.1% (range= 82.4-100) in intervention to 96.67% (range=82-100) in maintenance. Finally, the mean percentage of expanding the responses for Lamp increased from 91.9% (range= 82.4-100) in intervention to 92.8% (range = 84-100) in maintenance. Tau-U for Tell and Gi showed a strong effect during maintenance; 100% and 93.3% respectively. Tau-U for Kern and Lamp showed medium to high effects at 84.1% and 82.9% respectively. Table 3 represents the teacher participant's implementation data across four students (i.e., mean percentage of teacher use of expansion to student participation). Figure 3 visualizes the teacher's use of expansion across student participants.

Figure 3. Percentage of Teacher's Expanding Student Responses



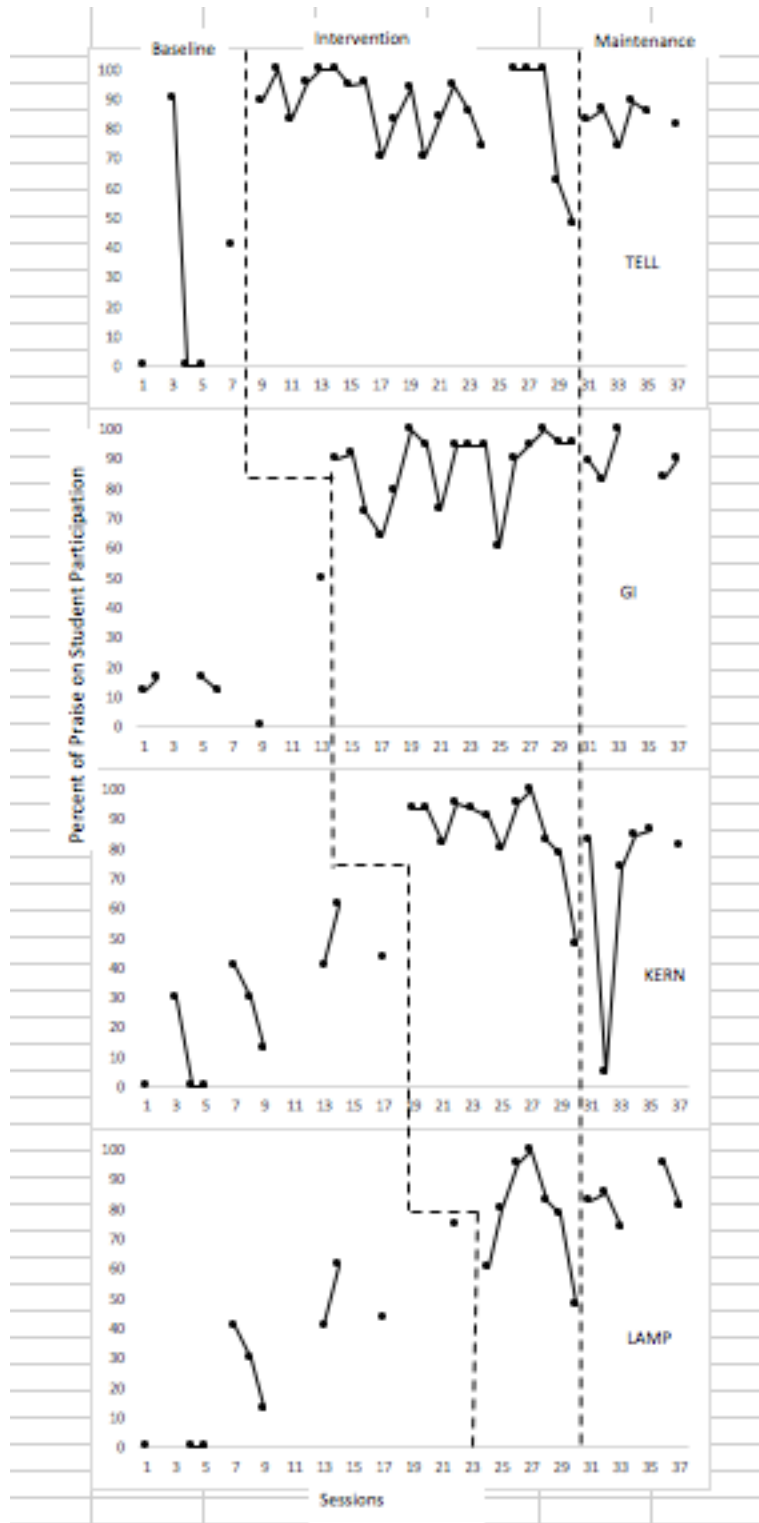
Teacher's Use of Praise to Student Participation

The teacher participant showed an increase in praising student participation from baseline to intervention across the four student participants (see Figure 4). The teacher showed an increase in the mean percentage of praising Tell from 26.2% (range= 0% - 90%) in baseline to 86.95% (range=48% -100%) in intervention. The teacher showed an immediate increase in mean percentage of praising Gi from 17.83% (0% - 50%) in baseline to 87.08% (range = 64% - 100%). The teacher showed an increase in mean percentage of praising Kern from 25.95% (range= 0% - 61.5%) in baseline to 86.1% (range = 48-100) in intervention. Although the teacher showed an immediate decrease in the percent of praising the participation of Lamp, the mean percentage of praising had an ascending trend from 30.46% (range = 0% - 75%) in baseline to 77.63% (range = 78%- 100%). PD showed larger or strong effects for the teacher's use of systematic instruction on GI and Kern with Tau-U for Gi at 100% and Kern at 98%. In addition, PD showed high effects for the teacher's use of systematic instruction on Tell and Lamp with Tau-U for Tell at 81% and Lamp at 89.6%.

In addition, the teacher participant successfully maintained the skill of praising her students (see Figure 4). While the teacher showed an increase in praising Gi and Lamp from intervention to maintenance, she used less praise for Tell and Kern. The teacher used a higher mean percentage of praise for Gi from 87.8% (range = 64% - 100%) in intervention to 89.09% (range = 82.4% - 100%) in maintenance. The teacher also showed an increase in praising Lamp from 77.63% (range = 48% – 100%) in intervention to 83.6% (range = 74% - 95%) in maintenance. The teacher showed a

decrease in the mean percent of praise for Tell from 86.95% (range = 48% - 100%) in intervention to 83.23% (range = 74% - 89%) in maintenance. In the same pattern, the teacher showed a decrease in the mean percent of praise for Kern from 86.1% (range = 48-100) to 82.3% (range = 74-86). Tau-U for Tell was 60%, showing a small effect. However, Tau-U for Gi and Kern was 100% and Tau-U for Lamp was 96.4%, both showing a larger or strong effect. Table 3 represents the teacher participant's implementation data across four students (i.e., mean percentage of teacher use of praise to student participation). Figure 4 visualizes the teacher's use of systematic instruction across student participants.

Figure 4. Percentage of Teacher's Use of Praise to Student Participation



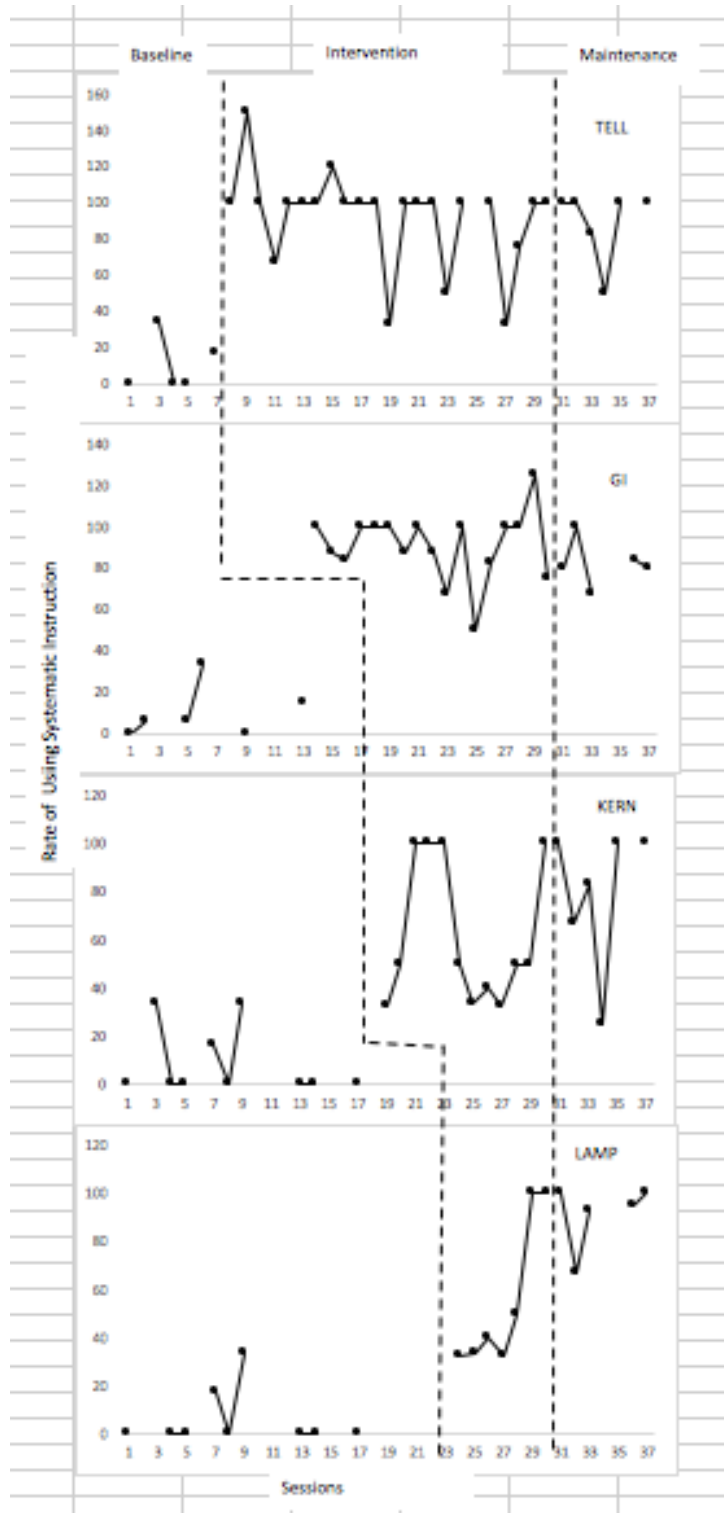
Teacher's Use of Systematic Instruction

The teacher participant showed an immediate increase on using systematic instruction for all four participating children when they entered intervention (see Figure 5). The teacher showed an increase in mean percentage of using systematic instruction on Tell from 10.06% (range = 0% - 33.3%) in baseline to 92.18% (range=33% - 150%) in intervention. The teacher showed an increase in mean percentage of using systematic instruction on Gi from 10.01% (0% - 14.3%) in baseline to 91.02% (range = 67% - 125%) in intervention. The teacher showed an increase in mean percentage of using systematic instruction on Kern from 8.36% (range= 0% - 33.3%) in baseline to 61.61% (range = 25% - 100%) in intervention. The teacher showed an increase in mean percentage of using systematic instruction on Lamp from 5.59% (range = 0% - 33.3%) in baseline to 55.61% (range = 33.3%-100%) in intervention. PD showed a larger or strong effect on teacher's use of systematic instruction on Tell and Gi with Tau-U for Tell at 96% and Gi at 100%. In addition, PD showed a high effect on teacher's use of systematic instruction on Kern and Lamp with Tau-U for Kern at 91.67% and Lamp at 92%.

The teacher decreased her use of systematic instruction for Tell and Gi from intervention to maintenance, while showing an increase in the use of systematic instruction for Kern and Lamp. The teacher decreased her average percentage of using systematic instruction for Tell from 92.18% (range= 33.3% - 150%) in intervention to 88.83% (range = 50% - 100%) in maintenance. The teacher showed a decrease in use of systematic instruction on Gi from 91.02% (range = 72% - 100%) in intervention to 82.2%

(range = 67% - 100%) in maintenance. The teacher showed an increase in use of systematic instruction on Kern from 61.61% (range = 50% - 170%) in intervention to 100% in maintenance. Finally, the teacher increased the use of systematic instruction on Lamp from 55.6% (range = 33.3-100) in intervention to 91% (range = 67-100) in maintenance. PD showed a large or strong effect on teacher's use of systematic instruction with Tell and Gi with Tau-U for Tell and Gi at 100%. In addition, PD showed a high effect of the teacher's use of systematic instruction for Kern and Lamp with Tau-U for Kern at 92% and Lamp at 91%. Table 3 represents the teacher participant's implementation data across four students (i.e., mean percentage of teacher use of praise to student participation). Figure 5 visualizes the teacher's use of systematic instruction across student participants.

Figure 5. Percentage of Teacher's Use of Systematic Instruction



Teacher's Use of Attention Prompts

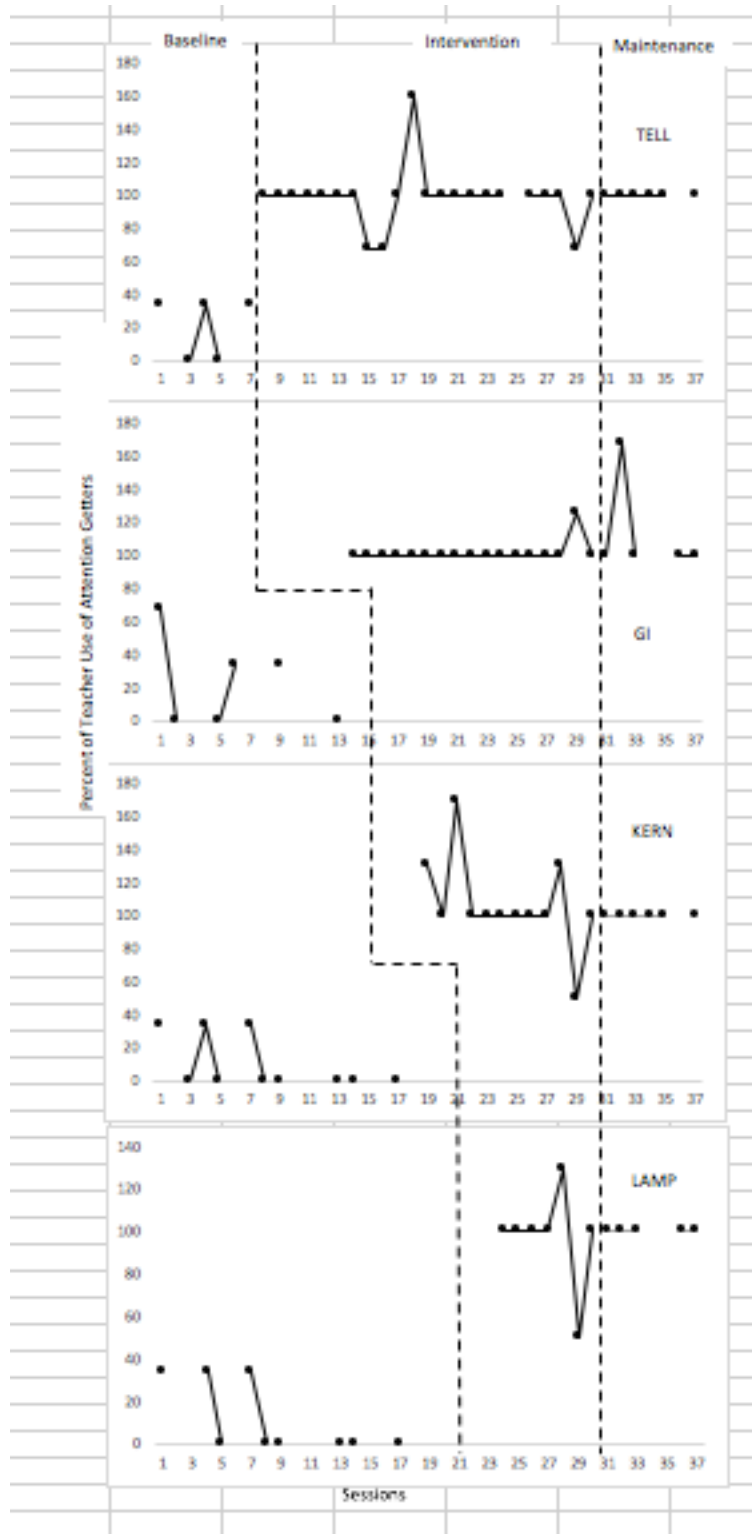
The teacher participant showed an immediate increase in use of attention prompts with all four student participants when they entered intervention (see Figure 6). The teacher showed an increase in mean percentage of using attention prompts to Tell from 19.98% (range =0% - 33.3%) in baseline to 98.23% (range=67% - 100%) in intervention. The teacher showed an increase in mean percent of use of gaining attention prompts with Gi from 22.27% (0% - 67%) in baseline to 101.4% during intervention (range = 100% - 100%). The teacher showed an increase in the mean percentage of use of attention prompts for Kern from 9.99% (range= 0% - 66%) in baseline to 106.7% (range = 50% - 170%) in intervention. The teacher showed an increase in mean percentage of using attention prompts for Lamp from 11.1% (range = 0% - 33.3%) in baseline to 97.14% (range = 50% - 130%) in intervention. PD showed strong effects on the teacher's use of attention prompts on all students with Tau-U at 100%.

The teacher showed an increase in use joint attention prompts for Tell, Gi, and Lamp, while showing a decrease for Kern from intervention to maintenance. The teacher increased her mean percentage of using attention prompts for Tell from 98.23% (range= 67% - 100%) in intervention to 100% in maintenance. The teacher was asked to use attention prompts three times a session, but data showed that she used attention prompts to Gi (range = 100%-167%), Kern (range = 50%-170%), and Lamp (range = 50%-130%) than she needed to. The teacher increased in using attention prompts for Lamp from 97.14% (range = 50% - 130%) in intervention to 100% in maintenance. However, the teacher showed a decrease in using attention prompts for Gi from 101.4% (range = 100%

- 167%) in intervention to 113.4% (range = 100% - 167%) in maintenance. The teacher showed a decrease in using attention prompts for Kern from 106.7% (range = 50% - 170%) in intervention to 100% in maintenance. PD showed large or strong effects on the teacher's continued use of attention prompts for all participants with Tau-U at 100%.

Table 3 represents the teacher participant's implementation data across four students (i.e., mean percentage of the teacher's use of attention prompts to student participation). Figure 6 provides a visual of the teacher's use of attention prompts across participants.

Figure 6. Percentage of Teacher's Use of Attention Prompts



Teacher's Use of Intentional Pause

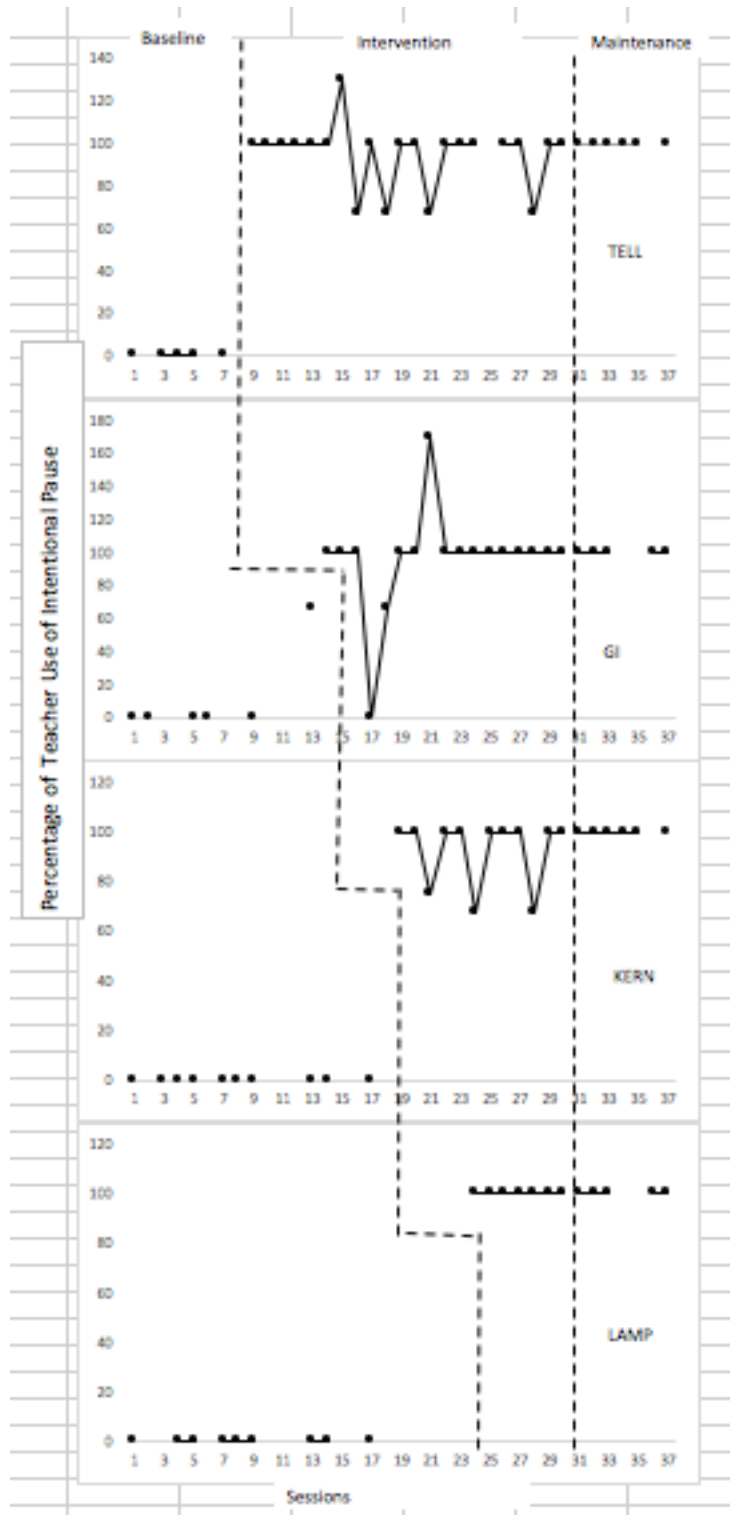
The teacher participant showed an immediate increase in use of intentional pause for all four student participants when they entered intervention (see Figure 7). The teacher showed an increase in mean percentage of using intentional pause to Tell from 0% in baseline to 95.14% (range=67% - 100%) in intervention. The teacher showed an increase in mean percentage of using intentional pause to Gi from 11.17% (0% - 67%) in baseline to 96.29% (range = 0% - 100%) in intervention. The teacher showed an increase in mean percentage of pausing intentionally to Kern from 0% in baseline to 92.42% (range = 67% - 100%) in intervention. The teacher showed an increase in mean percentage of using intentional pause to Lamp from 0% in baseline to 100% in intervention. PD showed strong effects on the teacher's use of intentional pause on all students with Tau-U at 100%.

The teacher showed an increase in use of intentional pause with all students from intervention to maintenance. The teacher increased her mean percentage of using intentional pauses with Tell from 95.14% (range= 67% - 100%) in intervention to 100% in maintenance. The teacher increased in using intentional pause with Gi from 96.29% (range = 0% - 170%) in intervention to 100% in maintenance. The teacher was asked to use intentional pause three times a session, but data showed that she used intentional pause to Gi (range = 0%-170%) than she needed to. However, the teacher showed a decrease in using intentional pause with Kern from 92.4% (range = 67% - 100%) in intervention to 100% in maintenance. The teacher's use of intentional pause remained stable for Lamp at 100% in both intervention and maintenance. PD showed strong

effects on the teacher's maintaining the use of intentional pause on all participants with Tau-U at 100%.

Table 3 represents the teacher participant's implementation data across four students (i.e., mean percentage of the teacher's use of intentional pause). Figure 7 provides a visual for the teacher's intentional pause across student participants.

Figure 7. Percentage of Teacher's Use of Intentional Pause



Research Question 2

How do the modified dialogic reading interventions affect the correct and spontaneous responses to fact- and inference-based questions of children with ASD?

The teacher asked an average of 14.15 questions during the baseline phase (range=3 questions -33 questions), 12.52 questions during intervention (range = 4 questions -23 questions), and 9.6 questions during maintenance (range=3 questions – 22 questions). Table 3 provides the percentage of unprompted correct responses to all questions (i.e., fact-based questions, and inference-based questions). It also included the Tau-U effect size estimates for them. Figure 7, 8, 9 and 10 include visual display for them.

Responses to Questions

Overall, all four student participants showed increases in the percentage of correct responses to total teacher questions (i.e., fact-based questions and inference-based questions) after entering the intervention phase. However, data also showed variability depending on specific question types. For example, Tell, Kern, and Lamp showed a decrease in correct responses to fact-based reading questions from intervention to maintenance while Gi increased her mean percentage of correct responses to fact-based questions. While Tell, Gi, and Lamp increased their mean percentages of correct responses to inference-based questions, Kern showed a decrease in correct responses to inference-based reading questions from intervention to maintenance. The following sections include detailed information.

Table 4. Means, Standard Deviations, and Tau-U Across Phases for Students' Listening Comprehension

Participant/Phase	Percentage of Correct Responses to Questions		Percentage of Correct Responses to Fact-based Questions		Percentage of Correct Responses to Inference-based Questions	
	M	SD	M	SD	M	SD
TELL						
Baseline	65.78	7.14	50.25	14.30	69.5	41.01
Intervention	86.34	9.6	93.59	7.48	77.79	23.31
Tau-U	92.86		100		-2.50	
Maintenance	88.28	9.6	83.23	20.57	88.67	19.1
Tau-U	13.49		80.56		19.44	
GI						
Baseline	66.03	16.70	56.48	31.77	45.83	51.03
Intervention	80.19	12.75	77.48	15.76	69.6	32.96
Tau-U	46.08		39.22		22.55	
Maintenance	86.8	3.96	80.4	12.18	72.5	41.83
Tau-U	86.67		46.68		22.67	
KERN						
Baseline	49.21	18.68	48.25	24.06	40.91	38.56
Intervention	78.58	11.18	83.69	14.97	73.29	27.1
Tau-U	85.61		82.64		50.76	
Maintenance	79.33	17.18	81.67	40.21	70.5	27.45
Tau-U	77.27		68.18		43.94	
LAMP						
Baseline	64.4	15.56	53.73	26.6	70.32	36.60
Intervention	87.17	14.01	91.48	9.88	83.2	29.01
Tau-U	73.61		86.11		21.67	
Maintenance	90.34	10.03	76	43.36	73.14	37.41
Tau-U	83.33		55		6.94	

Correct responses to teacher questions. Tell showed an immediate increase from baseline when entering intervention. He showed an increase in mean percentage of correct answers per session from 65.78% (range= 56-73) in baseline to 86.34% (range = 70-100) in intervention(see Figure 8), indicating a high effect with Tau-U at 92.86%.

TELL showed an increase in correctly responding to reading questions from intervention to maintenance. He showed a slight increase in the mean percent of correct responses to the given questions from 86.34% (range = 70-100) in intervention to 88.28% (range = 78-100) in maintenance, indicating a weak effect with Tau-U at 13.49%.

Percent of correct responses to fact-based questions. Tell showed an immediate increase in the percent mean of correct answers per session from 50.25% (range=36.4-54.5) in baseline to 93.59% (range = 77.8-100) in intervention. This indicates a strong effect with Tau-U at 100%. Tell showed a decrease in his mean percent of correct responses to fact-based questions from 93.59% (range = 77.8-100) in intervention to 83.23% (range = 77.8-100) in maintenance, indicating a medium effect with Tau-U at 80.56% (see Table 4). The percent of fact-based unprompted correct response shows that Tell increased from 43.83% in baseline to 93.59% in intervention and 83.23% in maintenance (Table 4).

Percent of correct responses to inference-based questions. Tell showed an immediate increase in percentage mean of correct answers to inference-based questions from 69.5% (range=0-100) in baseline to 77.79% (range = 33.3-100) in intervention (see Figure X). This indicates a weak effect with Tau-U at -2.50%. Tell increased his mean percentage of correct responses to inference-based questions from 77.79% (range = 0% - 100%) in intervention to 88.69% (range = 33.3% - 100%) in maintenance. This shows a weak effect with Tau-U at 19.44% (Figure 11).

In fact, Tell did not receive any inference-based questions during session 5 (Figure 10). Because this did not reflect the actual student responses to inference-based

questions, I considered it as an outlier and reanalyzed data (see Figure 11.a). Tell showed a decrease in the mean percentage from baseline to intervention. Tell showed a very weak effect with Tau-U at -23%. Tell increased his mean percentage of correct responses to inference-based questions from 77.79% (range = 0% - 100%) in intervention to 88.69% (range = 33.3% - 100%) in maintenance, indicating a small effect with Tau-U at 33.3%. The achievement comparison by phase (see Table X) shows that Tell made a slight decrease in the percentage of unprompted correct response to inference-based questions from 79.48% in baseline to 70% in intervention. However, he showed an increase in using the skill from 70% in intervention to 88.5% in maintenance.

Gi

Correct responses to teacher question. Gi showed an immediate increase from baseline when entering intervention. Gi showed an increase in percent mean of correct answers from 80.19% (range = 40-83.3) in baseline to 80.19% (range = 57-100) in intervention (see Figure 8). This indicates a weak effect with Tau-U at 46.08%. Gi increased her mean percentage of total correct responses from 80.19% (range = 57-100) in intervention to 86.67% (range = 82-90) in maintenance. Gi showed medium to high effects with Tau-U at 86.6%.

Percent of correct responses to fact-based questions. Gi showed an ascending trend from baseline to intervention, but showed an immediate decline right after the introduction of the intervention. Gi showed an increase in the percentage mean of correct answers from 56.48% (range = 5.7-93) in baseline to 77.4% (range = 33.3-100) in intervention. Gi showed a weak effect with Tau-U at 39.22%.

Gi showed an increase in the mean percent of correct response to fact-based questions from 77.48% (range = 33-100) in intervention to 80.4% (range = 67-100) in maintenance, indicating a small effect with Tau-U at 46.68%. The achievement comparison by phase shows that GI showed an increase in correctly responding to fact-based questions from 50.57% in baseline to 99% in intervention. She also showed continuous using the skill in maintenance (see Table 4).

Percent of correct responses to inference-based questions. Gi showed an ascending trend from baseline to intervention, but showed an immediate decline right after the introduction of the intervention. Gi showed an increase in percent mean of correct answers from 44.83% (range =0-100) in baseline to 69.6% (range = 0-100) in intervention. Gi showed a weak effect with Tau-U at 19.44%. Gi increased the mean percentages of correct responses to inference-based questions from intervention to maintenance. Gi showed an increase in the mean percentage of correct responses to inference-based questions from 69.6% (range = 0-100) in intervention to 72.5% (range = 0-100) in maintenance. Gi showed a weak or small effect with Tau-U at 22.67% (Figure 11).

In fact, Gi did not receive any inference-based questions during sessions 1, 4, 7, and 21, and 31 (Figure 11). Because this did not reflect actual student responses to inference-based questions, I considered them as outlier and reanalyzed data (see Figure 11.a). Gi showed a decrease in the mean percentage from baseline to intervention. Gi showed a very weak effect with Tau-U at -16.25%. Gi showed an increase in the mean percentage of correct responses to inference-based questions from 73.9% (range = 0-100)

in intervention to 90.63% (range = 75-100) in maintenance. Gi showed a small effect with Tau-U at 50%. Gi showed an increase in the percent of correctly responding to inference-based questions from 58.3% in baseline to 75.25% in intervention. From intervention to maintenance, she also showed an increase in maintaining the skill.

Kern

Correct responses to teacher question. Kern showed an immediate increase in the percentage of correct responses to teacher questions from 49.21% (range = 13-75) in baseline to 80.5% (range = 60-90.9) in intervention (see Figure 8), indicating a high effect with Tau-U at 85.61%. Kern also showed an increase in correctly responding to reading questions from intervention to maintenance. Kern remained stable in the mean percentage of correct responses to the given questions from 78.5% (range = 60-90.5) in intervention to 79.33% (range = 50-100) in maintenance. This indicates that Kern showed medium to high effects with Tau-U at 77.27%.

Percent of correct responses to fact-based questions. Kern showed an immediate increase from baseline when entering intervention. Kern showed an increase in the percentage of correct responses to teacher questions from 48.25% (range = 0-75) in baseline to 83.69% (range = 60-100) in intervention. Kern showed a high effect with Tau-U at 82.64%.

While Kern showed a decrease in correctly responding to fact-based reading questions from intervention to maintenance. Kern showed a decrease in his mean percentage of correct responses to fact-based questions from 83.69% (range = 60-100) in intervention to 81.67% (range = 0-100) in maintenance. Kern showed a medium effect

with Tau-U at 68.18%. Kern showed an increase in the percentage of correctly responding to fact-based questions from 48.59% in baseline to 85.05% in intervention. He showed that he maintained the skill at 81.7% (Table 4).

Percent of correct responses to inference-based questions. Kern showed an immediate increase from baseline when entering intervention. Kern showed an increase in the percentage of correct responses to teacher questions from 40.91% (range = 0-100) in baseline to 53.29% (range = 0-100) in intervention. Kern showed weak effects with Tau-U at 22.55%. Kern showed a decrease in his mean percentages of correct responses to inference-based reading questions from intervention to maintenance. Similarly, Kern showed a slight decrease in the mean percent of correct responses to inference-based questions from 73.29% (range = 0-100) in intervention to 70.5% (range = 0-100) in maintenance. Kern showed a weak or small effects with Tau-U at 43.94% (Figure 11).

In fact, Kern did not receive any inference-based questions during sessions 4, 5, 7, and 12 (Figure 10). Because this did not reflect the actual student responses to inference-based questions, I considered them as outlier and reanalyzed data (see Figure 11.a). Kern showed an improved percentage of correct responses to inference-based questions after entering the intervention phase. Kern showed a weak effect with Tau-U at 27.38%. Kern showed a slight decrease in the mean percent of correct responses to inference-based questions from 73.29% (range = 0-100) in intervention to 70.5% (range = 33-100) in maintenance. Kern showed a very weak effect with Tau-U at -11.9%. Kern showed an increase in the percentage of responding to inference-based questions from 64.29% in

baseline to 79% in intervention. He shows a slight decline in responding to inference-based questions from 79% in intervention to 70.65% in maintenance.

Lamp

Correct responses to teacher questions. Lamp showed an ascending trend from baseline to intervention, but showed an immediate decline right after the introduction of the intervention. Lamp showed an increase in the percentage of correct responses to questions from 64.4% (range = 33-92.5) in baseline to 87.17% (range = 63-100) in intervention (see Figure 8). Lamp showed an increase in correctly responding to reading questions from intervention to maintenance. Lamp showed medium to high effects with Tau-U at 87.17%. Lamp showed a slight increase in the mean percent of correct response to the reading questions from 87.17% (range = 63-100) in intervention to 90.34% (range = 80-100) in maintenance. Lamp showed medium to high effects with Tau-U at 83.3%.

Percent of correct responses to fact-based questions. Lamp showed an immediate increase from baseline when entering intervention. Lamp showed an increase in the percent of correct responses to questions from 73.73% (range = 0-90.9) in baseline to 91.40% (range = 80-100) in intervention. Lamp showed medium to high effects with Tau-U at 86.11%. Lamp showed a decrease in correctly responding to fact-based reading questions from intervention to maintenance. Lamp showed a considerable decrease in the mean percentage of correct response to the given fact-based questions from 91.48% (range = 80-100) in intervention to 76% (range = 0-100) in maintenance. Lamp showed weak or small effects with Tau-U at 55%.

Percent of correct responses to inference-based questions. Lamp showed an immediate increase in the percentage of correct responses to inference-based questions from 70.32% (range = 0-100) in baseline to 50.76% (range = 33-100) in intervention. Lamp showed a small effect with Tau-U at 50.76%. Lamp showed a decrease in their mean percentages of correct responses to inference-based reading questions from intervention to maintenance. Lamp showed a decrease in the mean percent of correct responses to the given inference-based questions from 83.2% (range = 33-100) in intervention to 73.14% (range = 0-100) in maintenance. Lamp showed weak or small effect with Tau-U at 6.94% (Figure 11). Lamp showed an increase in the percentage of responding to fact-based questions from 57.4% in baseline to 91.48% in intervention. He also showed an increase in using the skill from 91.48% in intervention to 95% in maintenance.

Lamp did not receive any inference-based questions during sessions 5, 14, and 36 (Figure 10). As such, I considered his data as an outlier and reanalyzed his data (see Figure 11.a). Lamp showed a decrease in the mean percentage from baseline to intervention. Lamp showed a very weak effect with Tau-U at 6%. Lamp showed a decrease in the mean percentage of correct responses to the given inference-based questions from 83.2% (range = 33-100) in intervention to 91.42% (range = 80-100) in maintenance. Lamp showed a weak effect with Tau-U at 17.50%. Lamp showed an increase in correctly responding to inference-based questions from 82.65% in baseline to 86% in intervention. He also showed an increase in maintaining the skill from 86% in intervention to 91.43% in maintenance.

Figure 8. Percentage of Students' Total Correct Responses to Reading Questions

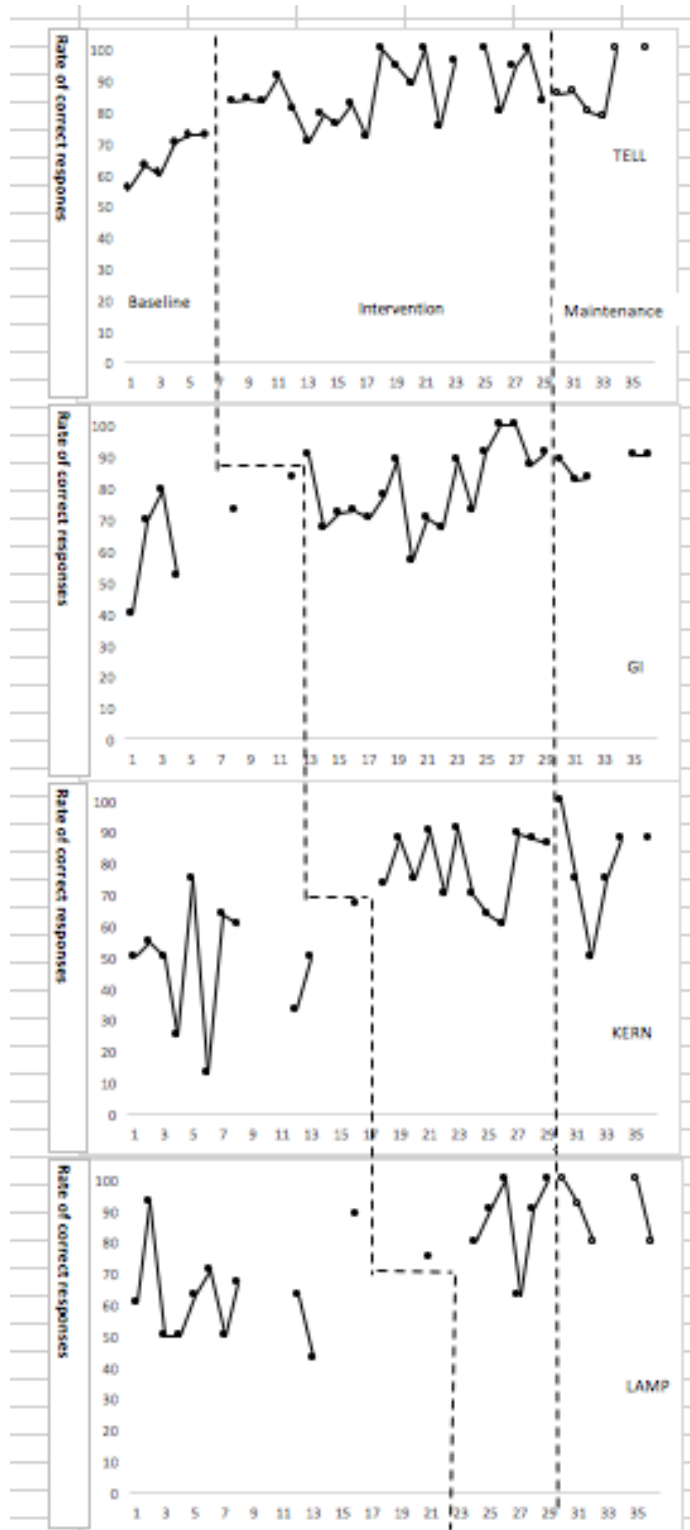


Figure 9. Percentage of Students' Total Correct Responses with Hierarchical Prompts

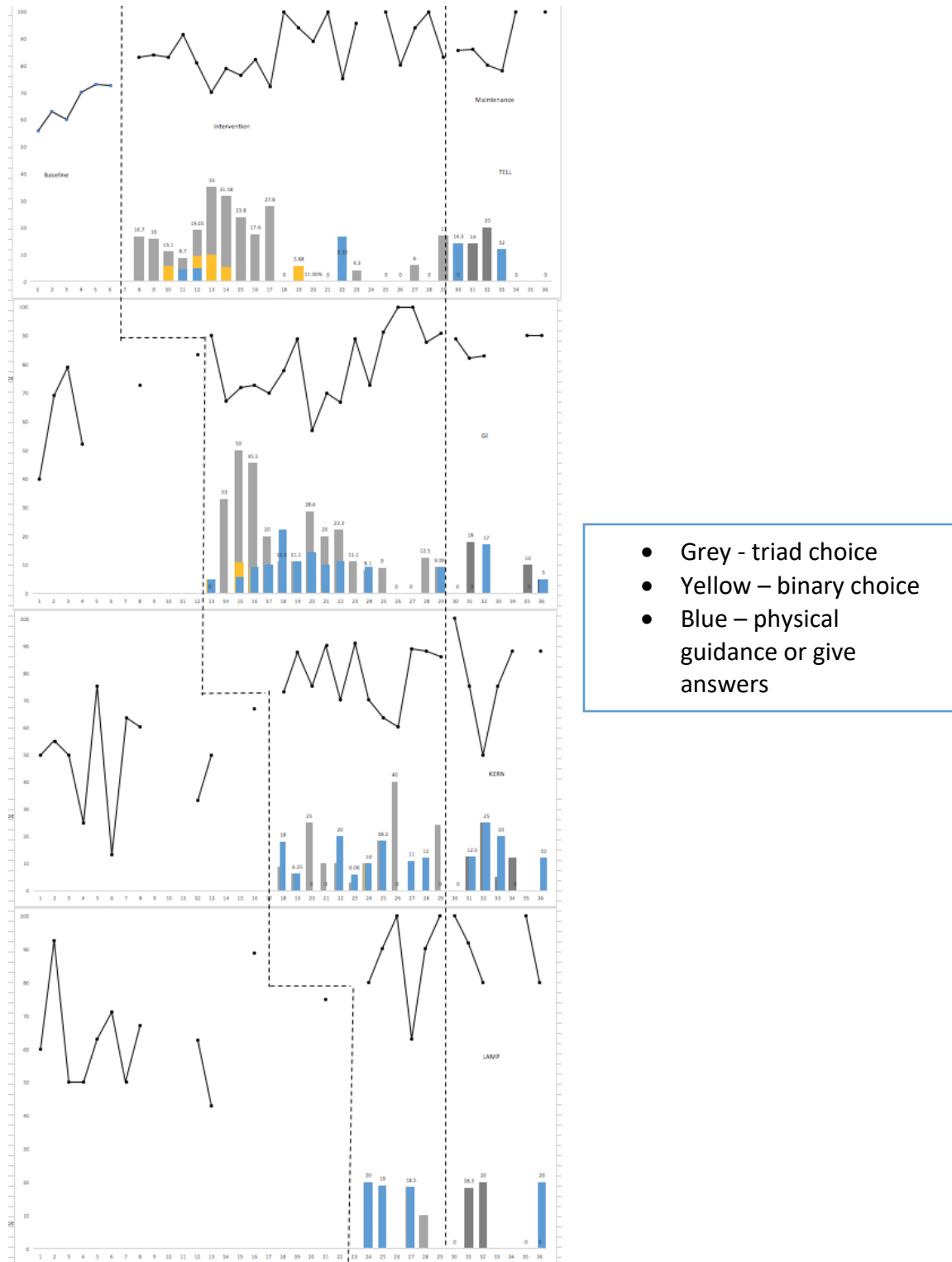


Figure 10. Percentage of Students' Correct Responses to Fact-based Questions

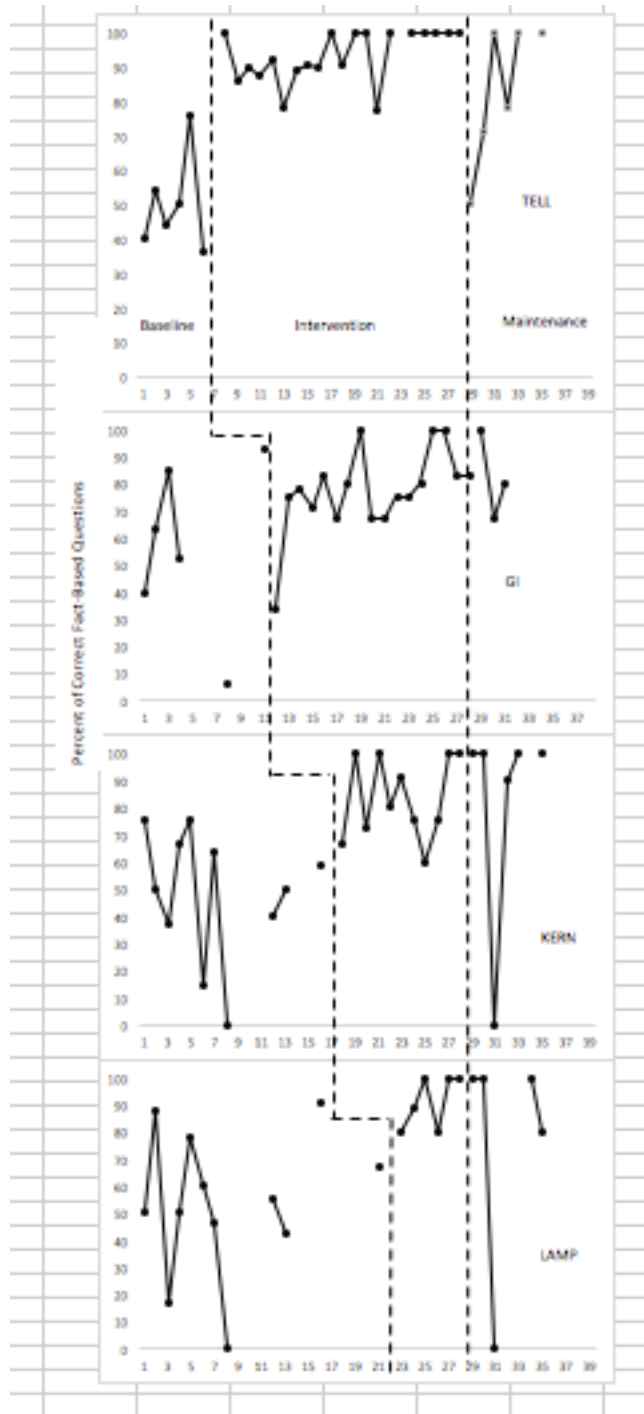


Figure 11. Percentage of Students' Correct Responses to Inference-based Questions

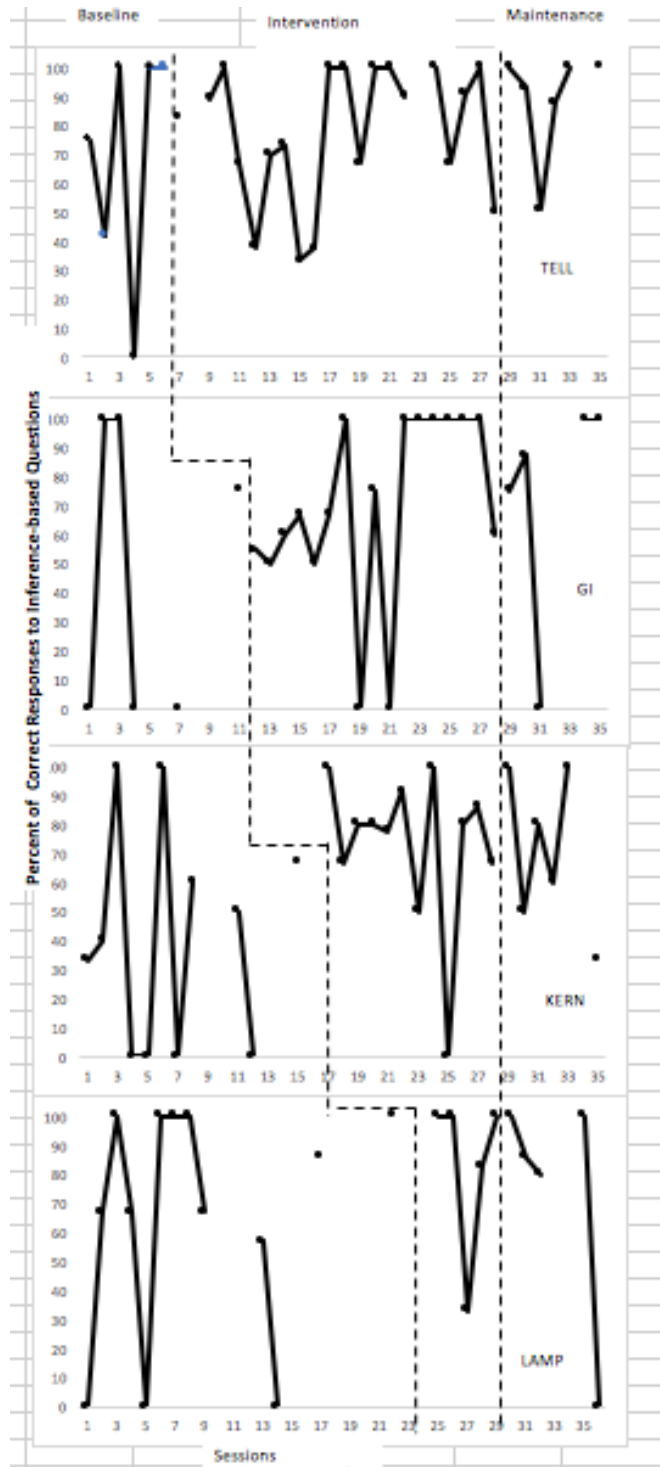


Figure 11a. Percentage of Students' Correct Responses to Inference-based Questions

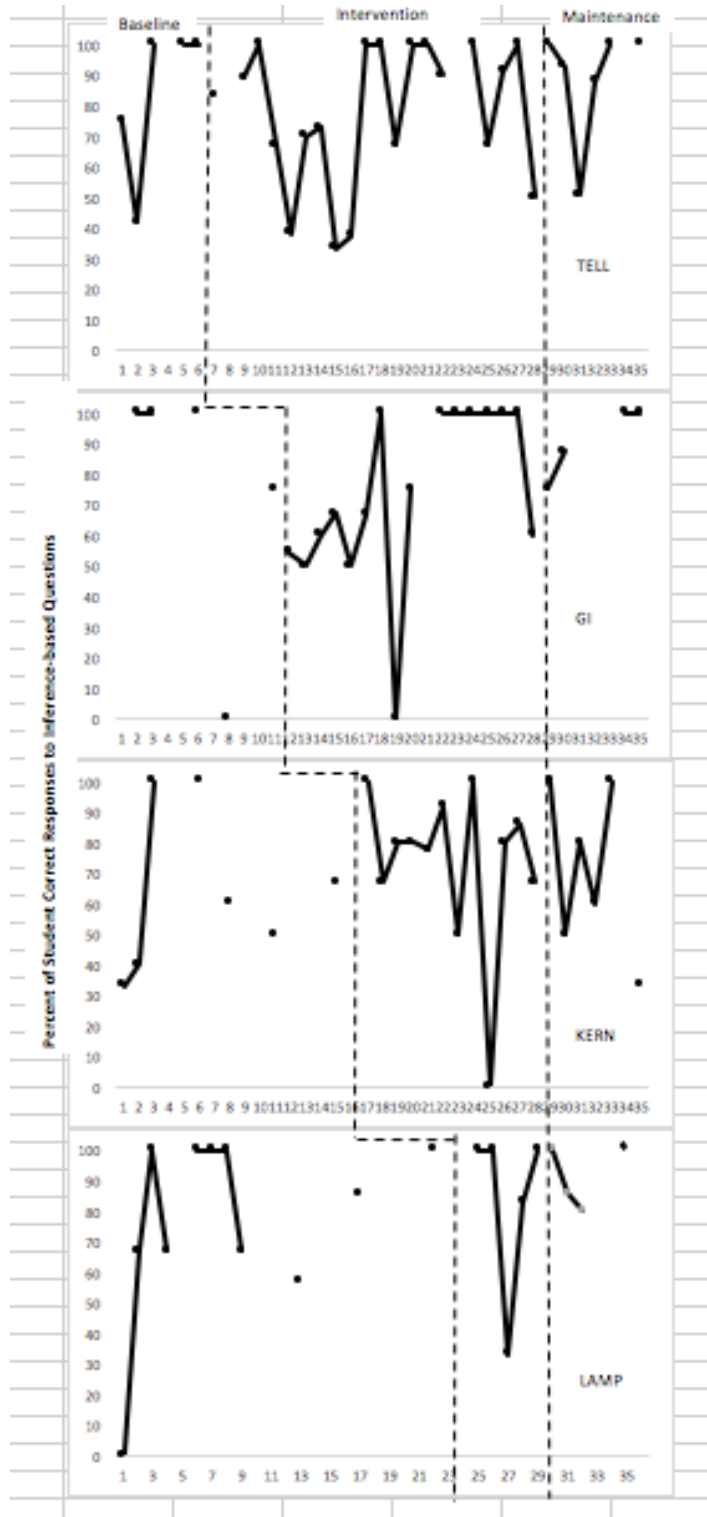


Table 5. Changes of Unprompted Responses to Fact- and Inference-based Questions

	% Fact Unprompted			% Inference Unprompted		
	Baseline	Intervention	Maintenance	Baseline	Intervention	Maintenance
TELL	43.83	93.59	83.23	79.48	70	88.5
GI	50.57	99	80.4	58.3	75.25	90.63
KERN	48.59	85.05	81.7	64.29	79	70.5
LAMP	57.4	91.48	95	82.65	86	91.43

Research Question 3

How do the modified dialogic reading interventions affect the verbal initiations of children with ASD?

The third purpose of this study was to determine the effects of the teacher’s use of modified dialogic reading strategy on the initiation skills of young children with ASD. Initiation skills were defined as asking questions or sharing opinions about books. To investigate the functional relationship of these variables, the frequency of student initiation attempts were counted. Table 4 represents student’s initiations (i.e., frequency mean of using initiation skills) and Figure 10 represents the data visually.

Table 6. Means, Standard Deviations, and Tau-U Across Phases for the Frequency of Using Initiation Skills of Students with ASD

Participant/Phase	Frequency of Using Initiation Skills	
	M	SD
TELL		
Baseline	4	2.45
Intervention	17.76	10.36
Tau-U	98.41	
Maintenance	12.5	7.15
Tau-U	77.78	
GI		
Baseline	0.83	1.33
Intervention	7.71	3.46
Tau-U	46.08	
Maintenance	6	2.71
Tau-U	86.67	
KERN		
Baseline	4.18	2.71
Intervention	15.75	9.33
Tau-U	83.33	
Maintenance	9.83	1.47
Tau-U	98.48	
LAMP		
Baseline	1.42	1.68
Intervention	13.67	9.05
Tau-U	88.89	
Maintenance	9.8	5.63
Tau-U	86.67	

All four young children showed an increase in the mean use of initiation after entering the intervention phase. All young children showed a decrease in their mean frequency of initiation from intervention to maintenance.

Tell

Tell showed an immediate increase from baseline when entering the intervention phase. Tell showed an increase in the frequency mean of use of initiation from 4 occurrences (range=1 occurrence -7 occurrences) in baseline to 17.76 occurrences (range = 7 occurrence - 47 occurrences) in intervention (see Figure 11). Tau-U for Tell was 98.41%, which indicated a large or strong effect. Tell showed a decrease in his mean frequency of use of initiation from 17.76 occurrences (range = 7 occurrences – 47 occurrences) in intervention to 12.5 occurrences (range = 6 occurrences – 24 occurrences) in maintenance. Tell showed medium to high effects with Tau-U at 77.78%.

Gi

Gi showed an immediate increase from baseline when entering the intervention phase. Gi showed an increase in frequency mean of initiation skills 0.83 occurrence (range = 0 occurrences – 3 occurrences) in baseline to 7.71 occurrences (range = 1 occurrence – 16 occurrences) in intervention. Tau-U for Gi was 46.08%, which indicated a weak or small effect. Gi showed a decrease in the mean frequency initiation from 7.71 occurrences (range = 1 occurrence – 16 occurrences) in intervention to 12.5 occurrences (range = 1 occurrence – 11 occurrences). Gi showed medium to high effects with Tau-U at 86.67%.

Kern

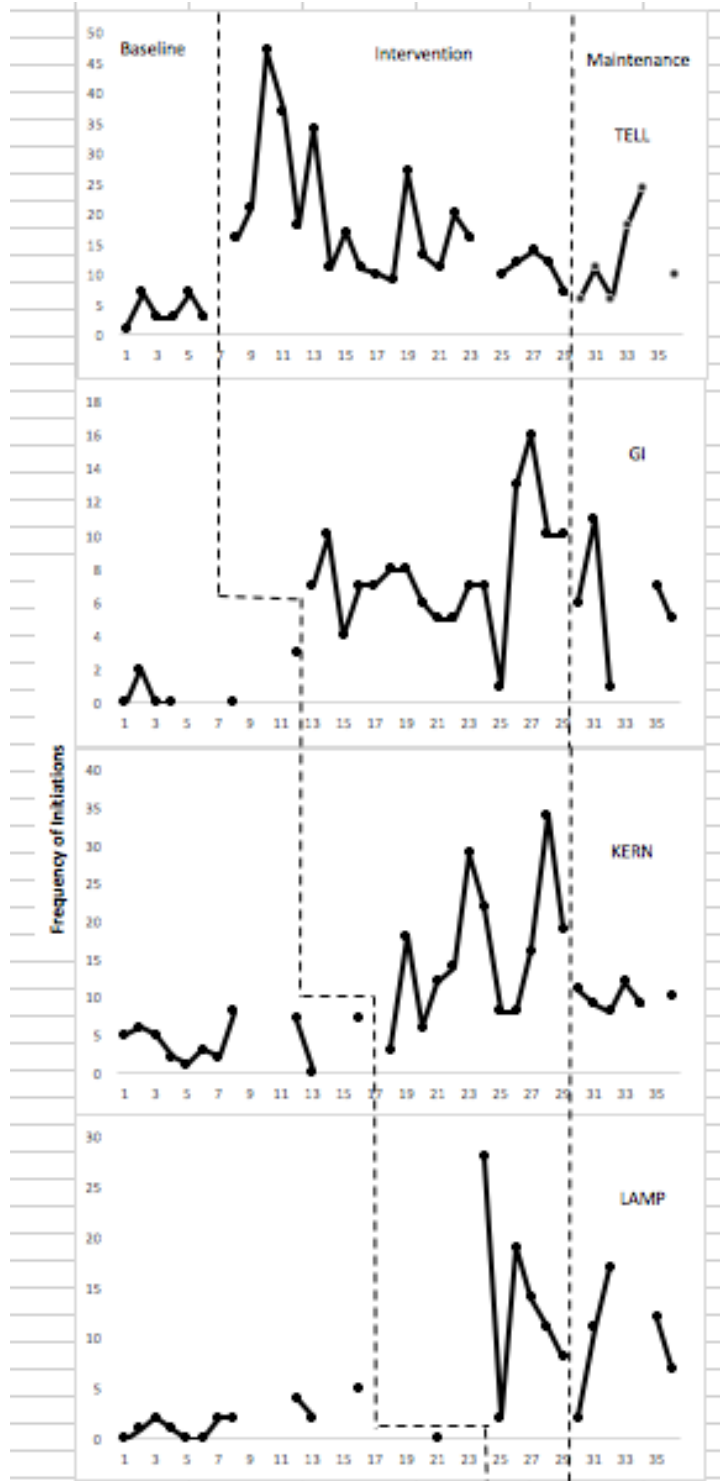
Kern showed an ascending trend from baseline to intervention, but showed an immediate decline in the frequency mean of initiation right after the introduction of the

intervention. Kern showed an increase in initiation from 4.18 occurrence (range = 0 occurrence – 8 occurrences) in baseline to 15.75 occurrences (range = 3 occurrences – 34 occurrences) in intervention. Tau-U for Kern was 83.3%, indicating a medium effect. Kern also showed a decrease in the mean frequency of initiation from 15.75 occurrences (range = 3 occurrences – 34 occurrences) in intervention to 9.83 occurrences (range = 8 occurrences – 12 occurrences) in maintenance. Kern showed a strong effect with Tau-U at 98.48%.

Lamp

Lamp showed an immediate increase from baseline when entering the intervention phase. Lamp showed an increase in the frequency mean of initiation from 1.42 occurrences (range = 0 occurrence – 5 occurrences) in baseline to 13.67 occurrences (range = 2 occurrences – 28 occurrences) in intervention. Tau-U for Lamp was 88.9%, indicating a medium effect. LAMP showed a decrease in the mean frequency of initiation from 13.67 occurrences (range = 2 occurrences – 28 occurrences) in intervention to 9.8 occurrences (range = 2 occurrences – 17 occurrences) in maintenance. Lamp showed medium to high effects with Tau-U at 86.67%.

Figure 12. Percentage of Students' Correct Responses to Inference-based Questions



Interobserver Agreement

A total of 78 videos were recorded and analyzed. To examine if the dependent variables were coded based on definitions (Schlosser, 2003), interobserver agreement (IOA) for 28% (n=22) of videos across phases (i.e., baseline, intervention, maintenance) was calculated. To calculate IOA, the total number of agreements with the second coder was divided by the total number of agreements and disagreements, which was then multiplied by 100 (Cooper, Heron, & Heward, 2007). The overall IOA for this study was 99.18% (range = 94%-100%), which met the criteria of acceptable IOA in the field (Cooper, Heron, & Heward, 2007).

As discussed in chapter III, I also calculated IOA for three dependent variables: teacher implementation, student responses, and student’s use of initiation skills. Overall IOAs for teacher implementation, student responses, and students’ use of initiation skills were 97.88%, 99.48%, and 100%, respectively. Table 5 represents students’ correct responses (i.e., frequency mean of using initiation skills) and Figure 11 visualizes the related data.

Table 7. Percent and Range of Interobserver Agreement Across Phases

	Teacher Fidelity		Student Response		Student Initiation Skills	
	IOA	Range	IOA	Range	IOA	Range
Baseline	95.65	82.60-100	99.42	97.68-100	100	100-100
Intervention	100	100-100	99.73	96-100	100	100-100
Maintenance	98	94-100	99.3	98-100	100	100-100

Social Validity

To gather the teacher participant's perceptions of using teacher-implemented modified dialogic reading strategy and its impact on student outcomes, the teacher participant completed a survey consisting of 10 five Likert-type scale items (see Appendix E). The scale ranged from 1, indicating *strongly disagree*, to 5, indicating *strongly agree*. According to her overall responses, she showed high level of satisfaction with this study. In particular, the teacher *strongly agreed* that the 2-hour training and on-going coaching was useful for her classroom practice. Additionally, the teacher *strongly agreed* that the modified dialogic reading strategy focused on improving students' listening comprehension and initiation skills. Regarding the statements asking about her knowledge and confidence for this specific strategy, the teacher *strongly agreed* that she knew the steps to implement the strategy and she felt confident in implementing the reading strategy with her students. In response to the statement claiming that she would use this strategy in the future, she responded *strongly agree*.

Summary

The purposes of this study were to investigate (a) the effects of professional development on teacher implementation of the modified dialogic reading in fidelity and (b) the effects of the teacher's use of the modified dialogic reading on student outcomes, including listening comprehension and initiation skills. Multiple measures were used to measure the changes of the teacher and student levels of outcomes.

In summary, the teacher demonstrated that she could implement the modified dialogic reading in fidelity. After completing the 2-hour professional development and

on-going coaching, the teacher participant showed an increase in her mean percent of implementing the modified dialogic reading with fidelity from baseline to intervention and from intervention to maintenance. Most of the evidence of her implementation showed increases in mean percentages of use of scripted questions, expanding student answers, praising for students' participation, using systematic instruction, attention prompts and intentional pause. However, the effects of PD on her implementation varied by student.

All student participants showed improved percentage of correct response to teacher questions after entering the intervention phase. However, changes in students' responses to fact-based and inference-based varied among participants. In addition, all student participants showed an increase in the frequency mean of initiation after entering the intervention phase. However, they showed decreases in their mean frequency of initiation skills from intervention to maintenance.

After the data collection was over, the teacher completed a social validity survey. This was to gather the teacher participant's perceptions of using teacher-implemented modified dialogic reading strategy and its impact on student outcomes. According to her responses, the teacher strongly agreed that the 2-hour training and on-going coaching was useful for improving her teacher knowledge and her classroom practice. Additionally, the teacher *strongly agreed* that the modified dialogic reading strategy focused on improving students' listening comprehension and initiation skills. The teacher strongly agreed that she would use this strategy in the future.

Interobserver agreement was calculated to examine if the dependent variables were coded based on the definitions (Schlosser, 2003). IOAs for three dependent variables (e.g., teacher implementation, student responses, and students' use of initiation skills) were 97.88%, 99.48%, and 100%, respectively. This shows that a trained second coder and I consistently coded dependent variables. Also, this indicates that we met the minimum criteria of IOA suggested in the field (i.e., 80%; Cooper et al., 2007) across all phases of this study.

CHAPTER V

DISCUSSION

The purpose of this study was to determine (a) the effects of PD on teacher fidelity of implementation of the modified dialogic reading and (b) the subsequent effect of teacher implementation of the modified dialogic reading on listening comprehension and initiation skills of students with ASD. Findings from this study showed that PD positively affected the teacher participant's use of the modified dialogic reading with fidelity. The high fidelity of teacher implementation of the modified dialogic reading also positively affected listening comprehension and initiation of young children with ASD. These three dependent variables for this study showed relatively high Tau-U effect size, indicating that the professional development had high effects on the teacher implementation with fidelity and listening comprehension and initiations of young children with ASD.

A review of the literature confirmed that students with ASD need more supports for listening comprehension and oral language skills that could meet their unique needs of cognitive profiles (Carnahan & Williamson, 2013; Nation et al., 2006; O'Connor & Klein, 2004; Williamson et al., 2012, 2013), but literacy instruction for students with ASD often lacks a focus on those areas. Additionally, the No Child Left Behind Act (NCLBA) (2001) and Individuals with Disabilities Education Improvement Act (IDEIA) (2004) mandated using EBPs to educate students with disabilities. Despite such legal

mandates, teachers reported their perceived unpreparedness of using EBPs in the classroom. Furthermore, some researchers found that teacher's literacy practices for students with ASD do not necessarily include EBPs (e.g., Whalon & Hart, 2009). These show the importance of support of teachers implementing EBPs in the classroom. Therefore, in this dissertation study, I investigated the effects of PD to help one special education teacher implement the modified dialogic reading and its subsequent effects on student outcomes.

Effects of PD on Teacher Implementation of EBPs with Fidelity

The findings of this study provide evidence that the teacher participant was reliably able to implement the modified dialogic reading with fidelity while she had reading sessions with students with ASD. The teacher showed immediate gains in implementation from baseline to intervention and maintained the skills. This finding is consistent with previous studies that examined the effects of professional development on teacher implementation of how to use literacy strategies in their classrooms (i.e., interactive shared reading, dialogic reading, fluency and word knowledge) (e.g., Brownell et al., 2017; Dennis & Horn, 2016; Justice et al., 2014; Rezzonico et al., 2015). PD used in these studies contributed to the advance of teacher knowledge and practice in fluency and word knowledge (Brownell et al.), shared book reading (Dennis & Horn; Justice) and dialogic reading (Rezzonico et al.).

However, none of studies on the modified dialogic reading (Fluery et al., 2016; Whalon et al., 2015, 2016) have ever explicitly measured the effects of professional development on teachers' use of the strategy. Only this dissertation study shows the

effects of PD on changing the teacher's instructional behaviors while implementing modified dialogic reading.

Data showed that modified dialogic reading is a user-friendly intervention that the teacher could easily learn to implement it with fidelity. The teacher indicated that after minimal training and ongoing feedback, she was able to implement modified dialogic reading with fidelity. This contrasts with the findings from the existing studies regarding on professional development. The researchers found that at least teachers need to have at least 20 hours of contact time, including workshops, lectures, and ongoing coaching (Desmione, 2009; Joyce & Showers, 1982; Leko & Brownell, 2009) to gain knowledge and use it in practice. In this dissertation study, the teacher had interacted with me through 2-hour professional development, ongoing coaching, informal conversation about the interventions, and booster sessions. However, the teacher participant in this dissertation study showed an immediate level change in implementing the modified dialogic reading intervention right after the 2-hour professional development. She also maintained the skills well even after ongoing feedback was faded.

The immediate change in teacher implementation was facilitated by the 2-hour professional development. Moreover, the teacher participant received ongoing coaching across the intervention phase. When the teacher used incorrect procedures while using the modified dialogic reading, the teacher received corrective feedback. As necessary, the teacher had booster sessions, which included watching videotaped sessions, and discussion of concerns. In addition, the teacher and I had frequent, informal conversations that served as informal coaching. This helped the teacher participant

transfer her knowledge into practice and maintain her skills. As Joyce and Shower (1982) addressed, coaching helped the teacher maintain skills.

In this dissertation study, the teacher participant received a professional development and ongoing coaching. Findings show that the independent variable (i.e., a 2-hr professional development and ongoing coaching) positively impacted the teacher's use of the modified dialogic reading and maintaining the skill across the intervention phases. Although there is a certain amount of variance in the teacher's fidelity of implementation across students (e.g., teacher's use of praise to student participants, systematic instruction) (see figure 4 and 5), calculating changes the mean percentage of how to use the strategy with fidelity and Tau-U shows that the teacher implemented the modified dialogic reading effectively.

In fact, data were variable, in particular for praise for student participants. The teacher demonstrated an overall decreasing trend of praising Tell during the intervention phase, but she had a big drop during session 28. This occurred after she gave Tell maximum praise (100%) after three consecutive data points (session 26, 27, 28). During the maintenance phase, data was stable. The teacher had a relatively increasing trend during the intervention phase for GI, with three dips at sessions 17, 21, and 25. During the intervention phase, the teacher participant showed an increasing trend of praising Kern until session 27, but her use of praise had a sharp drop by session 30. At the beginning of maintenance, the teacher showed increase in praising Kern, but there was a big drop at session 32. Finally, the teacher's use of praise for Lamp was stable during the intervention phase and showed a relative increase during the maintenance phase.

The variability in the trends across the participants for praise seems to be attributed by several factors. For example, as discussed in Chapter III and IV, each student had individual reading sessions or small group reading sessions depending on the student's schedule. Tell, Kern, and Lamp were considered as a same age group (seven or eight years old), so they often participated in the small groups. However, Gi was a pre-k student, so she did not have a chance to interact with the other three students because she was not a part of the group. This was why the teacher's behavior was differentiated between three students (Tell, Kern, and Lamp) and Gi from sessions 27 to 30.

Furthermore, more variability was observed from the percentage of the teacher's use of systematic instruction. The teacher was directed to give least to most prompts when students did not correctly answer within five seconds. The data on the percentage of the teacher's use of systematic instruction shows various trends across participants. For example, the teacher demonstrated a stable trend in providing a systematic instruction to Tell, but she also showed a variability. The teacher showed a relative decrease in using systematic instruction to Gi. The teacher also showed a very sharp decrease in using systematic instruction to Kern while showing increase to Lamp. From observations, the teacher asked clarification or repeated questions when the students did not answer correctly within five seconds. This likely increased variability in teacher behavior. However, the data showed the teacher responded differently to each student even though they were in the same group. On the other hand, the teacher also showed she used systematic instruction beyond what was required by the intervention. For

example, she provided praise 120% of the time to Tell at the beginning of intervention. For Gi, the teacher gave verbal choices.

Praising student participation and systematic instruction was depended on the teacher's judgment of student needs. Based on student characteristics (e.g., behavior issues) and classroom contexts (e.g., student group dynamics), the teacher individualized her use of these skills to each student. This is interpreted as her effort to provide support to each student within ZPD (Vygotsky, 1978).

Despite the variability in professional development data, findings of this study support those of previous professional development studies in literacy. Similar to the work of Dennis and Horn (2016) and Brownell and colleagues (2016), I designed this PD based on the combination of 2-hour professional development and on-going coaching. The results showed positive effects of the professional development. Additionally, this research included young children with ASD, which extended the work of Justice et al. (2014). Thus, this study extends the work of previous research because it combines professional development plus coaching and student participants on the spectrum.

Effects of the Teacher Implementation on Student Outcomes

Dialogic reading has been known to be effective for the oral language and listening comprehension development of young children. In 2008, a NELP study showed the effects of the dialogic reading on the oral language development of young children. Additionally, the meta- analysis conducted by Mol and colleagues (2009) showed that dialogic reading helps children to better gain vocabulary compared to typical shared reading. Regarding listening comprehension, Swanson and colleagues (2011) found that

dialogic reading showed a greater effect size in improving comprehension of at-risk young children in reading compared to other reading interventions (e.g., computer assisted programs, repeated reading).

In 2013, Whalon and colleagues proposed the need for modified dialogic reading, combining three EBPs: dialogic reading, visual supports, and systematic instruction. As a follow up study, Fluery (2016) and Whalon (2015, 2016) investigated the effects of the modified dialogic reading on student outcomes. The results of the studies showed that the modified dialogic reading helps young children with ASD to improve their listening skills and raise their class engagements.

In this dissertation study, I replicated and expanded the study of Whalon et al. (2015) by including a PD component on how to implement the modified dialogic reading for a special education teacher. The results of this study align with the ones from the existing studies, including Whalon et al. (2015). The results of this study remain promising for future use of modified dialogic reading to meet the needs of students with ASD.

Modified Dialogic Reading on Listening Comprehension

Unique cognitive profiles (e.g., joint attention, theory of mind, executive function) of students with ASD contribute to their difficulties in comprehension. To better support comprehension of students with ASD, Whalon and colleagues (2013) proposed the modified dialogic reading. The modified dialogic reading was a product of three EBPs: dialogic reading, systematic instruction, and visual supports. The single case design study conducted by Whalon et al. (2015) indicated that the modified dialogic

reading contributed to the increase in the response level of students. In detail, four young children with ASD showed an immediate decrease in incorrect or nonresponses, while they showed increases unprompted correct responses. Similarly, a case study conducted by Whalon et al. (2016) showed a preschooler improved correct responses to fact-based, inference-based, and open-ended questions.

This dissertation study aligns with the findings of Whalon et al. (2015, 2016). In this dissertation study, student participants showed an immediate increase in correct responses in terms of trend and level from baseline to intervention. In addition, the visual display shows that all students continued to respond at the maintenance phase. Given that literacy experience started with an attention to books (Bruner, 1981), the teacher's use of "attention recruiting behaviors" (Kadervek & Rabidoux, 2004) seemed to help the improvement in correct responses.

Regarding systematic instruction, results showed a variety of trends. As discussed in Chapter III, the teacher participant often used repeated or clarifying questions when student participants did not respond correctly within five seconds. At the beginning of intervention, all students responded to triad. As they approached the later part of the intervention phase, students did not need the triad prompts, which means their unprompted responses increased (see figure 8). For example, GI relied on the triad prompts at the beginning of intervention, but she increased unprompted responses at the end of the intervention. Even if she gave a wrong answer, she used fewer triad prompts and left no questions unanswered.

In fact, the visual analyses of student correct responses to fact-based and inference-based (see figure #9, 10) do not provide significant results. This is because teacher asked a different number of questions at each session, so converting the raw number into a percentage does not make a big difference. For example, Lamp responded correctly to 100% of the given inference-based questions at session 5,6, and 7. However, he was asked to respond to 6, 1, and 1 inference-based questions, respectively. At intervention, he showed 100% (session #), 33% (session #), and 33% (session #), but in fact, Lamp had only one question for the first session and three questions for the other sessions. Therefore, it is difficult to conclude his growth in listening comprehension for inference-based questions without controlling the number of questions per session.

Taken together, there are two important messages. First, students with ASD are able to learn when they have additional support. Student participants in this study showed improvements in unprompted correct responses to both fact- and inference-based questions with additional supports. This aligns with the findings of Whalon et al. (2015, 2016), whose student participants showed positive outcomes in fact-based, inference-based, and open-ended questions. Second, teachers need to be more consistent in providing students with more opportunities to respond to inference-based questions. Students in this study did not have enough opportunities to practice inference-making. Given that making inferences is a well-documented challenge for students with ASD (Williamson et al., 2012), teachers need to provide explicit direction and continuous support for it (Whalon et al., 2016). Unique to dialogic reading is the facilitation student responses by using specific formats of questions (e.g., CROWD) and a systematic

instructional sequence (e.g., PEER). Different from its core purpose, however, little attention has been given regarding how to explicitly teach students to answer to the given questions. Carnahan and Williamson (2013) indicated that students with ASD showed increases in reading comprehension of science passages as a result of explicit instruction targeting text structure using a compare-contrast strategy package. Similarly, Williams and colleagues (2004, 2007, 2009) show that explicit instruction is helpful to facilitate student reading comprehension. In this study, the teacher explicitly taught her students how to answer questions, expanded students' responses and provided positive feedback to their participation. This resulted in positive outcomes in students' correct unprompted responses to questions.

Effects of Modified Dialogic Reading on the Initiation Skills of Students with ASD

The central goal of the dialogic reading is to make a child a storyteller (Whitehurst et al., year). One of the ways to increase initiating conversation is to ask questions or make book- related comments to others. According to the interactive-to-independent literacy model (Kadervek & Rabidoux, 2004), attention and responsiveness play a critical role in literacy engagement. This model indicated that students with ASD need additional support for attention and responsiveness to transition from emergent to conventional readers.

Fluery and colleagues (2016) investigated the changes in the verbal participation of nine young children on the spectrum while using the modified dialogic reading. Paraeducators taught the children book-specific vocabularies and used least-to-most prompts to facilitate children's verbal participation. The visual display of the

participants' data indicated that all students showed increases in the rate of independent responses to adult questions, but they did not show improvements in initiating verbal interactions or asking questions in terms of level, trend, or variability. Tau- U effect size shows that the modified dialogic reading intervention brought large to very large response rates (Tau-U = .80-1.25, $p < .01$). This could be explained by the well-documented difficulty individuals with ASD have regarding initiating social interaction (Tager-Flusberg & Joseph, 2003; Tager-Flusberg et al., 2005).

Whalon and colleagues (2015) used question cards and systematic instruction to investigate the change in making initiations. Researchers trained intervention specialists to implement modified dialogic reading with four students with ASD. Whalon and colleagues measured the frequency of initiation skills and the data was displayed to capture the effects of the reading strategy. The visual supports on the question cards along with hierarchical teacher prompts (e.g., least-to-most prompts) helped students ask more questions during the reading class. Student participants in Whalon's study showed either stable or increasing trends in the frequency of using initiation skills, but variability was found through intervention and maintenance phases. Students from Whalon's study showed improvements in the frequency of initiations but did not show high effects based on the Tau-U calculation.

In this dissertation study, the teacher participant used question cards and systematic instruction (e.g., least-to-most prompts) to provide more supports to students with ASD. Right after entering the intervention phase, three out of four students made immediate increases in the level of frequency of their use of initiating skills. KERN did

not make an immediate increase at the beginning of intervention because he had been exposed to the intervention indirectly while one of his peers was receiving interventions in the same classroom.

As described in Chapter IV, student participants showed increases in the frequency of using initiation skills. All student participants showed stable or ascending baselines. During intervention, TELL and GI demonstrated relatively decreasing trends while KERN had an ascending trend. LAMP showed stable data during the intervention phase. During the maintenance phase, KERN and LAMP showed stable data while TELL and GI showed increasing trends. Although intervention and maintenance data show variations with several dips, it is notable that the level of using initiation skills at the intervention and maintenance phases were beyond the baseline. This indicates that the findings of this study align with Whalon's (2015) investigation of the initiation-making outcomes.

Some of the data variability during the intervention and maintenance phases seemed to be related to teacher intentional behaviors. Right after KERN joined the intervention, TELL showed a decreasing trend in asking questions or making comments. This was because the teacher limited TELL's initiation opportunities because his large number of initiations disrupted KERN's opportunities to initiate. This also negatively affected the increase in the number of initiations KERN attempted. GI hardly used initiation at baseline, but her frequency of initiation boosted to 7 occurrences at session 13. However, she showed a decrease in using the skill until session 25. Between sessions 13 and 25, GI had a peer (non-participant in this study) who was not initiating

discussion. Thus, the teacher explicitly encouraged her peer to ask more questions, but GI did not receive the same amount of encouragement. This indicates the need to consider how teachers manage group dynamics in order to improve student outcomes.

Different from existing studies regarding the modified dialogic reading, this dissertation study showed that the teacher participant explicitly taught students with ASD how to ask questions and share comments with others. For example, students were observed while asking questions. The teacher asked students questions, like “what do you need to start with if you want to ask questions?” For some students who showed difficulties, the teacher modeled how to ask questions and did role play. The teacher continued to do this through intervention and maintenance phases. At the beginning of intervention, Kern and Lamp expressed discomfort with asking questions. However, soon all students were observed using questioning strategies easily, even during recess. The results of this study show that children with ASD can learn how to use initiating skills when they are taught explicitly alongside additional support (e.g., visual supports, hierarchical prompts). At the intervention phase, TELL showed a large or strong effect with Tau-U at 98.41%. Kern and Lamp showed medium effects with Tau-U at 83.3% and 89.9%, respectively. Gi showed a small effect with Tau-U at 46.08%. At maintenance, Tell, Gi, and Lamp showed medium to high effects with Tau-U at 77.78%, 86.67%, and 86.67%, respectively. Kern showed a strong effect with Tau-U at 98.48%. Overall, the results of this dissertation study extend the ones of Whalon et al. (2015) that the modified dialogic reading increases the level of frequency of student initiations. The findings in this dissertation study show that using the modified dialogic reading not only

changed the level of frequency, but also created high effects on the frequency of initiation (see Table 6, 9). Therefore, the modified dialogic reading contributes to making a child a storyteller, the core purpose of the dialogic reading.

Comparison of Effect Size among Comparable Studies

Visual analysis of student outcome data for this dissertation study shows that modified dialogic reading had positive effects on listening comprehension and initiation skills of student participants in terms of level, trend, and latency. Shadish et al. (2016) indicate that reporting effect size is necessary to complement data analysis. Table 8 and 9 compare effect sizes on correct responses and initiation skills. Regarding the unprompted correct responses, first, this dissertation study shows higher effect sizes compared to Whalon et al. (2015). Furthermore, all related student data showed significance ($p < .001$) (Table 8). Second, children’s initiations in this dissertation study showed higher effects at Tau-U compared to previous studies (e.g., Whalon et al., 2015, Fleury et al., 2016). In addition, all student data showed significance ($p < .001$) (see Table 9).

Table 8. Effect Size Comparison on Unprompted Correct Responses

	Whalon et al. (2015)				Kang (2017)			
	Alex	Ben	Cam	Dan	TELL	GI	KERN	LAMP
Tau-U	.40	.77	.71	.71	.94	.53	.83	.78
90% CI					[.51, 1]	[.84, .98]	[.46, 1]	[.38, 1]
P value					.0004	.0002	.0001	.0004

Table 9. Effect Size Comparison on Child Initiations

	Whalon et al. (2015)			Fleury et al. (2016)			Kang (2017)		
	Tau-U	90% CI	P value	Tau-U	90% CI	P value	Tau-U	90% CI	P value
S1	.53	NA	NA	-.20	[-0.71, -0.31]	.52	.94	[.50, 1]	.0004
S2	.72	NA	NA	-.02	[-0.42, 0.38]	.93	.95	[.53, 1]	.0002
S3	.03	NA	NA	-.75	[-1.21, -0.29]	.01	.88	[.51, 1]	.0001
S4	.90	NA	NA	-.05	[-0.56, 0.46]	.87	.87	[.47, 1]	.0004
S5					[-0.62, 0.22]	.43			
S6					[-.042, 0.59]	.79			
S7					[-0.02, 0.90]	.12			
S8					[-0.29, 0.51]	.66			
S9					[-0.72, 0.09]	.20			

Limitations

Several limitations were identified with this study. The limitations were categorized into three issues of design, participant records, measures, and environments. First, in designing SCD high quality, WWC require functional relationships across six phases to *Meet Evidence Standards* (Kratochwill et al., 2012). This study included only one teacher participant, but one participant was not enough to determine functional relationships across six phases. Given that the teacher participant's behavior was not enough to be replicated across student participants, the findings regarding the effects of PD on teacher behaviors cannot be generalized. Therefore, the findings regarding this teacher participant need to be interpreted with caution. Second, student information described in Chapter III was collected from school records. The research site was a private school and it did not have enough student information to better understand student participants. The lack of student information prevents making definitive claims about the effects of the intervention on student outcomes based on their unique needs. Third,

student participants in this study had been diagnosed with high functioning ASD.

Although they showed growth in initiation skills and listening comprehension, one cannot generalize this effect to all children with ASD.

Regarding measures, I found two limitations. First, clear criteria were not used to determine when to provide booster sessions for the teacher participant. While I provided booster sessions based on teacher needs, it would be more helpful in understanding the functional relationship between PD and teacher implementation with fidelity if I establish more specific criteria for ongoing coaching (e.g., when to intervene the teacher's instructional behavior, when to provide booster sessions). Second, this dissertation study did not have any breaks between intervention and maintenance phases in terms of teacher independent variable. To better investigate the effects of PD on the teacher's use of the modified dialogic reading, I had to wait extra time for the teacher's use of the modified dialogic reading not to be affected by PD.

The frequency of initiations did not capture the growth of student communication observed during the reading sessions well. In particular, 5 second interval frequency count of initiation skills was not enough to capture student growth in initiating skills while communicating with the teachers or peers. Using different measures, such as the duration of verbalization, the number of words, the rate of combination of initiation and expansion may be better measures for future research.

Factors that were considered as possible limitations for measuring valid student outcomes include classroom environment and schedule factors. First, this study was conducted in a resource room, so some students became to learn about the intervention or

books before the actual intervention occurred for them. This might have affected number of their correct responses to questions and number of initiations they attempted. Additionally, a variety of school and class events made this study intermittent.

Implications for Research

This dissertation study found the positive effects of PD for a special education teacher on teacher implemented modified dialogic reading and of the teacher's use of the modified dialogic reading on the listening comprehension and initiation skills of young children with ASD. In this section, I discuss implications for research.

First, as mentioned in Chapter I and II, the effects of modified dialogic reading need to be investigated more in order to generalize its effects. To be recognized as EBPs, the practice must meet the EBP criteria (see Chapter II for details). Because the modified dialogic reading has been conducted by three research teams, including this dissertation study, two additional studies must be conducted. Future research should replicate and expand modified dialogic reading in order for more students with ASD to benefit from it.

Second, researchers should examine what the most effective professional development in literacy in terms of formats, frequency, and length would be. Although existing literature (e.g., Leko & Brownell, 2014; Desmione, 2009; Joyce & Showers, 1982) indicates professional development and coaching at least fifteen hours of contact time as the effective PD components, studies regarding the modified dialogic reading are missing from the literature. Perhaps this is due to the fact that it is customary to establish the practice as an EPB before establishing what should happen with PD.

Third, researchers need to keep investigating what adaptations are required to make positive impacts on modified dialogic reading so that it includes more students on the spectrum. For example, student participants in this study were young children with high-functioning ASD. Given that oral language and listening comprehension, in particular for inference-making, are challenges for most students on any range of the spectrum, researchers need to find a way for them to benefit from this.

Implications for Practice

This study will expand the field's knowledge about the functional relationship between PD and teacher implementation of evidence-based practices when teaching students with ASD. This dissertation study suggests several implications for practice. First, teacher educators or program developers must design and provide effective professional development to maximize student outcomes. Previous studies indicate a variety of formats, frequencies, and types of PD. This dissertation study has implications for practice because it provides additional evidence that supports teacher-implemented intervention in the classroom for young children with ASD.

Second, higher educators should encourage teachers of young children with ASD to use effective reading strategies as they are intended. This will maximize student outcomes. To do this, teacher educators need to provide continuous support for teachers, because one-time professional development or workshop is not effective in transferring teacher knowledge into practice. In addition, teacher educators need to find effective strategies and instruct teachers how to implement the strategies correctly. Additionally, teacher educators need to share how to find the resources so that the teachers can help

themselves. The present study has implications for practice because it adds evidence of how to support special education teachers continuously to maintain teacher knowledge and to use it in the classroom.

Finally, teacher educators should encourage inservice teachers to read books to students with ASD, and the reading sessions should facilitate their oral and literacy development. The present study provides evidence that when the special education teacher provided a dialogic reading intervention to students with ASD, correct responses and initiation skills of young children grew.

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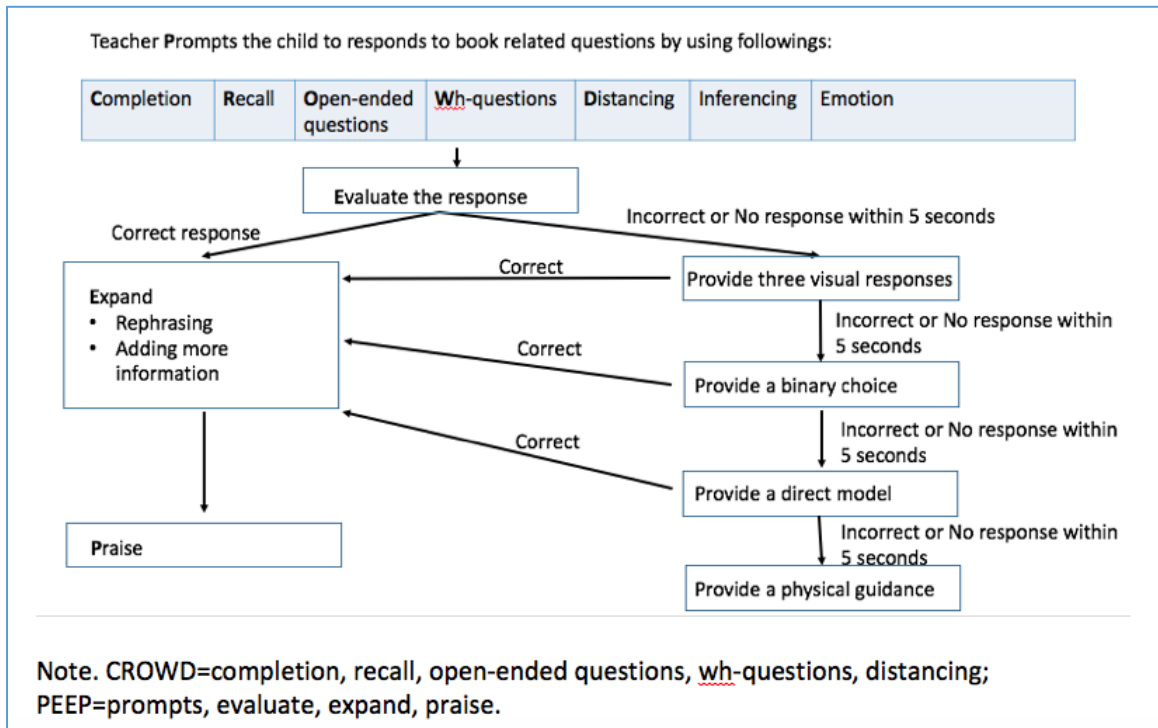
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APPENDIX A

DIALOGIC READING INSTRUCTIONAL SEQUENCE: CROWD, PEEP, AND SYSTEMATIC HIERARCHY VISUAL



APPENDIX B

TEACHER FIDELITY CHECKLIST

Teacher Fidelity Checklist

Participant: _____

Date: _____

Phase: Baseline Intervention Maintenance Generalization

Session#: _____

Teacher Fidelity Checklist	
Teacher Action	Occur (+) or Not Occur (-)
Teacher verbally introduced the topic of the book	
Teacher read the title of the book and gave at least one student the opportunity to point to title. -or- Teacher gave at least one student the opportunity to read the title of the book out loud.	
Teacher modeled opening the book and gave at least one student the opportunity to open the book. -or- Teacher gave at least one student the opportunity to open the book.	
Teacher asks a question to build children’s interest.	
Mark a tally mark in the box each time you observe a CROWD prompt being used.	
Completion – The reader creates an incomplete sentence to promote the children to come up with the appropriate response.	
Recall- The reader asks a question designed to help children remember key elements of the story.	

Open-Ended – The reader asks a question or makes a statement that requires children to describe part of the story in their own words beyond just a “yes” or “no” response.	
Wh-questions- The reader asks a question about the story that begins with what, where, who, or why.	
Distancing – The reader helps children make connections between events that happen in the story to those that occur in their own lives.	
Make notes about examples of CROWD prompts you observed.	
Make a tally mark in the box each time you observe the PEEP sequence being used.	
PEEP sequence (Prompt-Evaluation-Expansion-Praise). The reader uses a CROWD prompt, then evaluates and expands on the children’s responses, and then repeats the prompt to provide another opportunity for the children to respond. The PEEP sequence should always be done in this order.	
Make notes about examples of PEEP you observed.	
Adapted from CONNECT (2011). Dialogic Reading Observation Form. Chapel Hill: University of North Carolina, FPG Child Development Institute, CONNECT: Center to Mobilize Early Childhood Knowledge.	

APPENDIX C

MODIFIED DIALOGIC READING INTERVENTION PROMPTS

Question prompt	Definition	Example
DR question prompts (CROWD)		
Completion	A blank is left at the end of a sentence.	“My buttons, my buttons, my four groovy _____.”
Recall	Questions about the events or main idea.	“What popped off?”
Open-ended	Ask the child what is happening.	“What is happening on this page?”
Wh-question	Focus on vocabulary from the book.	“What is this?” while pointing to an item/ object in the book.
Distancing	Ask children to relate events from the story to their own experience	“What do you do when you lose something?”
Added question prompts		
Wh-inference	Wh-question prompts that require prediction or understanding motivation.	“What will happen next?” “Why is he angry?”
Emotion Identification	Questions that ask the child how a character is feeling or how he or she would feel in a similar situations	“How do you think Pete feels!”

Cite. Whalon et al. (2015), p. 106

APPENDIX D

MODIFIED DIALOGIC READING INSTRUCTIONAL PROMPTS

RECALL Instructional Sequence and Prompting Hierarchy	
PEEP interaction sequence	RECALL prompting hierarchy Follow the PEEP interaction sequence by asking a question (e.g., “What happened?”) and then evaluating the response.
1. Prompt: Prompt the child to say something about the book.	Level 1: Correct response: Continue through the PEEP sequence (i.e., Step 3 expand). No response within 5 or incorrect response: Provide three visual responses (e.g., “What happened? It snowed, the wind blew, it rained? Pointing the visuals.)
2. Evaluate: Evaluate the child’s response	Level 2: Correct response: Return to Step 3 in the PEEP sequence, expand. No response within 5 or incorrect response: Provide a binary choice (e.g., “What happened? It snowed, or the wind blew? Pointing the visuals.)
3. Expand: Expand the child’s response by rephrasing and adding more information.	Level 3: Correct response: Step 3 in the PEEP sequence, expand. No response within 5s or incorrect response: Provide a direct model (e.g., “The wind blew”) and ask the child to repeat.
4. Praise: Praise the child for the correct response.	Level 4: Correct response: Step 3 in the PEEP sequence, expand. If the child does not intimate within 5 s: Physically guide the child to point to the picture representing the correct response, state the correct response, and ask the child to repeat it (“The wind blew.” Guide the child to point to the visual representing wind blew and ask him or her to repeat the full or partial phrase.)

Note. PEEP=prompt, evaluate, expand, and praise
Cite. Whalon et al. (2015)

APPENDIX E

SOCIAL VALIDITY SURVEY

- Q1 The training on the dialogic reading was useful.
- Strongly Agree
 - Agree
 - Neither Agree nor Disagree
 - Disagree
 - Strongly Disagree
- Q2 The intervention focuses on students' listening comprehension.
- Strongly Agree
 - Agree
 - Neither Agree nor Disagree
 - Disagree
 - Strongly Disagree
- Q3 The intervention focuses on students' communication initiation skills.
- Strongly Agree
 - Agree
 - Neither Agree nor Disagree
 - Disagree
 - Strongly Disagree
- Q4 I believe that this intervention will produce effective results.
- Strongly Agree
 - Agree
 - Neither Agree nor Disagree
 - Disagree
 - Strongly Disagree
- Q5 I understand the intervention steps.
- Strongly Agree
 - Agree
 - Neither Agree nor Disagree
 - Disagree
 - Strongly Disagree

Q6 The intervention is easily incorporated into my classroom system.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Q7 I believe I can accurately implement this intervention in my classroom.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Q8 The time required for this intervention is reasonable.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Q9 I saw an increase in my students' listening comprehension because I participated in this study.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Q10 I am willing to use this intervention again.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

Thank you for your participation in this survey. If you have any questions, contact Jeongae Kang at j_kang2@uncg.edu or 713-922-0635.