THE EFFECTS OF THE SYSTEM OF LEAST PROMPTS ON TEACHING
COMPREHENSION SKILLS DURING A SHARED STORY TO STUDENTS WITH
SIGNIFICANT INTELLECTUAL DISABILITIES

by

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ABSTRACT

PAMELA JOANNE MIMS. The effects of the system of least prompts on teaching comprehension skills during a shared story to students with significant intellectual disabilities (Under direction of DR. DIANE BROWDER)

The development of literacy skills is a crucial skill that all students are entitled to develop (Browder, Gibbs, Ahlgrim-Delzell, Courtade, Mraz, Flowers, in press). Currently limited research has been conducted on the acquisition of early literacy skills for students with significant disabilities (Browder, Mims, Spooner, Ahlgrim-Delzell, & Lee, 2008; Browder, Trela, & Jimenez, 2007; Zakas, Browder, & Spooner, 2009) and even more limited on the acquisition of text dependent comprehension (Mims, Browder, Baker, Lee, & Spooner, in press). The current study examined the effects of the system of least prompts to teach multiple types of text dependent listening comprehension question during a shared story to students with significant intellectual disabilities. In addition, maintenance, generalization, and social validity were also examined. A teacher and two paraprofessionals were trained to implement a prompt hierarchy involving three levels (reread, model, physical) during three different shared stories with four different students. Results indicated that all four students increased the number of correctly answered comprehension questions during all three shared stories. In addition, students were able to maintain comprehension after a two week maintenance period. One student was able to generalize the skills used to develop comprehension during a shared story to the third book as well as an additional book. Finally, the interventionists reported high levels of satisfaction with the teaching strategy as well as student outcomes.

DEDICATION

I would like to dedicate this dissertation to my family and friends. Most importantly, this is dedicated to my husband Mike who encouraged and inspired me in this journey. Mike stood by my side with his unwavering love and dedication throughout this process. Second, I am grateful to my parents who always provided me with love, knowledge, support, and the curiosity to continue to set goals. I would also like to thank my siblings, Jason and Chrissie, who cheered me on throughout all of my adventures. To my friends, Vicki, Allison, Josh, Bree, Val, Sharon, Angel, and the many others who have completed this adventure or are in the process of completing this adventure with me. You have inspired, encouraged, supported, and pushed me through this process. I could have never done this without your friendship and collaboration. Finally, this is dedicated to Marley, who was an unexpected inspiration to me in this past year. I love you more than words can say.

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CHAPTER 1: INTRODUCTION

Many researchers have argued that teaching literacy skills is a functional life skill that is essential for all students, including students with significant intellectual disabilities (Browder, Gibbs, et al., in press; Downing, 2006; Gurry & Larkin, 2005; Koppenhaver & Erickson, 2003). The ability to read and experience text can enhance survival in the community, but also can provide a means to learn general curriculum content. Additionally, the development of literacy skills can promote both social interaction and self-determination skills (Browder, Gibbs, et al., in press). Gaining meaning from text is not only practical, but can also be an enjoyable human right that must be provided to all individuals. However, historically some resistance exists for teaching students with significant intellectual disabilities literacy skills. Browder et al. (in press) suggest this resistance may be due to an overwhelming societal assumption that individuals with significant disabilities (e.g., IQ of 55 or below) are unable to acquire these types of skills. While, there is a growing research base on teaching specific literacy skills to students with significant intellectual disabilities, the research is currently limited to primarily functional sight words (Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006).

Browder et al. (2006) completed a comprehensive literature review on reading instruction for students with significant disabilities. Results indicated that out of 128 literacy studies for students with significant disabilities, most focused on vocabulary

skills, specifically, functional sight words. Only 31 of the studies in the review focused on comprehension, 13 on phonics instruction, 5 on phonemic awareness, and 36 on fluency. The researchers discovered through the research reviewed that students with severe disabilities can learn symbols that are literacy related, but that there is a lack of research on how to teach the other reading components to this population. Specifically, there is a need for more research on the development of comprehension. This development may need to begin with research on teaching listening comprehension.

Not only is there a lack research on how to teach other literacy skills for students with significant disabilities, but also little conceptual guidance has been offered to practitioners on how and why to teach literacy skills in a meaningful and systematic way. Recently, a conceptual model of literacy was proposed by Browder, Gibbs, et al. (in press) with two primary outcomes for literacy: enhanced quality of life through shared literature and increased independence as a reader. The model emphasizes the use of shared stories, also known as read alouds or story-based lessons, as a means for increasing listening comprehension.

Shared stories have been commonly used to promote emerging literacy for young children without disabilities, but recent research suggest that shared stories promote increases in literacy development for students with disabilities and for those at risk (Coyne, Simmons, Kame'enui, & Stoolmiller, 2004). Providing shared story experiences can allow access to literacy concepts like print awareness, phonological awareness, alphabet knowledge, and metalinguistic awareness (Justice & Kaderavek, 2002). Coyne et al. (2004) examined the effect of shared stories on literacy skills of students at risk for reading failure. Results indicated that significant increases in early literacy skills of

students at risk for reading failure occurred with instruction that is carefully designed and delivered in a shared story format.

Shared stories also have been shown to be effective in promoting increases in communication and literacy development for students with disabilities (Crowe, Norris, & Hoffman, 2004; Justice & Kaderavek, 2002, 2003; Justice, Kaderavek, Bowles, & Grimm, 2005; Justice & Pullen, 2003; Otaiba, 2004). Most of the current research in the field has focused primarily on communication between the reader and the listener, active participation in a shared story events, and vocabulary development. Results from these studies indicate students with disabilities can show increases in communication, participation, and vocabulary development.

When using shared stories, adaptations may be necessary for students with physical and cognitive delays to access the books (e.g., incorporation of assistive technology, selection of age-appropriate books, physical and cognitive adaptations). In addition, the use of instructional methods needed for students to learn to engage with the books may be necessary for this population of students to engage with grade appropriate text. To date, few studies have been conducted with this population of students on literacy development through shared stories (e.g., Skotko, Koppenhaver, & Erickson, 2004) and fewer still employing research strategies with a systematic instructional focus (e.g., Browder, Trela, & Jimenez, 2007).

Studies on shared stories with this population focus mostly on engagement with a book and social communication. For example, Skotko et al. (2004) examined the effects of shared story activities with girls diagnosed with Rett Syndrome for whom intentional communication had not yet been established. The intervention included the use of

augmentative communication devices and several communication strategies like asking prediction questions and pausing for the child to respond. Both an increase in communication and engagement with the literacy materials were found.

Another study by Blyden (1988) examined the effects of repeated shared book readings on the literacy skills of learners with multiple disabilities. The teachers found that shared book readings with adaptations (e.g., large print, pictures, and sign language) increased attention skills, receptive and expressive language, social interaction, and increased active participation in the learners.

While Skotko et al. (2004) and Blyden (1998) found that increases in participation, engagement, and language skills occurred from the use of shared stories with individuals with significant intellectual disabilities, these studies lacked a systematic instructional format when teaching. Delivery of systematic instruction is important in studies in order to replicate the results in future studies. In addition, systematic instructional strategies can be helpful when teaching academic and functional skills to students with significant intellectual disabilities. Research has shown that students with significant intellectual disabilities learn best through systematic instructional strategies (Collins, 2007; Westling & Fox, 2004).

One systematic instruction strategy that has been used to teach students with significant intellectual disabilities during a shared story is the use of a task analysis to progress through the story. Task analytic instruction involves breaking a skill or chain of behaviors into smaller, teachable skills (Cooper, Heron, & Heward, 2007; Spooner, 1984). Each skill in the task analysis is typically taught through a response prompting strategy (e.g., least-to-most prompts, most-to-least prompts, time delay).

Three studies indicate the use of a task analytic approach to teaching shared stories. First, in a single subject study by Browder et al. (2007), special education teachers used adapted novels and a task analysis to help middle schools students with autism and moderate to severe intellectual disabilities learn to engage with grade-appropriate literature. In this study, the teachers were trained to follow a task analysis to present a story-based lesson using adaptations of books like *Call of the Wild* by Jack London that had text summaries and picture symbols, which were read aloud. Results indicated that the teachers were able to follow the task analysis to present the story-based lesson with high fidelity. In addition, students showed an increase in literacy skills after the story-based lessons. Some of the literacy skills the students acquired that reflected understanding included locating the title, pointing to text to follow the reader, and using pictures to answer comprehension questions.

Second, Browder, Mims, Spooner, Ahlgrim-Delzell, and Lee (2008) looked at the effects of an individualized task analysis created through a team planning meeting for students with the most significant cognitive disabilities on the number of independent responses during a story-based lesson. In this study, the researcher adapted books with salient objects, repeated story lines, surprise elements, and the student's name embedded into the text. A team (e.g., members of the research team, the teacher, the occupational therapist) individualized the task analysis to include the application of the three components of Universal Design for Learning (UDL; representation, expression, and engagement) to each step in order to increase student engagement and communication during the story-based lesson. Results indicated that all 3 participants increased student engagement and participation during the story-based lessons. In addition, students were

able to correctly answer comprehension questions including a prediction and simple recall question.

Finally, in a study by Zakas, Browder, and Spooner (2009) examined if peers without disabilities could learn to follow a task analysis to share an adapted novel with a student with severe disabilities. In addition, a secondary focus was to determine if this peer-supported engagement in a grade-appropriate adapted novel would increase the early literacy skills of students with severe disabilities. Results indicated that all peers showed considerable improvement from the baseline to intervention in the delivery of a shared story using a task analytic approach. In addition, the students with disabilities also showed improvement in early literacy skills (e.g., identifying author, identifying title, turning the page, text pointing, answering a prediction question) from the baseline to intervention. Finally, students were able to answer a comprehension question asked in the delivery of the story.

Collectively, these studies (Browder et al., 2008; Browder et al., 2007; Zakas et al., 2009) demonstrated that by using a task analytic approach to teaching a shared story, teachers presented students with significant intellectual disabilities a systematic approach to a literacy lesson and, more importantly, students showed an increase in emerging literacy skills. Although Browder et al. (2007) and Zakas et al. (2009) have demonstrated that teachers and peers can be trained with high fidelity to implement a story-based lesson using task analytic instruction; these studies are limited because they focused only on foundational literacy skills. Foundational literacy skills are the beginning point for literacy access for students with significant cognitive disabilities. Browder et al. (in press) described these skills as conventions of reading (e.g., choosing between two books,

orienting the book, turning pages of book at appropriate times) or skills needed in order to become a conventional reader. Foundational literacy skills focus primarily on skills for the development of print awareness. Print awareness includes understanding of words and nonwords, awareness of correspondence to speech, understanding that text occurs left to right and top to bottom (Adams, 1990). For example, Skotko et al. (2004) and Blyden (1998) both demonstrated increases in communication and participation with literacy materials, but were limited due to the primary focus on the development of foundational skills. Although foundational and social communication skills are very important for students with severe disabilities to acquire, it may be possible to teach more grade aligned language arts content through specific objectives for listening comprehension. This increased understanding of text is crucial in the ability to function independently in society.

While task analytic instruction used for foundational skills may be a good foundation for teaching students with significant intellectual disabilities emerging literacy skills, more defined systematic instruction prompting systems need to be developed to teach listening comprehension. For students to acquire these objectives a direct, systematic instructional procedure needs to be implemented. One prompting strategy that has been commonly used to teach both functional and academic skills is the system of least prompts, also known as least-to-most prompt system or system of least intrusive prompting. This prompting system involves a prompt hierarchy that is delivered, as needed, after the presentation of the natural cue. If the student does not respond after a predetermined amount of time, the least intrusive prompt is delivered. This occurs until the highest prompt in the hierarchy has been delivered or the student responds correctly.

Doyle, Wolery, Ault, and Gast (1988) conducted a literature review of the system of least prompts. They found over 90 studies conducted employing the system of least prompts to teach both chained and discrete skills. Participants in the studies reviewed ranged from preschool aged students to adults and included participants with mild to profound cognitive delays. Results indicated that 85% of the studies taught all skills to criterion. The other 15% of studies reported either improvement in the intervention phase, improvement for some participants, but not all, or did not teach to criterion rather conducted a certain number of sessions or trials. Due to the strength of the research on the system of least prompts, this system has potential for success for use with shared stories.

To date there has been a paucity of research on shared stories where the primary dependent variable is specific text-dependent listening comprehension. Only a few studies have employed a systematic prompting procedure and those that were completed had limited measures for outcomes of comprehension. Therefore, the purpose of this study is to demonstrate a method for teaching listening comprehension during a shared story using adapted grade level text for students with significant intellectual disabilities. Building on the work of Browder et al. (2007) and Zakas et al. (2009) systematic instructional strategies will be used for increasing listening comprehension skills.

Significance of the Study

This study may extend the literature demonstrating that students with significant intellectual disabilities will gain increases in comprehension literacy skills after participating in literacy activities. While gains in foundational literacy skills are important, the most critical outcomes from shared stories are the gains in text-dependent

listening comprehension skills. Listening comprehension may promote future reading skills, but even if students do not learn to read, they will at least have acquired skills to access literature. Gaining listening comprehension skills through a shared story approach may ultimately lead to the development of increased communication, independence, self-determination, and dignity or other indicators of improved quality of life.

This study may also provide a model for teaching literacy to students with significant cognitive disabilities to improve text comprehension. The comprehension skills of focus will include prediction, main theme, and story element, all of which are included in standards addressed by elementary students without disabilities. Results will extend the current research on literacy instruction for students with significant disabilities beyond sight word instruction as identified in the comprehensive literature review by Browder et al. (2006) to more grade aligned literacy skills.

This study will expand the current research on outcomes of using a shared story to beyond foundational skills. Current studies demonstrate that teachers teach a shared story to promote foundational skills (Browder et al., 2007), as well as peers (Zakas et al., 2009). In addition, outcomes from these studies (Browder et al., 2007; Zakas et al., 2009) as well as others (Blyden, 1998; Browder et al., 2008; Skotko et al., 2004) demonstrate that increases in participation, engagement, and foundational literacy skills can be seen. The current study will extend the prior research by measuring text-dependent listening comprehension skills using a systematic instructional prompting strategy.

Research Questions

The following research questions will guide this investigation:

1. What is the effect of the system of least prompts on the number of comprehension questions answered during a story-based lesson for students with significant intellectual disabilities?

2. What are the effects of the system of least prompts on ability to maintain text dependent listening comprehension among students with significant intellectual disabilities?

3. To what extent does the system of least prompts to teach comprehension skills during a story-based lesson generalize to additional comprehension during a different story?

4. What value does the interventionist place on using the system of least prompts to teach comprehension of grade appropriate text?

Delimitations

This study will evaluate the efficacy of the system of least prompts on the acquisition of listening comprehension during a shared story for students with significant intellectual disabilities by employing single subject research design. It is important to discuss possible limits of this investigation. First, this investigation will be conducted with three students and one teacher. The small number of participants will limit generalizability, but this is a known characteristic of single subject research (Tawney & Gast, 1984) and this study will add to the current literature base. Second, the students in the study will be at the elementary level. Generalizability to other grade bands (e.g., 6-8, 9-10) will be unknown. Third, student outcomes may directly be affected by the teacher's

ability to deliver the system of least prompts. In future replications, if the teacher does

not implement the prompting procedure with perfect procedural fidelity, the student may

be limited in how fast they will acquire the targeted comprehension questions. In the

current study, this potential limitation will be reduced by providing the participating

teachers an intensive training, including role playing opportunities, on the exact steps of

the prompting procedure. In addition, the teacher will be required to collect data during

each implementation of the shared story and any missing score will be clearly apparent

for that data collection session. Fourth, the population of focus includes students at the

concrete symbolic level of communication. That is, students will already have some skills

in picture recognition. The prompting strategy and expected outcomes may not be

applicable to those students at the presymbolic level. Similarly, students at the abstract

symbolic level of communication may need different strategies that build on skills that

are currently in their repertoire. Finally, using a multiple probe across materials (i.e.,

books) design is a limitation due to the possibility of generalization of acquisition of the

system of least prompts to additional materials. Although, past research has indicated this

population of students has had difficulty with generalization.

Definition of Terms

Concrete symbolic level of communication- Students who primarily rely on pictures to communicate their wants and needs (Browder, Spooner, Wakeman, Trela, & Baker, 2006).

Constant time delay- A response prompting procedure that uses a single controlling prompt that is faded over time by increasing the delay interval for a student to independently respond from zero seconds to a set interval of time across sessions (Collins, 2007, Snell & Gast, 1981).

Foundational literacy skills- Also referred to as conventions of reading, which includes skills such as choosing between two books, orienting the book right side up, and turning the page at the appropriate time (Browder et al., 2006).

System of Least Prompts- A prompting strategy that consists of the presentation of a target stimulus, a prompt hierarchy, and an opportunity to respond independently. Once the target stimulus is provided and no response occurs the least intrusive prompt is delivered and the student is given a chance to respond. This continues until all of the prompts in the hierarchy have been delivered or the student correctly responds (Doyle et al., 1988).

Listening comprehension- The development of the meaning of spoken communication or text from a reader (Browder et al., 2007).

Literacy- The ability to use language to read, write, speak, and listen in order to understand words and concepts (Vacca, Vacca, Gove, Burkey, Lenhart et al., 2006).

Presymbolic level of communication- Students who primarily rely on objects, facial expressions, and looking toward object or person to communicate their wants and needs (Browder et al., 2006).

Reading- Deriving meaning from written or printed text; involves both decoding and comprehension (Carnine, Silbert, & Kame'enui, 1997).

Shared Stories- A repeatable and predictable process of reading a book in an interactive turn taking style, where the student is able to construct meaning from text. Also known as story-based lessons or read alouds (Browder et al., 2007).

Students with significant intellectual disabilities- Intellectual disability is a disability characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before the age of 18 (American Association on Intellectual Developmental Disabilities; AAIDD, 2008).

Systematic Instruction- A repeatable, predictable, organized process which reflects currently accepted best practices using performance data to make educated modifications to instruction (Snell, 1983).

Task analysis- The breaking down of a chained behavior into its component steps (Collins, 2007, Spooner, 1984).

Text-dependent listening comprehension- The use of comprehension questions that may only be answered if the student has been attentive to the passage, as opposed to text-independent listening comprehension, which does not require reading or attentiveness to the read passage in order to answer the question (Ahlgrim-Delzell, Browder, Flowers, & Baker, 2008).

CHAPTER 2: REVIEW OF LITERATURE

Early Literacy

Literacy development provides students with necessary skills in the following

areas: (a) to increase their community participation, (b) to become less dependent on

others, (c) to gain new knowledge, (d) to explore new ideas, participate in leisure

pursuits, (e) to make individual choices about learning, and (f) to increase opportunities

for employment (Copeland & Keefe, 2007). Early literacy development is based upon

early life experiences of an individual (e.g., exposure to print, parent/child interactions

with books). While preschool years are typically the prime time for the development of

emergent literacy skills (Pullen & Justice, 2003), the development of these skills can

occur across the years of a student, especially those with severe disabilities.

Emergent literacy can be defined as skills, knowledge, and attitudes that lead to

the development of conventional forms of reading and writing (Whitehurst & Lonigan,

1998). In addition, the environment can support the development of skills, knowledge,

and attitudes. An environmental approach is one type of support to promote early literacy

development. Many researchers stress the importance of early literacy instruction

beginning very early for typically developing children and infants as well as those at risk

or those with disabilities (Justice & Kaderavek, 2004; Pullen & Justice, 2003; Whitehurst

& Lonigan, 1998). Although for those students with disabilities, early literacy instruction

may not only occur before school age or in preschool, but may extend throughout the

elementary years. Recently, a concentrated focus on literacy development for all students has produced significant research summaries such as *Put Reading First, The Research Building Blocks for Teaching Children to Read* (National Institute for Literacy, 2001) and programs like the Reading First initiative (U. S. Department of Education, 2008). Although, left out of these summaries is literacy development for students with significant disabilities.

  Early literacy instruction. Two approaches have traditionally been taken on early literacy instruction. First, a "top-down" holistic model focuses on interventions that concentrate on child-directed, informal, naturalistic, contextualized, and meaningful interactions with both oral and written language (Justice & Kaderavek, 2004). The second approach, a "bottom-up" approach, also known as a phonological approach, focuses on interventions that promote explicit teaching of discrete emergent literacy skills through a teacher-led approach (Justice & Kaderavek, 2004). Justice and Kaderavek (2004) suggest a model that focuses on both of these options by providing young children with meaningful, naturalistic literacy experience that are embedded throughout the day (i.e., an environmental supports model) as well as regular systematic targeted emergent literacy goals (i.e., an instructional supports model). Such a model will promote a strong literacy foundation for learners focusing on emergent literacy skills. This type of model most closely aligns with a model most commonly used in schools today called an "interactive model." An interactive model is a balanced approach to teaching literacy that is well supported in the literature (Vacca et al., 2006), taking a combination of a bottom up and a top down model. One commonality of most early literacy approaches is the emphasis of access to books. Although literature has provided different models for early literacy

instruction, little is known about early literacy instruction for those students with disabilities.

Early literacy instruction for individuals with disabilities. Similar to experts for children without disabilities, experts for children with disabilities also support the use of an environmental or instructional model to promote literacy learning. Katims (1991) echoes researchers in the field of emergent literacy (Justice & Kaderavek, 2004; Pullen & Justice, 2003; Whitehurst & Lonigan, 1998) by proposing that literacy development begin much sooner than children with disabilities begin to conventionally read and write. Individuals with disabilities may lack life experiences that typically developing children often experience (Foley, 1993; Pierce & Williams, 1994). Other experts note that there is a paucity of research on the literacy development for individuals with disabilities (Foley, 1993; Pierce & Williams, 1994). One of the few existing studies is Katim's year-long exploratory work with young children identified as having special needs. In this study when students were exposed to structured, print-rich environments with a plethora of opportunities to engage in literacy experiences, they showed an increase in emergent literacy behaviors (i.e., independently selecting and interacting with different books, increases in "writing" behaviors). Specifically, a statistically significant difference in concepts of print was found within the group from pretest to posttest measures (t=8.69, df=20, p<.001). In a follow up study by Katims (1991), 24 students with mild to moderate mental retardation were randomly assigned to a control or experimental group. The control group consisted of 10 students and the experimental group consisted of 14 students. Students in the experimental group were exposed to a three phase approach to emergent literacy activities, including access to the well-stocked classroom library center,

daily group storybook readings of books selected by the students, and regular "writing"
activities that were both functional and meaningful. Results were similar to those of the
earlier study. Students in the experimental group increased interest in and desire to
interact with books. In addition, students in the experimental group had a statistically
significant difference in gain scores from a pre and post test that measured concepts of
print.

Another study conducted by Katims (1994) was designed to document the ways in
which emerging literacy behaviors could be promoted in a group of preschool children
with mild to moderate disabilities. After being exposed to a literacy-rich environment
with multiple daily readings of familiar and predictable books by adults, the children had
significant increases in independent reenactments and concepts of print. Katims (1994)
suggests that increases were a result of daily, multiple readings by adults of familiar and
predictable books, as well as techniques such as prediction cycle, assisted readings, active
student involvement (i.e., filling in missing parts of book), modeling, and interactive
dialogues.

Using a similar environmental supports model, Koppenhaver and Erickson (2003)
explored the effects of providing natural emerging literacy supports for preschoolers with
autism and severe communication impairments. The natural literacy opportunities
provided included an abundance of print materials, experiences, and writing technologies
in the students' preschool classroom. Results indicated that all participating students
increased overall emergent literacy behaviors (e.g., browsing, silent studying, pretend
reading, conventional reading, writing).

Research with students with visual impairments has also emphasized environmental supports. Murphy, Hatton, and Erickson (2008) conducted a survey to identify strategies used to promote early communication and literacy. Respondents included 192 teachers of infants, toddlers, and/or preschoolers with visual impairments. Results found that about 70 percent of the teachers supported the development of early literacy by facilitating early literacy attachment and bonding, 74 percent provided early literacy support to families, and 55 percent provided adaptations to provide increased accessibility to literacy materials. In contrast, the study found an overall lack of access to evidence-based resources, lack of explicit phonological awareness instruction, lack of emphasis on shared storybook reading, and an overall limited access to low vision devices and writing technology.

Erickson, Hatton, Roy, Fox, and Renne (2007) used a qualitative case study design to identify methods that early interventionists used to support development in emerging literacy for infants and toddlers with visual impairments. Three themes emerged as a result of the study. First, when addressing emergent literacy in early intervention a family-centered approach is important. Second, the role of the early interventionists is imperative in both language and concept development. Finally, the focus on the senses in regard to literacy is essential. All themes identified support the role of environmental supports for literacy instruction with this population.

In another qualitative study, Erickson, Koppenhaver, Yoder, and Nance (1997) expanded upon their earlier work by conducting a longitudinal case study of an 11-year-old boy with significant cognitive disabilities to identify communication and literacy learning progress. The researchers found the student showed marked improvement in his

acquisition of literacy and language skills over a few years. The authors discussed several of the reasons for the student's success. First, the student had a supportive home environment with a parent who collaborated with an AAC team and advocated for all of his needs. Second, the student's classroom placement encouraged active participation with same-age peers in academic content. Third, the student was provided interactive reading and writing experiences by his teachers. Fourth, the teachers were educated on providing the student with literacy instruction. Fifth, the assistive technology device (i.e., Dynavox) was used consistently and modified as needed to provide the student with independent access and increased interaction opportunities during instruction. Sixth, all teachers and parents held high expectations and positive attitudes for the students' ability to read, write, and communicate. Finally, as a result of overall success in school, the student acquired self-confidence and motivation to learn.

As the findings of Murphy et al. (2008) demonstrate, teachers may overlook some aspects of an environmental supports model, but also may overlook the importance of instructional support. Besides the large body of research on sight words instruction (Browder, Algrim-Delzell, Spooner, Mims, & Baker, 2009; Browder & Xin, 1998), only a few studies have focused on using instructional supports to promote literacy with students with moderate and severe disabilities. In Hendricks, Katims, and Carr (1999) 9 students with mild to moderate disabilities participated in four instructional blocks of reading. The first block, the Basal Block, included guided reading activities such as choral reading, reading in pairs, and individual reading. This block focused on sight word instruction, phonics instruction, and guided comprehension activities. The second block, the Literature Block, consisted of time to participate in self-selected reading. The third

block, the Word Block, focused on decoding skills. Finally, the fourth block, the Writing

Block, consisted of writing activities including involving the writing process and further

focus on concepts of print. Results indicated that students made meaningful gains in the

use of word identification and comprehension strategies, metalinguistic skills, written

language, and increased confidence with the written word.

Although not many have evaluated instructional models for literacy for this

population, several experts have described what these models should include. Foley

(1993) recommends the importance of providing systematic instruction throughout the

students' educational program as well as the importance of using available technology. In

general, Foley suggests that focus on increasing instruction in the following areas should

be considered: (a) phonological awareness, (b) automaticity of word recognition, (c)

comprehension and use of complex syntactic structures, and (d) comprehension of

narrative and expository text. Pierce and McWilliams (1993) recommend using an

instructional model based around an interactive storybook reading using adapted books

that met the learners' needs. Erickson and Koppenhaver (1995) suggest, in addition to the

combined use of technology and child-centered instruction, a four component model

including (a) writing during daily calendar time; (b) directed reading with the teacher in a

small group or individual format; (c) use of computer software (i.e., *Spell-a Word*); and

(d) group activities (i.e., modeled writing component and group computer time). This

model was implemented in a rural classroom for students with significant cognitive

disabilities in upstate New York. Erickson and Koppenhaver (1995) reported on the

progress of two students in the classroom. Both students developed emerging reading and

writing skills after the implementation of a new technology system and the four component literacy model.

From the literature identified on early literacy and students with disabilities, several key points can be gleaned. First, instruction should begin as early as possible. Children with disabilities typically have limited experiences and exposure to literacy due to a focus on their other needs (e.g., physical needs; Katims, 1991; Murphy et al., 2008; Pierce & McWilliams, 1993). Second, students should be provided with a variety of literacy experiences and opportunities throughout their day (Erickson et al., 2007; Foley, 1993; Katims, 1990, 1991, 1994; Murphy et al., 2008; Pierce & McWilliams, 1993). Third, students should be exposed to daily storybook readings that involve predictable and repeatable text (Erickson et al., 1997; Erickson & Koppenhaver, 1995; Hendricks et al., 1999; Katims, 1991, 1994; Pierce & McWilliams, 1993). Fourth, students should participate in "writing" activities (Erickson & Koppenhaver, 1995; Erickson et al., 1997; Foley, 1995; Hendricks et al., 1994; Katims, 1991). Fifth, books need to be adapted for students to access them readily (Erickson et al., 2001; Murphy et al., 2008; Pierce & McWilliams, 1993). Sixth, students should be provided appropriate assistive technology devices for increased access to text and participation in literacy experiences (Erickson & Koppenhaver, 1995; Erickson et al., 1997; Foley, 1993). Next, students should be provided with direct, systematic instructional strategies when teaching literacy concepts (Foley, 1993). Finally, teachers and parents should set high expectations for students with disabilities in regard to emerging literacy skills (Erickson et al., 1997; Foley, 1993).

Rationale for Focus on Instruction of Early Literacy for Students with Significant Intellectual Disabilities. As mentioned in the literature above, a well-balanced literacy

program needs to include environmental supports (e.g., access to a variety of literacy experiences, interactive book experiences), but the direct instruction for specific literacy skills is also critical to student learning. As Foley (1993) discusses, this population of students needs systematic instructional strategies to promote the development of literacy concepts.

When developing and evaluating an early literacy intervention, it is essential to identify what to teach and the methods of instruction. The use of interactive lessons with storybooks has been recommended by several experts (Erickson et al., 1997; Erickson & Koppenhaver, 1995; Hendricks et al., 1999; Katims, 1991, 1994; Pierce & McWilliams, 1993). In addition, conceptual models of literacy for this population have focused on the importance of access to a story through a read aloud approach (Browder, Gibbs, et al., in press; Erickson & Hatton, 2007). The conceptual model by Browder, Gibbs, et al. (in press) not only stressed the importance of a shared story experience, but also the use of systematic instruction. For students with severe disabilities, the use of systematic instruction is crucial to achieve the development of important literacy skills. The literature on shared stories and systematic instruction of literacy will now be discussed.

Shared Stories

Shared stories have been found to play an important role in both early language development and overall literacy development (Ezell & Justice, 2005). Previous research has shown that daily readings with young children lead to higher scores on vocabulary, comprehension, and decoding measures (Bus, van IJzendoorn, & Pellegrini, 1995; Coyne et al., 2004; Senechal, Thomas, & Monker, 1995). Shared stories have also been called shared readings, read alouds, story-based lessons, or book sharing. When young children

are provided with consistent exposure to shared stories improved comprehension and

vocabulary development can occur (Justice, 2002; Justice, Meier, & Walpole, 2005;

Vacca et al., 2006; Whitehurst et al., 1994; Whitehurst, Falco, Lonigan, Fischel,

DeBaryseh, Valdez-Menchaca et al., 1988). Providing shared story experiences can be

used to promote (a) print awareness, (b) phonological awareness, (c) alphabet knowledge,

and (d) metalinguistic awareness (Justice & Kaderavek, 2002). In addition, the explicit

referencing of print during a shared story reading as been shown to increase children's

contacts with print during shared story activities (Justice, Pullen, & Pence, 2008) as well

as overall knowledge of print concepts (Lovelace & Stewart, 2007). Shared book reading

has been found to have potential positive effects on the early reading and writing skills of

children as defined by *What Works Clearinghouse* (Institute of Educational Sciences).

Although most research has been with young children not identified with disabilities,

shared stories also have been shown to be effective in promoting increases in

communication and literacy development for young students with language impairments

and students at risk (Crowe et al., 2004; Justice & Kaderavek, 2002, 2003, 2004; Justice

et al., 2005; Justice & Pullen, 2003).

A study by Crowe et al. (2004) was conducted with 6 children with average

intellectual ability. All 6 students exhibited language impairments as demonstrated by the

Preschool Language Scale-3. All students received speech services and all children's

primary caregivers also participated in the study. The research design was a multiple

baseline across subjects design. The participants were assigned pairs to the 3 segments of

the treatment design (Caregiver-Child Dyad 1 and Caregiver-Child Dyad 2 entered first

after 3 baseline sessions; Dyads 3 and 4 began training after 4 baseline sessions; Dyads 5

and 6 entered the training phase after completing five baseline sessions). The intervention included an interactive storybook reading intervention called Complete Reading Cycle (CRC). CRC is a four step process consisting of the following steps during a storybook reading: (a) Attentional vocative- establishing joint focus, (b) Query- eliciting a response, (c) Responses- providing a response, and (d) Feedback- giving feedback. The dependent variable measured child communicative behaviors for increases in active verbal participation, story initiations, and lexical diversity of utterances. Specifically the frequency of communicative turns, frequency of story initiations, number of different words, and total number of words were measured during an interactive storybook reading were measured. Results indicated that all 6 children demonstrated increases in their number of communicative turns from baseline to training. Five of the 6 children demonstrated an increase in story initiations, but all 5 showed decreases from training to follow-up. All 6 children showed increases from baseline to training in the number of different words produced. In addition, all 6 children showed increases from baseline to training for the total number of words used.

Coyne et al. (2004) evaluated a storybook intervention with participants identified as at risk of experiencing reading difficulties. Participants included 34 kindergarten students who received the storybook intervention and 30 kindergarten students served as the control group (Open Court). A randomized control group design was used and all students were randomly assigned into either a treatment or control group. All participants were administered a measure (pre- and posttest) assessing selected vocabulary from the stories used in storybook intervention. A storybook intervention included direct teaching of target vocabulary vs. untaught vocabulary. The dependent variable was the vocabulary

growth as measured by the PPVT scores and a 20 word instrument was developed that required students to produce word meanings or tell anything they knew about target words. Structured Equation Modeling (SEM) was used to compare vocabulary growth across groups (the storybook group and the control group) and within groups (taught vocabulary and untaught vocabulary). Results indicated that there was a statistically significant difference in the effect of initial PPVT for taught vocabulary between the storybook group and the control group, but there was not a statistically significant difference in the effect of the initial PPVT for untaught vocabulary between the storybook group and the control group. In addition, the students in the storybook group did not learn the meanings of untaught words at a greater rate than student in the control group.

A study by Justice (2002) was conducted with 23 preschool children (10 females, 13 males) to examine questioning versus labeling of novel words and conceptual versus perceptual questions about novel words during a storybook reading. A multivariate split plot research design was used with questioning and labeling of novel words served as a within-group factor and perceptual and conceptual questions about novel words served as between-group factor. The dependent variable was receptive and expressive learning of novel vocabulary words measured by novel receptive vocabulary and novel expressive vocabulary. Results indicated expressive naming abilities produced minimal novel word learning over the course of two exposures via shared book reading. Receptive word learning performed much higher than that observed for expressive. Adults labeling of novel words increased children's learning of receptive words more than questioning. In

addition, no difference in receptive or expressive word learning from conceptual versus perceptual questions was found.

Although the benefits of shared stories are mixed, outcomes are strong for students learning skills for which they received instruction (e.g., taught *vs*. untaught words). This is a particularly important finding to consider when planning for students with severe intellectual disabilities due to the lack of a strong research base in this area.

Shared stories for students with severe disabilities. A review of literature yielded several studies conducted on the use of shared stories for students with severe intellectual disabilities. A study by Skotko et al. (2004) examined the effects of shared story activities with girls diagnosed with Rett Syndrome and for whom intentional communication had not yet been established. The intervention included the use of augmentative communication devices and several communication strategies like asking prediction questions and pausing for the child to respond. Both an increase in communication and engagement with the literacy materials were found (e.g., increases in purposeful activation of a communication device).

Another study by Blyden (1988) examined the effects of repeated shared book readings on the literacy skills of learners with multiple disabilities. Participants included students with cognitive and physical impairments. The teachers found that shared book readings with adaptations (e.g., large print, pictures, sign language) increased attention skills, receptive and expressive language, social interaction, and increased active participation in the learners.

Additionally, Koppenhaver, Erickson, and Skotko (2001) conducted a study with 4 parent-child dyads. All child participants included 4 girls (ages 3 to 7) with Rett

Syndrome; in addition their mothers participated in the study. All 4 girls communicated

using objects or facial expressions. A multiple baseline design across behaviors was used

as the research design of this study. The baseline phase (Phase one) included shared

storybook reading alone. Phase two involved hand splinting, which was the process of

splinting the non-dominant hand during storybook reading. Phase three included the

addition of a variety of assistive technologies (i.e., picture communication symbol set,

single-message Big Mack, multi-message four in-line Cheap Talk, and PVC pipe stands

to mount devices and symbols). Finally, in Phase four a parent training program taught

parents to attribute meaning to child's communicative attempts, prompt the use of

Alternative and Augmentative Communication (AAC) through naturalistic approaches,

provide adequate wait time in the prompt hierarchy, and consistent use of questioning and

comments that require the use of Picture Exchange Communication System (PECs) and

Voice Output Communication Aides (VOCA). The dependent variable in the study

included measuring both the communication modes (e.g., pointing with eyes, fingers, or

objects to pictures; facial expressions; and activation of VOCA) and acts (i.e.,

labeling/commenting) recorded from videotaped sessions of shared storybook readings.

Results indicated that both labeling and commenting increased frequency in phase 3 and

4 for all 4 participants. For 3 out of 4 participants phase four resulted in the highest rates

of labeling and commenting. In addition, all 4 participants had significant increases in

accessing VOCA in either or both phases 3 and 4 and 3 out of 4 participants increased the

frequency of VOCA access after phase four. All 4 participants increased use of VOCA

for symbolic communication, but decreased in other forms of symbolic communications

(i.e., eye gaze or pointing to picture symbols).Varied results were demonstrated in the

appropriate and inappropriate switch use. Finally, hand splinting did not lead to significant increases in either communication acts or modes.

While research on shared stories with individuals with disabilities has shown the potential for increased communication (Koppenhaver et al., 2001) and engagement (Skotko et al., 2004), these studies have lacked a direct, systematic instructional approach. A systematic instructional approach may be beneficial in developing skills beyond communication and engagement.

Systematic Instruction

One major strategy for teaching individuals with disabilities is the use of systematic instructional procedures. Ault, Wolery, Doyle, and Gast (1989) reviewed 31 studies that identified and compared different systematic instructional strategies commonly used to teach individuals with significant cognitive disabilities. The review was completed to determine the efficiency and effectiveness of each strategy. The review included the following instructional strategies: trial and error, error correction, most-to-least prompts, system of least prompts, constant and progressive time delay, stimulus shaping, and stimulus fading. Results indicate that all systematic instructional strategies were effective in teaching students the acquisition of new skills. Although some strategies were more efficient than others (i.e., stimulus prompting procedures over response prompting procedures), others were more parsimonious than others (i.e., response prompting procedures over stimulus prompting procedures). A list of the most common response and stimulus prompting procedures can be found in Table 1.

Table 1

Systematic Instructional Strategies and Definitions

Strategy	Definition
Trial and error	Teacher reinforces the student for correct responses and ignores incorrect responses or gives feedback with no further information
Error correction	Teacher models the correct response or provides further information to the student after an error occurs and has the student respond to the task again.
Most-to-Least prompts	Teacher presents a hierarchy of prompts from most to least intrusive. Initially, the most intrusive prompt is paired with the discriminative stimulus until the student reaches the criterion. When the criterion is met, the next less intrusive prompt is provided. This continues until the student responds to the discriminative stimulus without a prompt
System of least prompts	Teacher presents a hierarchy of prompts from least to most intrusive. Student is given a chance to respond to the discriminative stimulus alone and if no response or an incorrect response is given, prompts are delivered from least intrusive to most intrusive, with a fixed time interval, until a correct response occurs

Constant time delay	Teacher presents the discriminative stimulus at the same time as the controlling prompt for a set number of trials. In following trials a constant time delay is presented between the presentation of the discriminative stimulus and the controlling prompt
Progressive time delay	Teacher presents the discriminative stimulus at the same time as the controlling prompt for a set number of trials. In following trials a progressively increasing time delay is presented between the presentation of the discriminative stimulus and the controlling prompt
Stimulus shaping	Stimulus is presented in a specific form which triggers the student to respond. That specific form of the stimulus is then gradually changed until the student can respond correctly to the target stimulus
Stimulus fading	Stimulus is presented that enhances an irrelevant dimension of that stimulus. The stimulus is gradually changed until the student can respond correctly to the target stimulus

A second review was found for 90 studies using the system of least prompts (Doyle et al., 1988) in order to determine variations used within the prompting strategy and the overall effectiveness of this strategy. All studies were completed with students with disabilities. Results indicated that in 85% of the studies the target behaviors were taught to criterion. In addition, all studies reviewed demonstrated overall improvement of

the target behavior from baseline to intervention. In the review they determined the system of least prompts was used in teaching a variety of students across many different tasks that were both discrete and chained.

An additional review was found conducted by Schuster et al. (1998) that reviewed 20 studies on the use of constant time delay in teaching chained tasks. Results indicated that time delay has been effective in teaching a wide range of students, settings, and arrangements (individual and group), as well as successfully implemented by a variety of trainers. These results reiterated results from a review by Wolery et al. (1992) that included studies on the use of constant time delay in teaching discrete tasks.

The above reviews clearly demonstrate the strength of using systematic prompting strategies. The reviews also provide information on the viability of these strategies when teaching students with a wide range of disabilities as well as a wide range of skills, including both discrete and chained. Recent literature has shown the applicability of these instructional strategies to promote early literacy development.

Systematic instruction during shared stories. Three studies in the literature used systematic instruction, with a specific focus on task analytic instruction. First, a study by Zakas et al. (2009) examined if peers without disabilities could learn to follow a task analysis to share an adapted novel with a student with severe disabilities. In addition, a secondary focus was to determine if this peer-supported engagement in a grade-appropriate adapted novel would increase the early literacy skills of students with severe disabilities. Results indicated that all peers showed considerable improvement from the baseline to intervention in the delivery of a shared story using a task analytic approach. In addition, the students with disabilities also showed improvement in early literacy skills

(e.g., identifying author, identifying title, turning the page, text pointing, answering a prediction question) from the baseline to intervention.

In Browder et al. (2007), special education teachers used adapted novels and a task analysis to progress through a shared story and help middle schools students with autism and moderate to severe intellectual disabilities learn to engage with grade-appropriate literature. In this study, the teachers were trained to follow a task analysis to present a story-based lesson where they read aloud adaptations of novels like *Call of the Wild* that had text summaries and picture symbols. After training, teachers were able to follow the task analysis to present the story-based lesson with high fidelity. In addition, students showed an increase in literacy skills after the story-based lessons. Some of the literacy skills the students acquired included locating the title, pointing to text to follow the reader, and using pictures to answer comprehension questions.

Browder et al. (2008) looked at the effects of an individualized task analysis created through a team planning meeting for students with the most significant cognitive disabilities on the number of independent responses during a shared story. In this study, books were adapted with salient objects, repeated story lines, surprise elements, and the students name embedded into the text. The individualization of the task analysis included applying the three components of Universal Design for Learning (UDL; representation, expression, and engagement) to each step in order to increase student engagement and communication during the story-based lesson. Results indicated that all 3 participants increased student engagement and participation during the story-based lessons.

The studies by Browder et al. (2007), Zakas et al. (2009), and Browder et al. (2008) demonstrated that by using a task analytic approach to teaching a shared story,

teachers can present students with significant intellectual disabilities a systematic approach to a literacy lesson and, more importantly, students will show an increase in foundational literacy skills. Browder et al. (in press) describes these skills as conventions of reading (e.g., choosing between two books, orienting the book, turning pages of book at appropriate times) or skills needed in order to become a conventional reader. Foundational literacy skills focus primarily on skills for the development of print awareness. Print awareness includes understanding of words and nonwords, awareness of correspondence to speech, understanding that text occurs left to right and top to bottom (Adams, 1990).

More important than the development of foundational skills is the development of comprehension skills. Comprehension is building of the meaning of spoken communication or text. The building that occurs involves an interaction between the receiver and the message as the receiver processes and interprets a given message (Browder et al., in press). To increase independence as a reader, comprehension is necessary as learners are able to question, predict, and interpret what is being read or said.

Research on Comprehension

Although the most important outcome of emerging literacy development discussed may be comprehension, very little research has been conducted on the development of comprehension for students with disabilities and even less with those with significant disabilities. Reading comprehension has been considered "the most important academic skill learned in school" (Mastropieri & Scruggs, 1997, p. 1). The ability to read and understand written text increases learning opportunities and improves

communication (Nation & Norbury, 2005). If students are unable to read text, they still need skills to participate in literacy experiences and access text in order to develop meaning. In addition, understanding text has been determined to be a crucial skill for functioning independently in society (Walilberg & Magliano, 2004). Research on reading comprehension will be briefly reviewed next to identify possible implications for listening comprehension in shared stories.

Research on reading comprehension. The National Reading Panel (2000) identified 13 instructional methods for teaching reading comprehension. Of the methods identified, five methods were for teaching vocabulary and eight for teaching text comprehension. Those methods identified represent the most promising general education practices. The five identified vocabulary instructional methods include the following: (a) explicit instruction (i.e., students are given definitions of target words), (b) implicit instruction (i.e., students are exposed to a wide range of words), (c) multimedia methods (including other media beyond text, such as graphics, hypertext, or American Sign Language), (d) capacity methods (i.e., practice to make reading automatic), and (e) association methods (i.e., students make connections between words they knew and words they do not know). The eight identified text comprehension instructional methods include the following: (a) comprehension monitoring, (b) cooperative learning, (c) graphic and semantic organizers, (d) story structure (i.e., students ask and answer wh-questions about the plot or map out timelines and events in stories), (e) question answering, (f) question generation (i.e., students ask wh- questions to themselves), (g) summarization, and (h) multiple-strategy teaching (i.e., students use several strategies flexibly across the text).

Chiang and Lin (2007) conducted a comprehensive review which provides a research base on teaching reading comprehension to individuals with Autism Spectrum Disorders (ASD). Eleven studies met the inclusion criteria of the search. Of the 11 studies, seven focused on sight word comprehension skills and four focused on text comprehension. The following instructional strategies were successfully used in the 11 identified studies: (a) progressive time delay, (b) discrete trial training procedures, (c) peer tutoring strategies, (d) cooperative learning groups, (e) incidental teaching procedures, (f) computer-based video instruction, and (g) simulated multimedia programs. A major limitation in the reviewed literature is a lack of multiple studies employing the same strategy. As a result, researchers and practitioners lack a strong evidence-base on the most effective strategies to teach comprehension skills for this population.

Another review conducted by Browder et al. (2006) identified research on reading instruction for students with significant cognitive disabilities. Overall, less than a third of the studies contained a measure of comprehension (31 studies) and either had a functional application (e.g., 18 of the studies) or an academic application (13 studies). Some of the evidence-based practices used to teach comprehension were a massed trial format, systematic prompting strategies, and picture use. Overall the review revealed that most of the research conducted on reading with individuals with significant cognitive disabilities was on sight word instruction. The authors reported a need for additional research in the other areas of NRP's components of reading, especially in the area of comprehension.

After the Chiang and Lin (2007) and Browder et al. (2006) review were published, a study by Flores and Ganz (2007) was conducted with 4 students with autism

and developmental disabilities. They used a Direct Instruction program to teach reading comprehension (i.e., facts, analogies, and inferences). Results indicated a functional relationship between Dl and reading comprehension skills. All four students met criterion across the statement inference, using facts, and analogies conditions.

Although these studies focused on reading comprehension versus the listening comprehension that is targeted during shared stories, they offer intervention guidelines that may be generalizable. For example, the review by Chiang and Lin (2007) suggest a systematic instructional prompting strategy (i.e., progressive time delay) to be useful in developing reading comprehension skills. The same approach was found useful by Browder et al. (2006). A systematic instructional approach may be useful in teaching listening comprehension skills as well. These studies also offer some guidance for expanding the types of comprehension. Rather than simple prediction or anticipation, students may also be able to learn sequencing or classification skills.

Research on Listening Comprehension during Shared Stories

A few authors have conducted research on the development of text-dependent listening comprehension. These studies illustrate a method that targets text-dependent listening comprehension. That is, the development of comprehension based on text that is read aloud from a book, story, or novel. In Browder et al. (2007) on the use of shared stories with students with significant cognitive disabilities, teachers learned to use a task analytic approach to progress through a shared story. Data were collected on the student responses to each step of the task analysis in the shared story. A couple of these steps included measures of comprehension (i.e., prediction question, comprehension question

at the end or throughout the story), but did not provide specific strategies for the development of comprehension only.

Comprehension was also an indirect dependent variable in a study by Browder et al. (2008). One major difference was the students in this study included those with very limited communication or intentionality. All participating students had multiple, significant cognitive disabilities. Of the steps on the task analysis 5 included indicators of early comprehension of text read aloud (e.g., prediction, summary question, recognition of repeated storyline, recognition of name embedded in text).

Finally, a study by Mims, Browder, Baker, Lee, and Spooner (in press) was conducted with 2 students with significant cognitive disabilities and visual impairments. In this study the interventionist used the system of least prompts to teach comprehension during a shared story. Books were adapted to include salient objects representing nouns throughout the story. In addition, students were provided with the same objects as response options (including a distracter object and the target object). One limitation of the study was that students only had 2 choices to respond to when asked the question, thus providing the student with a 50-50 chance of getting the answer correct.

Overall the paucity of research on text-dependent listening comprehension for students with significant disabilities is troubling given its importance. Although there is growing research on reading comprehension, its applicability to shared stories is very limited in the research. While there are a few studies measuring text-dependent listening comprehension, they are limited due either being a secondary dependent variable or limited response options.

Summary of Research Foundation for the Current Study

  Dependent variables. A major potential contribution of this study is to expand the literature base on text-dependent listening comprehension. The studies reviewed above included measures of text-dependent listening comprehension, but this study will go beyond by including this measure as a primary dependent variable as well as providing more than two response options. The variables measured by other researchers on the use of shared stories include the acquisition of targeted vocabulary words (novel or targeted; Coyne et al., 2004; Justice, 2002), number of steps followed on a task analysis (Browder et al., 2007; Zakas et al., 2009), the number of independent responses during a shared story (Browder et al., 2009), and the frequency of communication modes and acts (Crowe et al., 2004; Koppenhaver et al., 2001). The current study will measure the number of comprehension questions answered. This is different than other studies previously conducted on the use of shared stories in that two of the studies (Browder et al., 2007; Zakas et al., 2009) had primary dependent variables that focused on training the use of task analytic instruction versus specific student outcomes. In addition, some of the studies focused on increases in communication rather than a specific academic outcome (Crowe et al., 2004; Koppenhaver et al., 2001). This study will on focus on academic outcomes (i.e., text-dependent comprehension skills). The differences will contribute to the field by providing research specifically on academic outcomes (i.e., comprehension of text) for students with severe intellectual disabilities during a shared story. The current study will explore a similar dependent variable as measured in the study by Mims et al. (in press). This study looked at the acquisition of comprehension during a literacy activity. The

current study will measure the development of comprehension, but the response options will include three responses as opposed to two as found in the Mims et al. study.

Independent variables. The component of the treatment package from other studies on shared stories that are similar to the current study is the use of a shared story approach to teach emerging literacy skills. A similar treatment package will help to build the evidence-base (Horner et al., 2005). Although, many of the studies used a variety of terms for this activity (e.g., storybook reading, shared story, story-based lesson), they all included the same basic idea of the adult interacting with the student while reading aloud. For example, the adult guides the student through the book by asking prediction questions, comprehension questions, and focusing on target vocabulary. In addition to the use of a shared story approach, the use of systematic instruction procedures (i.e., task analytic instruction) in three of the seven studies (Browder et al., 2007; Browder et al. 2008; Zakas et al., 2009) will also be similar to the current study.

Several of the studies used a different treatment package along with shared stories, including two studies (Coyne et al., 2004; Justice, 2002) that used a specific technique to teach target vocabulary. Coyne et al. (2004) used a direct instruction strategy called explicit instruction to teach target vocabulary words. Explicit vocabulary instruction includes directly teaching the meanings of words that are targeted. Justice (2002) targeted both questioning versus labeling of novel words and conceptual versus perceptual questions about novel words. Systematic prompting to answer specific comprehension questions was chosen instead of these procedures because due to the overwhelming evidence of its success in teaching numerous skills including academic skills (Snell, 1988; Wolery & Gast, 1984).

Limitations. One potential limitation is the confounding variable of the use of AAC devices. Browder et al. (2008) discussed the need to identify all possibly AAC devices for student use before the study started. In the current study the researcher will review an AAC evaluation on each participating student to ensure they have access to the most appropriate AAC device for participation in the shared story.

Finally, Crowe et al. (2004) discussed the time investment needed to train teachers to use shared stories a limitation. In contrast, for this population of students to acquire literacy skills, a time intensive session to train teachers may be necessary. For the current study, the teachers will be trained to proficiency on the shared story experience and implementation of comprehension questions via a system of least prompts strategy prior to starting the study. In addition, if any participating teachers show a lapse in implementing the intervention with high procedural fidelity, a booster training will be provided.

Potential Contribution of the Current Study

There are several potential contributions the current study could provide the literature base. First, a shared story approach has been the primary recommendation of experts in the field as a primary method for early literacy instruction. In addition, two primary instructional models are used to teach students with disabilities literacy skills during a shared story format, including an environmental-based model and an instructional-based model. The current study will add to the literature on the use of an instructional-based model to promote text dependent listening comprehension skills. Specifically, the system of least prompts will be used to teach the targeted comprehension skills. Third, of the studies using an instructional model, few have addressed

comprehension with this population. Those that have measured comprehension have been limited due to focusing on primarily on other variables (foundational skills) or using limited response options for comprehension. The current study will focus on text-dependent comprehension as a primary dependent variable and provide students more than two response options. This will provide the literature base with an additional study targeting literacy learning for students with severe intellectual disabilities.

METHOD

Introduction

The focus of this study was the development of text-dependent listening comprehension through a shared story format for students with significant intellectual disabilities. The primary independent variable implemented during the study was the system of least prompts. The primary outcome measured during the course of this study was the number of comprehension questions correctly answered. A multiple probe across materials was used as the research design in the study.

Participants

The classroom teacher and two para-professionals served as the interventionists in the study. The teacher nominated potential participants based on the eligibility criteria that include: (a) adequate vision and hearing, (b) an IQ of 55 or below, and (c) little or no emerging literacy skills (e.g., text-dependent listening comprehension, print awareness, word awareness, letter awareness). In addition, the teacher nominated students at the concrete symbolic level of communication or specifically, students who could identify picture symbols and primarily used picture symbols to communicate. Demographic information for the 4 participating students is provided in Table 2. The demographic table includes information on the age, disability, IQ, tests used to determine IQ and diagnosis, description of reading and communication skills (e.g., AAC devices used, pictures, words, objects), and current amount of time participating in literacy activities.

Table 2

Student Demographics

Student	Age	Disability	IQ/ Test	Reading and Communication	Literacy
Fred	11	Intellectual Disabilities-Moderate	44/ WISC	Nonverbal; uses visual supports to complete activities and communicate	90 minutes per day
Richard	11	Intellectual Disabilities-Moderate	42/ WISC	Minimal sight word vocabulary; communicates wants and needs though visual supports	90 minutes per day
Charlie	10	Multi-handicapped	Was labeled as untestable due to nonverbal nature (76% delay; Battelle Developmental	Minimal sight word vocabulary; communicates wants and needs though	90 minutes per day

			Inventory)	visual supports	
Dave	11	Intellectual Disabilities- Moderate	30/ WISC	Nonverbal; uses visual supports to complete activities and communicate	90 minutes per day

Setting

The study took place in a self-contained classroom in an elementary school in a large, urban district in the southeastern United States. The classroom served students with severe disabilities. There were 2 teacher assistants in the classroom in addition to the classroom teacher. The teacher had 16 years of experience and a BS special education degree (triple certificate for EH, LD, and MH). Currently the teacher had limited training in literacy instruction. The first paraprofessional had 11 years experience working with students with significant cognitive disabilities. The second paraprofessional had six years experience working with students with significant cognitive disabilities. In addition, the classroom had a part-time student teacher who spent the spring semester in the classroom on a part-time basis. This student teacher was pursuing a degree in the adapted curriculum licensure area in special education program at a local university.

The school contained 808 students in grades Kindergarten through 5th. There were four self-contained classrooms for students with disabilities. Approximately 11 % of the school population had a disability and 24 percent of those were students with

significant intellectual disabilities. Seventeen percent of the students in the school received free or reduced-price lunch. The school had 56 teachers, 1 assistant principal, 1 student services specialist, and 53 support staff. Approximately 14.1% of the students were African American, 75.2% White, 5.1% Hispanic, and 5.6% other. There were 10 students in the classroom with disability labels ranging from moderate to severe cognitive delays and autism. All assessments and interventions were conducted in the elementary special education classroom that the students currently attended.

Materials

Three age-appropriate and grade appropriate elementary books were used for the story-based lessons. The books were selected in consultation with a literacy expert after identifying book choices based on a list of recommended books for early elementary grades. Each book was adapted to meet the needs of a learner at the concrete symbolic level of communication. Specifically, the length of the book was reduced to promote full engagement for the duration of the shared story lesson. Next, pictures were added throughout the book for enhanced understanding of the text. Pictures representing key vocabulary or main ideas were added to the book. The books were adapted to contain a repeated story line for the main idea of the book. The development of the storyline occurred by prereading the text and focusing on a line that summarizes the main idea of the story. Finally, comprehension questions were created to be used during the shared story (see Table 3). All adaptations were made to the books before baseline assessment occurred.

Students were asked to respond to the comprehension questions asked throughout the shared story. The response options were presented in the form of picture responses.

For each question asked, there was one correct picture symbol and two distracter picture symbols. Of the distracter options, both were not be a plausible option. All picture symbol options were presented on a response board and presented in a random order.

Table 3

Comprehension Questions Across Books

Comprehension Questions for Jamaica's Find

Question #1 (prediction): What do you think the story will be about?

Question #2 (recall): Where did Jamaica arrive?

Question #3 (recall): What did Jamaica find in the sand?

Question #4 (comprehension- sequence): When Jamaica found the stuffed dog what did she do first, next, last?

Question #6 (application): Jamaica is in her bedroom? Are you in your bedroom right now?

Question #7 (application): Jamaica ran to the park house. Are you running?

Question #8 (analysis): How are Jamaica and Kristin the same?

Question #9 (synthesis- cause and effect): What did Jamaica do when Kristin said she could not find Edgar dog?

Question #10 (synthesis- main idea): What was our story about?

Comprehension Questions for Don't Wake Up the Bear!

Question #1 (prediction): What do you think the story will be about?

Question #2 (recall): What is the bear doing in his cave?

Question #3 (recall): Why did the hare snuggle up to the bear?

Question #4 (comprehension- sequencing): What animal was the first, next, last to

snuggle up to the bear?

Question #6 (application): The mouse is in the snow. Are you in the snow right now?

Question #8 (analysis): How are the hare, badger, fox, squirrel and mouse the same?

Question #9 (synthesis- cause and effect): When the mouse sneezed, what happened?

Question #7 (application): The animals are running. Are you running right now?

Question #5 (comprehension- identification): What happened at the end of the story?

Question #10 (synthesis- main idea): What was our story about?

Comprehension Questions for Alexander and the Terrible, Horrible, No Good,

Very Bad Day

Question #1 (prediction): What do you think the story will be about?

Question #4 (comprehension- sequencing): When Alexander woke up, what

happened first, next, last?

Question #2 (knowledge- recall): What did Alexander draw a picture of?

Question #3 (knowledge- recall): Where was Alexander when he found he had a

cavity?

Question #8 (analysis): How was Alexander's trip to the shoe store different from

Anthony and Nick's?

Question #9 (synthesis- cause and effect): What happened when Alexander forgot to

listen to his dad?

Question #7 (application): Alexander is wearing railroad-train pajamas. Are you

wearing pajamas right now?

Question #6 (application): Alexander is in bed? Are you in bed right now?

Question #5 (comprehension- identification): What happened at the end of the story?

Question #10 (synthesis- main idea): What was our story about?

Research Design

A multiple probe single subject design across materials (i.e., books) with concurrent replication across students (Horner & Baer, 1978; Tawney & Gast, 1984) was used to examine the effects of the system of least prompts on the number of comprehension questions correctly answered during a shared story. During baseline, the interventionists read each adapted book to their assigned student. Throughout the shared story the participating students were asked comprehension questions without any additional input or instruction. All students participated in a shared story (independent of each other) with all three target books and the interventionists scored each comprehension question asked. After a student demonstrated consistent responding in the baseline phase; the interventionists provided the student with the intervention in a staggered fashion across books. Once the student's data showed clear acceleration of the trend line during the first book, the interventionist reprobed the student on all additional books. Once a stable baseline occurred in the second book, the student entered intervention with this book as well. The student remained in the intervention on all books until a mastery criterion of 8 out of 10 occurred for 3 consecutive sessions. Once a mastery criterion was achieved, data collection stopped for this book, but continued in the other books until the same mastery criterion was reached with those as well. This continued until the student was in the intervention with all three books. In addition, due to the concurrent replication across students, one student may have been in book 2 or 3 and another may have been in book one. This occurred if one student progressed through the intervention faster than the other students. The concurrent replication was

independent of other students in the intervention. If any student in any book provided data that was increasing or unstable, they remained in baseline conditions until data became stable or decreased.

Dependent Variable and Data Collection Procedures

    Dependent variable. The dependent variable was the number of correctly answered comprehensions questions. A sequence of specific question was created for each book that focused on the following: (a) a prediction question (with a logical answer versus illogical options); (b) 2 knowledge questions (factual recall); (c) 2 comprehension questions concerning a sequencing question and identification; (d) 2 application questions; (e) 1 analysis question; and (f) 2 synthesis questions (1 cause and effect and 1 main idea). Each question was asked at a predetermined time during the shared story, which occurred the same way each time the story was read. These questions were validated by two reading experts to ensure they matched the type of question indicated. Data summarized the number of correctly answered comprehension questions during a shared story.

    Construct validity. Two content experts validated the comprehension questions used in the intervention prior to their use in data collection. In addition, a third content expert was asked to provide a blind review of questions at the end of the study. This review involved labeling each question with the type of comprehension question asked to ensure each question was labeled correctly. This process revealed that the cause and effect questions (synthesis) for *Alexander and the Terrible, Horrible, No Good, Very Bad Day* was more similar to a recall question. It is important to consider this error when interpreting the results.

Data collection. After asking all comprehension questions associated with the story, the interventionist scored the student's response on the comprehension question data sheet (see Appendix A). The intervention was delivered by each student's teacher or teacher assistant. Fred and Richard were assigned to the teacher. Charlie was assigned to Teacher Assistant 1 and Dave was assigned to Teacher Assistant 2. A second observer observed at least 25% of the lessons and scored the student's responses for purposes of computing inter-rater reliability. Each question on the data sheet was scored as mastered (+) or not mastered (-). Inter-rater reliability was calculated by taking the number of agreements and dividing it by the number of agreements plus disagreements and multiplying by 100. The criterion for acceptability was set at 90% or above. If criterion was not met, the interventionist and the lead researcher met to discuss discrepancies in order to provide more consistency in future reliability checks.

Procedural fidelity. A second observer collected information on procedural fidelity by scoring whether the interventionist presented each step of the system of least prompts prompting strategy for the delivery of each predetermined comprehension question (see Appendix B). In addition, procedural fidelity was scored during the training of the prompting procedure and shared story process for each teacher implementing the intervention. For this training, the number of present items was divided by the total number of items and multiplied by 100 to obtain a procedural fidelity score (see Appendix C).

Procedures

  Baseline. The interventionists presented the adapted book to their assigned student, started reading, and included the 10 predetermined comprehension questions paired with each book. The interventionist read each page of the book pausing to give the student the opportunity to make a response to each comprehension question asked. All responses were scored immediately after the opportunity was given. During baseline, the interventionist read with animation, but did not prompt or praise student responses. Students only received praise for appropriate behavior during the story.

  Intervention. The intervention included the systematic teaching of the system of least prompts during the shared story. During intervention the interventionists provided a prompt hierarchy, as necessary, after the presentation of each comprehension question asked. The interventionist started by asking the comprehension questions and waiting three seconds for a student response. If the student did not respond, the interventionist provided a first level prompt, also referred to as a reread prompt, by rereading the sentence in the story with the targeted information and provided the three response options again. Again the interventionist waited three seconds for the student to respond. If the student did not respond, the interventionist provided a second level prompt, also referred to as a model prompt, by rereading more specific target information and modeled a correct response (i.e., briefly pointing to the correct picture) and asked the student to find the correct response on his or her own. The interventionist waited an additional three seconds for the student to respond. At this point if the student did not respond, the interventionist provided a third level prompt, referred to as a physical prompt, by guiding the student's hand to the correct response. If at any time during the prompt hierarchy the

student provided an incorrect response, responses were ignored and the interventionist provided the next prompt level in the hierarchy.

Reinforcement was provided when the student answered the question correctly. Initially reinforcement occurred after an independent correct response or a prompted correct response. If the student demonstrated the ability to correctly respond after a given prompt, all additional correct responses to prompts that are higher up on the hierarchy were not reinforced (e.g., on the first trial the student responds to a verbal prompt, but the next trial responds to correctly to a model prompt, no reinforcement will be given). Reinforcers were individualized based on teacher recommendations and identified before all students entered baseline.

The time involved for completing a shared story session varied depending on each student in the intervention. For example, one student may have required more time due to needing to progress through all prompt levels in the hierarchy. On average the intervention lasted approximately 30 minutes.

Social validity. The social validity of the intervention was measured by giving the participating teachers a survey. This was designed to obtain the teacher's perspective of the effect of using the system of least prompts to listening comprehension in a shared story lesson. Other survey items focused on why each dependent variable is socially important and overall student outcomes. Questions also addressed if the implementation of the independent variable was practical and cost effective (see Appendix D).

Data Analysis

Data were analyzed by visually inspecting graphed data to identify trend, level, and variability and to determine if a functional relationship existed between the

independent and dependent variable. Predication, verification of prediction, initial effect, and replication of the effect was the target with all three books for all participating students. Mastery criteria were set at 8 out of 10 correctly answered questions for three consecutive sessions.

Threats to Validity

Internal validity. Contemporary history was controlled for through the use of a multiple probe across books design. The effects of maturation were controlled for by implementing the intervention with more than one student. In addition, the use of a multiple probe across books design helped control for the effects of maturation. The effects of testing were controlled for through the implementation of a multiple probe across books design instead of a multiple baseline design. Instrumentation was controlled for by having at least 25% of the sessions observed by a second observer and through expert validation of the comprehension questions. The effects of mortality were controlled for by having concurrent replication with 3 additional students.

External validity. Controlling for external validity is a potential problem in single subject research. It is often addressed by having a sufficient number of students in the study, as well as replication of the independent variable (Horner et al., 2005). External validity was controlled for by replicating the study with 3 additional students.

CHAPTER 4: RESULTS

Reliability and Treatment Integrity

Reliability

In this section the results on interobserver reliability will be provided for each student. In addition, for each student results will be discussed for all three books. For the first student, Fred, second observers evaluated 30% of the baseline data collected and 36% of the intervention data collected for *Don't Wake up the Bear*. Interobserver reliability was 100% for all baseline and intervention sessions observed. The second observers evaluated 40% of the baseline data collected and 29% of the intervention data collected for *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Inter-observer reliability was 100% for all baseline and intervention sessions observed. The second observers evaluated 43% of the baseline data collected and 43% of the intervention data collected for *Jamaica's Find*. Inter-observer reliability was 100% for all baseline sessions observed and was 97% (ranged from 90% to 100%) for all intervention sessions observed.

For Richard, second observers evaluated 30% of the baseline data collected and 45% of the intervention data collected for *Jamaica's Find*. Interobserver reliability was 90% for all baseline sessions and 100% for all intervention sessions observed (overall *M*= 98%, overall range 90% to 100%). The second observers evaluated 50% of the baseline data collected and 33% of the intervention data collected for *Alexander and the Terrible,*

No Good, Very Bad Day. Inter-observer reliability was 90% (*M*=95%, range 90% to 100%) for all baseline session and 100% for intervention sessions observed (overall *M*= 98%, range 90% and 100%). The second observers evaluated 40% of the baseline data collected and 40% of the intervention data collected for *Don't Wake up the Bear*. Inter-observer reliability was 90% for all baseline sessions observed and 100% for all intervention sessions observed (overall *M*= 97.5%, range 90% to 100%).

For Charlie, second observers evaluated 30% of the baseline data collected and 35% of the intervention data collected for *Don't Wake up the Bear*. Inter-observer reliability was 100% for all baseline sessions and intervention sessions observed. The second observers evaluated 40% of the baseline data collected and 30% of the intervention data collected for *Jamaica's Find*. Inter-observer reliability ranged from 90% to 100% with a mean of 95% for all baseline session observed and 100% for intervention sessions observed (overall *M*= 98%, range 90% to 100%). The second observers evaluated 33% of the baseline data collected for *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Inter-observer reliability ranged from 90% to 100% with a mean of 97% for all baseline sessions observed. Charlie never entered intervention for this book due to meeting the mastery criteria in baseline conditions.

For David, second observers evaluated 30% of the baseline data collected and 32% of the intervention data collected for *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Inter-observer reliability was 100% for all baseline and intervention sessions observed. The second observers evaluated 40% of the baseline data collected and 33% of the intervention data collected for *Jamaica's Find.* Inter-observer reliability was 100% for all baseline session and intervention sessions observed. The

second observers evaluated 33% of the baseline data collected and 33% of the intervention data collected for *Don't Wake up the Bear*. Overall, inter-observer reliability was 100% for all baseline and intervention sessions observed.

Treatment Integrity

To substantiate treatment adherence, data were collected in intervention sessions. Second observers used a detailed checklist (Appendix B) to measure the integrity of intervention implementation. During baseline sessions, praise and prompting were not observed.

For Fred, second observers evaluated 30% of the baseline data collected and 36% of the intervention data collected for *Don't Wake up the Bear*. Procedural fidelity ranged from 97% to 100% with a mean of 99% for all intervention sessions observed. The second observers evaluated 40% of the baseline data collected and 29% of the intervention data collected for *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Procedural fidelity ranged from 90% to 100% with a mean of 97% of intervention sessions observed. The second observers evaluated 43% of the baseline data collected and 43% of the intervention data collected for *Jamaica's Find*. Procedural fidelity was 100% for all intervention sessions observed.

For Richard, second observers evaluated 30% of the baseline data collected and 45% of the intervention data collected for *Jamaica's Find*. Procedural fidelity ranged from 83% to 100% with a mean of 95% for all intervention sessions observed. The second observers evaluated 50% of the baseline data collected and 33% of the intervention data collected for *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Procedural fidelity was 100% for all intervention sessions observed. The second

observers evaluated 40% of the baseline data collected and 40% of the intervention data collected for *Don't Wake up the Bear*. Procedural was 100% for all intervention sessions observed.

For Charlie, second observers evaluated 30% of the baseline data collected and 35% of the intervention data collected for *Don't Wake up the Bear*. Overall, procedural fidelity ranged from 97% to 100% with a mean of 99.5% intervention sessions observed. The second observers evaluated 40% of the baseline data collected and 30% of the intervention data collected for *Jamaica's Find*. Procedural fidelity ranged from 95% to 100% with a mean of 98% for all intervention sessions observed. The second observers evaluated 33% of the baseline data collected for *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Charlie never entered intervention due to meeting the mastery criteria in baseline conditions.

For David, second observers evaluated 30% of the baseline data collected and 32% of the intervention data collected for *Alexander and the Terrible, Horrible, No Good, Very Bad Day*. Procedural fidelity ranged from 94% to 100% with a mean of 97% of intervention sessions observed. The second observers evaluated 40% of the baseline data collected and 33% of the intervention data collected for *Jamaica's Find.* Procedural fidelity ranged from 91% to 100% with a mean of 97% of all intervention sessions observed. The second observers evaluated 33% of the baseline data collected and 33% of the intervention data collected for *Don't Wake up the Bear*. Procedural fidelity ranged from 90% to 100% with a mean of 94% of all intervention sessions observed.

Results for Question 1

What is the effect of the system of least prompts on the number of comprehension

questions answered during a story-based lesson for students with significant intellectual

disabilities?

Fred's Scores

Figure 1 presents the total number of correct responses for Fred on the 10

comprehension questions asked in each of the three books. Scores for Fred indicated that

the intervention had a positive impact on this student's knowledge. Further, visual

analysis of the graph indicated a functional relationship between implementing the

system of least prompts intervention and increased participant knowledge of text

dependent comprehension questions in all three books.

Don't Wake Up the Bear. During baseline, Fred's scores were all at 0 out of 10.

During intervention, his scores ranged from 1 to 9 with a mean of 6.27. Fred met the

mastery criteria and entered a maintenance phase of two weeks. The maintenance datum

indicated a score of 8 out of 10, which was at the same level for mastery indicating that

Fred maintained the skills gained during intervention.

Alexander and the Terrible, Horrible, No Good, Very Bad Day. During baseline,

Fred's scores ranged from 0 to 3, with a mean of 1.6. During intervention, his scores

ranged from 3 to 9 with a mean score of 7.83. During maintenance, Fred met the mastery

criteria in this book and entered the two week maintenance phase. The maintenance

datum indicated a score of 9/10, which was slightly above the mastery level of 8 out 10

indicating that he maintained the skills gained during intervention.

Jamaica's Find. During baseline, Fred's scores ranged from 0 to 3, with a mean

of 1.2. During intervention, his scores ranged from 2 to 10 with a mean score of 8.14.

Fred met the mastery criteria for this book and entered the two week maintenance phase.

Maintenance datum indicated that Fred maintained the skills gained in intervention after

receiving a score of 10 out of 10.
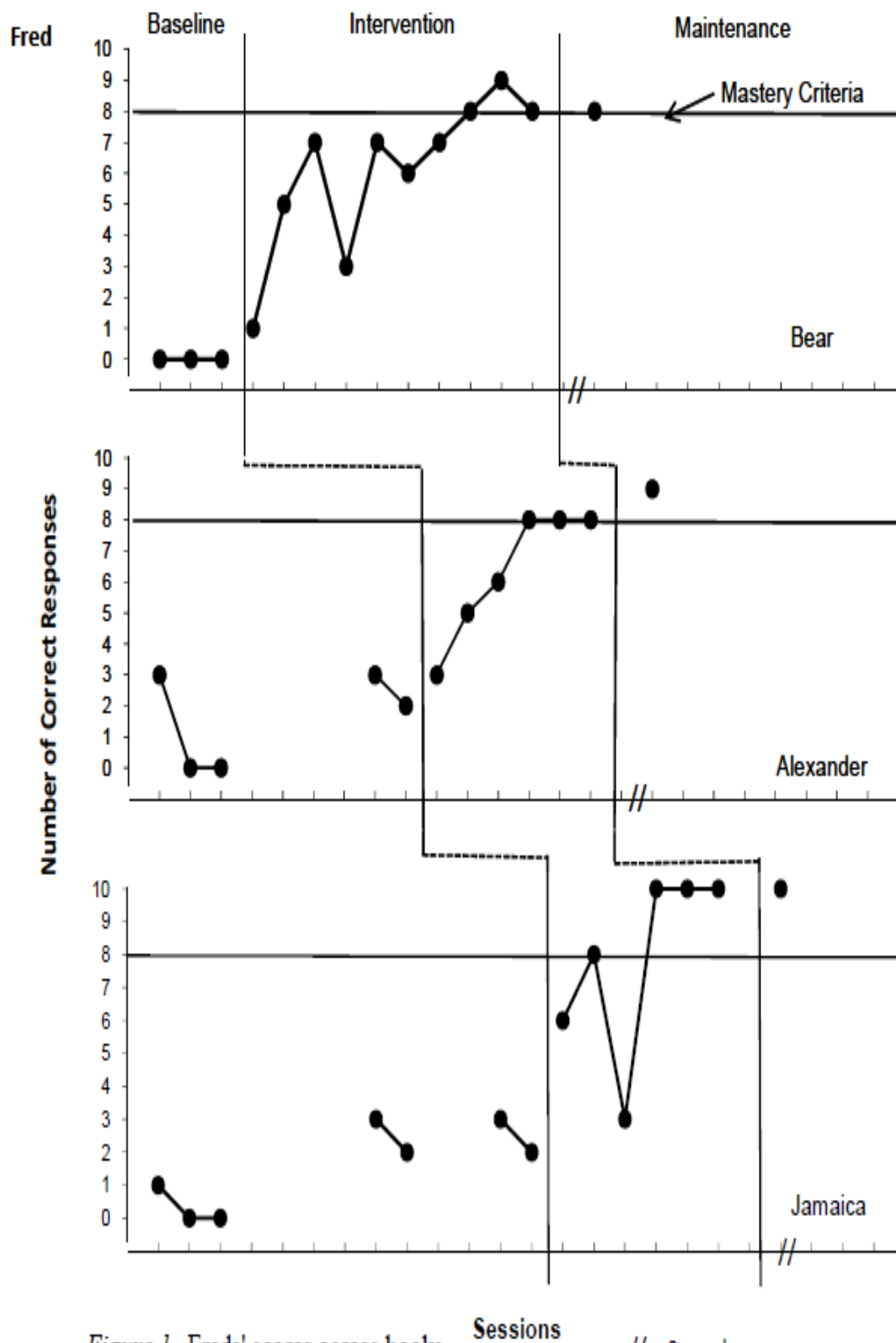
Figure 1. Freds' scores across books

Richard's Scores

Figure 2 presents the total number of correct responses for Richard on the 10 comprehension questions asked in each of the three books. Scores for this student indicated that the intervention had a positive impact on his knowledge. Further, visual analysis of the data indicated a functional relationship between implementing the system of least prompts intervention and increased participant knowledge of text dependent comprehension questions in all three books.

Jamaica's Find. During baseline, Richard's scores ranged from 3 to 6, with a mean of 4. During intervention, his scores ranged from 3 to 10 with a mean score of 7.8. Richard met the mastery criteria for this book and entered the two week maintenance phase. Maintenance score indicated that Richard maintained the skills gained in intervention after receiving a score of 10 out of 10.

Alexander and the Terrible, Horrible, No Good, Very Bad Day. During baseline, Richard's scores ranged from 3 to 6, with a mean of 4.25. During intervention, his scores ranged from 3 to 10 with a mean score of 7.8. During maintenance, Richard met the mastery criteria in this book and entered the two week maintenance phase. The maintenance datum indicated a score of 10/10, which was above the mastery level of 8 out 10 indicating that he maintained the skills gained during intervention.

Don't Wake Up the Bear. During baseline, Richard's scores ranged from 2 to 5, with a mean of 3.6. During intervention, his scores ranged from 7 to 10 with a mean of 9.2. Richard met the mastery criteria and entered a maintenance phase of two weeks. The

maintenance datum indicated a score of 10 out of 10, which indicated that Richard

maintained the skills gained during intervention.
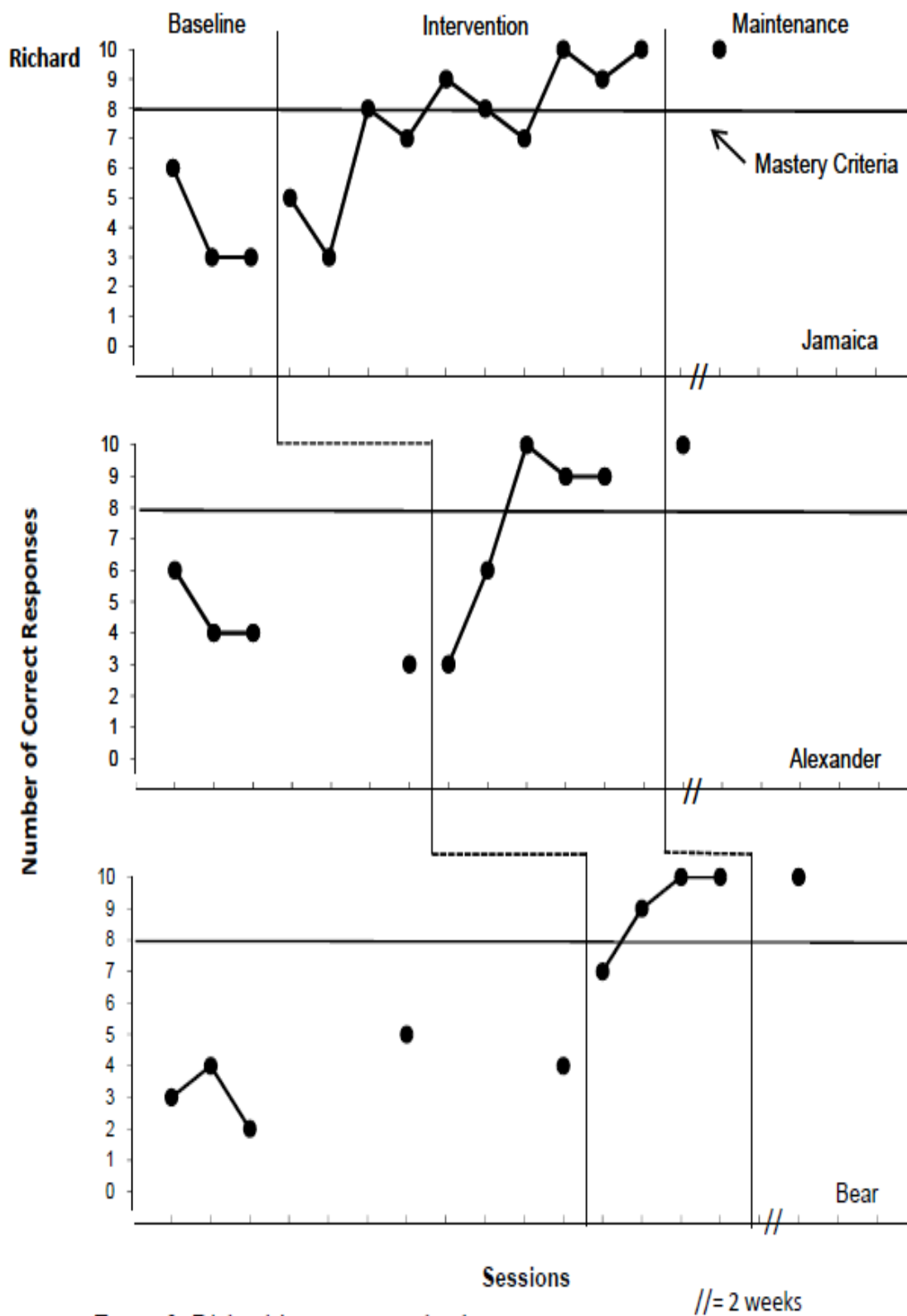
Figure 2. Richards' scores across books

Charlie's Scores

Figure 3 presents the total number of correct responses for Charlie on the 10 comprehension questions asked in each of the three books. Scores for this student indicated that the intervention had a positive impact on his knowledge. Further, visual analysis of the data indicated a functional relationship between implementing the system of least prompts intervention and increased participant knowledge of text dependent comprehension questions in all three books.

Don't Wake Up the Bear. During baseline, Charlie's scores ranged from 4 to 5, with a mean of 4.3. During intervention, his scores ranged from 5 to 10 with a mean of 7.4. Charlie met the mastery criteria and entered a maintenance phase of two weeks. The maintenance datum indicated a score of 10 out of 10, which indicated that Charlie maintained the skills gained during intervention.

Jamaica's Find. During baseline, Charlie's scores ranged from 1 to 6, with a mean of 3.8. During intervention, his scores ranged from 4 to 9 with a mean score of 7.1. Charlie met the mastery criteria for this book and entered the two week maintenance phase. Maintenance data point indicated that Charlie maintained the skills gained in intervention after receiving a score of 9 out of 10.

Alexander and the Terrible, Horrible, No Good, Very Bad Day. During baseline, Charlie's scores ranged from 3 to 6, with a mean of 4.25. Charlie never entered intervention in this book due to achieving mastery criteria (at least 8 out of 10 for three consecutive sessions).

Because Charlie seemed to generalize the skills to the third book, the researcher decided to assess generalization to an additional untrained book. Charlie showed some

generalization to the book *Tar Beach*. In four data sessions his scores ranged from 5 to 9 with a mean of 6.2. The last three data sessions collected, Charlie met the mastery criteria of 8 out of 10 or higher for three consecutive sessions. Data collection was discontinued at this time.
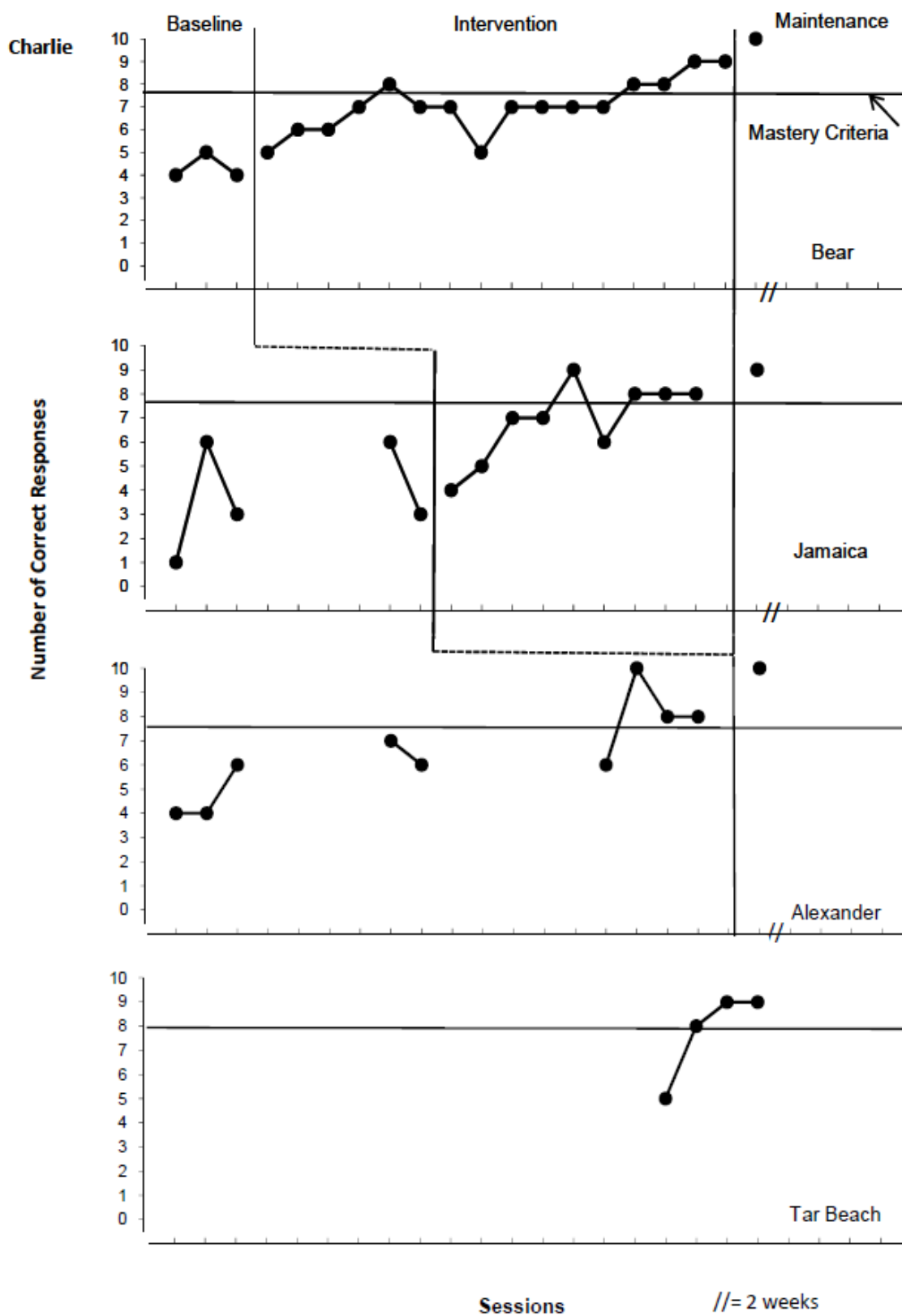
Figure 3. Charlie's scores across books

Dave's Scores

   Dave. Figure 4 presents the total number of correct responses for Dave on the 10 comprehension questions asked in each of the three books. Scores for this student indicated that the intervention had a positive impact on his knowledge. Further, visual analysis of the data indicated a functional relationship between implementing the system of least prompts intervention and increased participant knowledge of text dependent comprehension questions in all three books.

   Alexander and the Terrible, Horrible, No Good, Very Bad Day. During baseline, all Dave's scores were 0 out of 10. During intervention, his scores ranged from 0 to 10 with a mean of 4.75. Dave met the mastery criteria for this book and entered the two week maintenance phase. Maintenance data were collected for two sessions and indicated that Dave maintained the skills gained in intervention after receiving a score of 9 out of 10 for both data sessions.

   Jamaica's Find. During baseline, Dave's scores ranged from 0 to 3, with a mean of 1.2. During intervention, his scores ranged from 1 to 10 with a mean of 6.22. Dave met the mastery criteria for this book and entered the two week maintenance phase. Maintenance score indicated that Dave maintained the skills gained in intervention after receiving a score of 10 out of 10.

   Don't Wake Up the Bear. During baseline, Dave scores ranged from 0 to 2, with a mean of .67. During intervention, his scores ranged from 1 to 9 with a mean of 6.5. Maintenance data were not collected for this book due to a conflict in schedule.
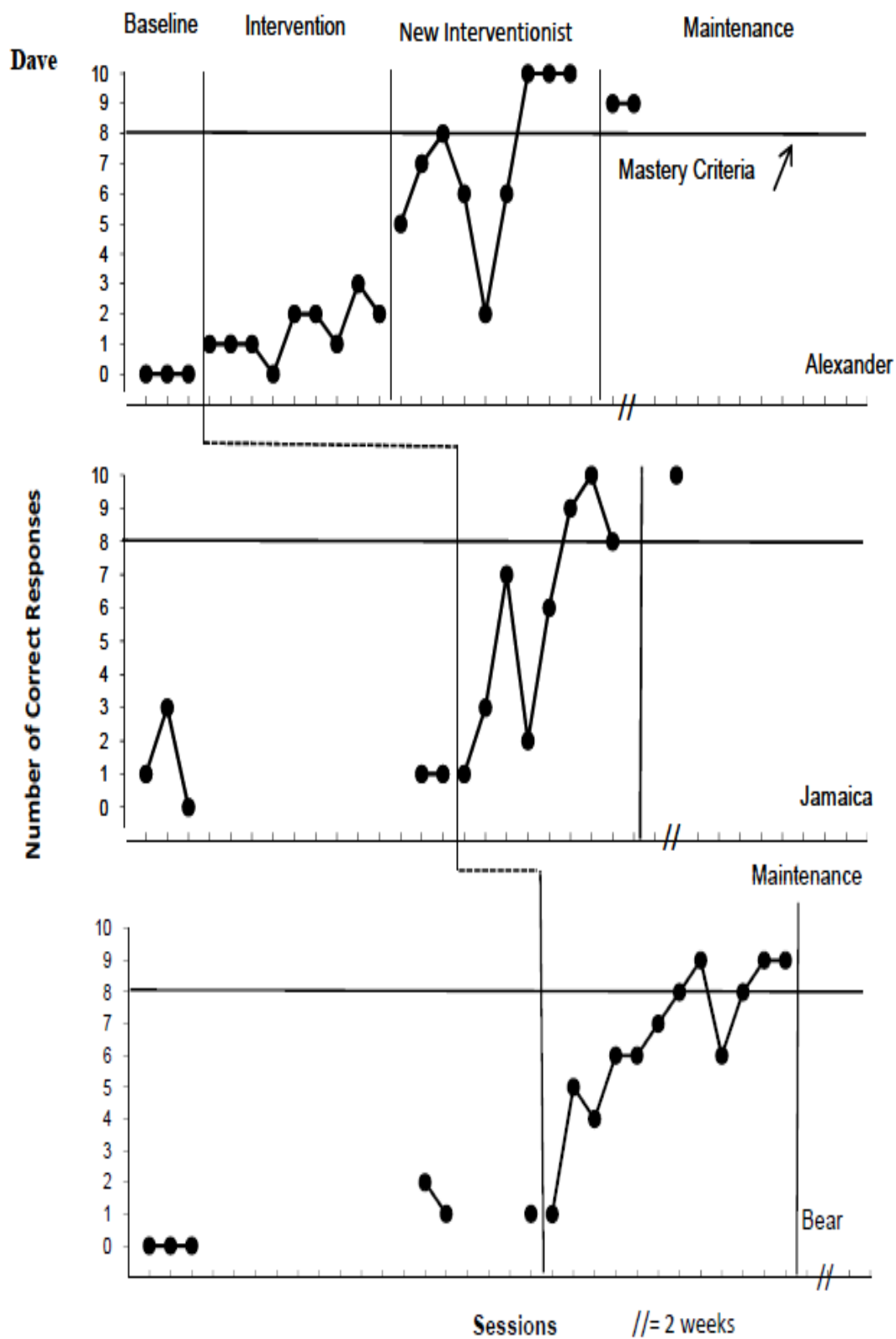
Figure 4. Dave's scores across books.

Item Analysis

An item analysis was conducted for all 4 students across all three books to identify any questions the students had consistent difficulty answering. Results will be discussed student by student.

Fred (see Figure 5). For question 1 (prediction), 2 (recall), 4 (sequence), 6 and 7 (application), 8 (analysis), and 9 and 10 (synthesis), Fred was able to correctly answer these question with consistency across all three books. For most of the questions there was a progression in the prompts required from more intrusive to less intrusive over time. This was not the case for two specific questions. In the book, *Don't Wake up the Bear*, the #3 recall question was variable overtime. In addition, the book Alexander and the Terrible, Horrible, No Good, Very Bad Day, Fred only performed the identification question, #5, independently in one data session.

Figure 5. Item Analysis across Each book for Fred.

Questions	Books	Date 1	Date 2	Date 3	Date 4	Date 5	Date 6	Date 7	Date 8	Date 9	Date 10	Date 11
Question 1 (Prediction)	Bear	P	I	I	I	I	I	I	I	I	I	I
	Alexander	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A
	Jamaica	I	M	I	I	I	I	I	N/A	N/A	N/A	N/A
Question 2 (Recall)	Bear	P	M	P	P	V	P	P	I	I	I	I
	Alexander	P	P	I	I	I	V	I	N/A	N/A	N/A	N/A
	Jamaica	I	I	V	I	I	I	I	N/A	N/A	N/A	N/A
Question 3 (Recall)	Bear	P	P	I	V	I	M	P	M	P	I	V
	Alexander	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A
	Jamaica	I	I	P	I	I	I	I	N/A	N/A	N/A	N/A
Question 4 (Sequence)	Bear	M	I	I	V	I	V	V	I	I	I	I
	Alexander	I	V	V	I	I	V	I	N/A	N/A	N/A	N/A
	Jamaica	I	I	V	I	I	I	I	N/A	N/A	N/A	N/A
Question 5 (Identification)	Bear	I	V	V	V	I	P	P	V	I	I	I
	Alexander	M	P	V	V	M	I	M	N/A	N/A	N/A	N/A
	Jamaica	I	I	M	I	I	I	I	N/A	N/A	N/A	N/A
Question 6 (Application)	Bear	V	I	I	I	I	I	I	I	I	I	I
	Alexander	P	M	V	I	I	I	I	N/A	N/A	N/A	N/A
	Jamaica	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A
Question 7 (Application)	Bear	V	P	I	I	V	I	I	I	I	I	I
	Alexander	P	V	V	I	V	I	I	N/A	N/A	N/A	N/A
	Jamaica	V	I	P	I	I	I	V	N/A	N/A	N/A	N/A
Question 8 (Analysis)	Bear	P	I	I	P	I	I	V	I	I	I	I
	Alexander	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A
	Jamaica	M	I	V	I	I	I	I	N/A	N/A	N/A	N/A
Question 9 (Synthesis)	Bear	P	I	P	P	V	I	I	I	I	V	I
	Alexander	I	V	I	V	I	I	I	N/A	N/A	N/A	N/A
	Jamaica	P	V	V	I	I	I	I	N/A	N/A	N/A	N/A
Question 10 (Synthesis)	Bear	M	V	I	V	I	I	I	I	I	V	M
	Alexander	M	V	I	I	I	I	I	N/A	N/A	N/A	N/A
	Jamaica	M	V	I	I	I	I	I	N/A	N/A	N/A	N/A

*Day 3 in Bear- 3 observers

Richard (see Figure 6). Richard was able to correctly answer all questions with consistency across all three books. For most of the questions there was a progression in the prompts required from more intrusive to less intrusive over time, but Richard never required a physical prompt to answer the question. He did not have difficulty with any specific question in the three books.

Figure 6. Item Analysis across Each book for Richard.

Questions	Books	Date 1	Date 2	Date 3	Date 4	Date 5	Date 6	Date 7	Date 8	Date 9	Date 10	Date 11
Question 1 (Prediction)	Jamaica	I	I	I	I	I	I*	I	I	I	I	I
	Alexander	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 2 (Recall)	Jamaica	M	M	I	I	I	I	V	I	I	I	I
	Alexander	I	V	I	I	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	V	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 3 (Recall)	Jamaica	I	M	I	I	I	I	I	I	I	I	I
	Alexander	M	V	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 4 (Sequence)	Jamaica	I	I	I	M	I	I	I	I	I	I	I
	Alexander	I	M	I	V	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	M	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 5 (Identification)	Jamaica	M	V	I	V	I	V	I	I	I	I	I
	Alexander	V	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	I	V	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 6 (Application)	Jamaica	I	I	I	I	I	I	V	I	I	I	I
	Alexander	V	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 7 (Application)	Jamaica	V	M	I	I	I	I	V	I	V	I	I
	Alexander	V	I	I	I	V	I	N/A	N/A	N/A	N/A	N/A
	Bear	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 8 (Analysis)	Jamaica	M	V	M	M	V	I	I	I	I	I	I
	Alexander	M	M	I	I	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	V	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 9 (Synthesis)	Jamaica	I	I	I	I	I	I	I	I	I	I	I
	Alexander	M	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A
Question 10 (Synthesis)	Jamaica	M	V	V	I	V	V	I	I	I	I	I
	Alexander	V	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A
	Bear	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A

Charlie (see Figure 7). For most of the questions there was a progression in the prompts required from more intrusive to less intrusive over time. In the book, *Don't Wake up the Bear*, question 10 (synthesis), Charlie rarely was able to answer this question correctly. The two applications questions (# 6 and #7), he was able to independently answer these questions from the first day in intervention.

Figure 7. Item Analysis across Each book for Charlie.

Questions	Books	Date 1	Date 2	Date 3	Date 4	Date 5	Date 6	Date 7	Date 8	Date 9	Date 10	Date 11	Date 12	Date 13	Date 14	Date 15	Date 16	Date 17
Question 1 (Prediction)	Bear	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Jamaica	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 2 (Recall)	Bear	I	I	I	I	I	P	V	V	M	I	I	M	M	I	I	I	I
	Jamaica	V	V	M	P	V	I	M	I	M	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 3 (Recall)	Bear	I	I	I	I	I	I	I	M	I	I	I	I	I	I	I	I	I
	Jamaica	I	M	I	I	I	M	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 4 (Sequence)	Bear	P	V	V	M	I	P	I	P	I	V	P	M	I	I	V	I	I
	Jamaica	V	P	I	M	I	M	I	V	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 5 (Identification)	Bear	M	M	M	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Jamaica	P	I	M	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 6 (Application)	Bear	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Jamaica	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 7 (Application)	Bear	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	Jamaica	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 8 (Analysis)	Bear	P	I	I	I	I	P	I	I	P	V	P	I	I	V	I	I	I
	Jamaica	V	M	I	I	I	M	V	V	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 9 (Synthesis)	Bear	P	P	P	P	V	I	M	P	I	M	I	I	I	I	I	I	I
	Jamaica	V	M	I	I	I	I	I	I	V	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 10 (Synthesis)	Bear	P	M	M	M	V	I	V	M	P	I	M	P	P	M	I	M	I
	Jamaica	P	I	M	P	I	I	V	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alexander	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Dave (see Figure 8). For most of the questions there was a progression in the prompts required from more intrusive to less intrusive over time. In the book, *Don't Wake up the Bear*, question 10 (synthesis), Dave was never able to answer this correctly. In addition, in the same book with question 4 (sequence), Dave rarely was able to answer this question correctly. Finally, Dave was not making much progress on any of the questions in *Alexander and the Terrible, Horrible, No Good, Very Bad Day* and as a result, on day 10 in the intervention, a new interventionist was put in place.

Figure 8. Item Analysis across Each book for Dave.

Questions	Books	Date 1	Date 2	Date 3	Date 4	Date 5	Date 6	Date 7	Date 8	Date 9	Date 10	Date 11	Date 12	Date 13	Date 14	Date 15	Date 16	Date 17	Date 18	Date 19
Question 1 (Prediction)	Alexander	P	I	I	V	I	I	P	P	I	I*	I	I	I	I	I	I	I	I	I
	Jamaica	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	I	I	I	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 2 (Recall)	Alexander	P	P	P	P	P	P	P	P	P	I*	V	I	I	P	M	I	I	I	I
	Jamaica	P	P	I	P	V	P	I	P	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	V	I	I	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 3 (Recall)	Alexander	P	P	P	P	P	I	P	P	P	M*	V	I	M	P	I	I	I	I	I
	Jamaica	P	P	I	P	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	P	M	V	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 4 (Sequence)	Alexander	P	P	P	P	P	P	P	P	P	V*	V	V	I	P	I	I	I	I	I
	Jamaica	M	P	I	I	P	I	I	V	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	M	V	P	P	P	P	P	I	P	P	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 5 (Identification)	Alexander	I	P	P	V	P	P	P	M	I	I*	I	I	I	P	I	I	I	I	M
	Jamaica	M	M	P	P	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	M	P	P	M	P	I	I	I	M	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 6 (Application)	Alexander	P	P	P	P	P	P	P	I	I	I*	I	P	P	I	I	I	I	V	I
	Jamaica	P	I	I	M	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	P	I	I	I	I	I	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 7 (Application)	Alexander	P	P	P	P	M	P	P	I	P	P*	I	I	I	P	I	I	I	I	I
	Jamaica	M	P	I	M	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	V	I	I	I	I	P	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 8 (Analysis)	Alexander	P	P	P	P	P	P	P	P	P	V*	I	I	V	P	M	I	I	I	I
	Jamaica	P	P	P	P	M	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	P	P	P	P	P	P	I	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 9 (Synthesis)	Alexander	P	P	P	P	P	P	P	I	P	I*	I	I	M	P	P	I	I	I	I
	Jamaica	P	I	I	P	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	P	I	V	I	I	I	P	I	I	I	I	I	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Question 10 (Synthesis)	Alexander	P	P	P	P	I	P	P	M	V	M*	I	I	I	P	V	I	I	I	I
	Jamaica	P	P	P	M	P	I	I	I	I	N/A	N/A	V	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Bear	P	M	P	P	P	P	P	V	P	M	V	V	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*New interventionist on the book

Results for Question 2

What are the effects of the system of least prompts on ability to maintain text dependent listening comprehension among students with significant intellectual disabilities?

Maintenance data for Fred (See Figure 1), Richard (See Figure 2), Charlie (See Figure 3), and Dave (See Figure 4) were collected after a two-week interval for one session after reaching mastery. All students were able to maintain mastery level data in all 3 books (note: Maintenance data were not collected for Dave in *Don't Wake up the Bear*).

Results for Question 3

To what extent does the system of least prompts to teach comprehension skills during a story-based lesson generalize to additional comprehension during a different story?

Fred. Generalization did not occur from intervention in book one to baseline in book two. Generalization did not occur from intervention in book two to baseline in book three.

Richard. Generalization did not occur from intervention in book one to baseline in book two. Generalization did not occur from intervention in book two to baseline in book three.

Charlie. Generalization did not occur from intervention in book one to baseline in book two. Generalization did occur from intervention in book two to baseline in book three. Charlie met mastery in baseline conditions in book three (i.e., *Alexander and the Terrible, Horrible, No Good, Very Bad Day*). As a result of the generalization that occurred in book three, a new book (book four; *Tar Beach*) was introduced into baseline conditions in order to determine if the generalization that occurred in book three occurred

or was a coincidence or would also occur in book four. Results indicated that Charlie was

able to generalize the skills gained in a fourth book.

Dave. Generalization did not occur from intervention in book one to baseline in

book two. Generalization did not occur from intervention in book two to baseline in book

three.

<div align="center">Results for Question 4</div>

What value does the interventionist place on using the system of least prompts to teach

comprehension of grade appropriate text?

Teachers responded to seven questions related to treatment acceptability. The

responses options ranged from Strongly Agree (5), Agree (4), Neutral (3), Disagree (2),

and Strongly Disagree (1). The teachers on average felt that they agreed with the

statement that systematic instruction procedure used with the student was appropriate

(*M*= 3.75). The teachers on average reported that they were neutral or agreed with the

statement about the prompt hierarchy determined for the student being appropriate (*M*=

3.50). The teachers on average reported that they disagreed with the statement regarding

the 3 second wait time used between prompts being appropriate for the student (M= 2).

The teachers on average felt that they agreed with a statement about if the teacher would

consider using the system of least prompts to help increase other students'

comprehension skills during the shared stories (*M*= 3.75). The teachers on average felt

that they were neutral or agreed with the intervention program is important and

appropriate for this student (*M*= 3.50). The teachers on average felt that they agreed to a

statement about if the teacher would consider the continuous use of the instructional

package with this student in the future (*M*= 3.75). Finally, the teachers reported on

average that they agreed to a statement about if the teachers would consider the use of this instructional package with other students who have similar needs in the classroom (*M*= 3.75).

Teachers responded to three questions related to social validity of procedures and goals. The responses options ranged from Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1). The teachers reported on average that they agreed the comprehension items selected for interventions for this student are important and adequate (*M*= 3.75). The teachers on average reported that they agreed the books adapted to include pictures were a good investment for designing an effective intervention (*M*= 4.25). Finally, the teachers reported that they agreed with assessing the student's ability to correctly answer comprehension questions during a story-based lesson is a valuable practice (*M*= 4.0).

Teachers responded to four questions related to the social validity of student outcomes. The responses options ranged from Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1). On average the teachers reported that they agreed with noticing meaningful increases in the student's comprehension after the implementation of the intervention (*M*= 3.75). On average the teachers reported that they were neutral with noticing meaningful increases in the student's comprehension in other activities after the implementation of the intervention (*M*= 3.0). On average the teachers reported that they were neutral with noticing meaningful increases in the student's participation in other activities with an academic focus after the implementation of the intervention (*M*= 2.75). Finally, teachers reported on average that they disagreed or were neutral noticing meaningful increases in the student's participation in other activities with

a functional focus after the implementation of the intervention (*M*= 2.50).

CHAPTER 5: DISCUSSION

The purpose of this investigation was to demonstrate a method for teaching text dependent listening comprehension to students with significant intellectual disabilities. A multiple probe design across materials (i.e., books) was used to determine the impact of the independent variable on the primary dependent variable.

Building on the work of Mims et al. (in press) and Zakas et al. (2009) text-dependent listening comprehension questions were taught during a shared story, but additionally, comprehension addressed the following types of questions: (a) a prediction question; (b) 2 knowledge questions (factual recall); (c) 2 comprehension questions concerning a sequencing question and identification; (d) 2 application questions; (e) 1 analysis question; and (f) 2 synthesis questions (1 cause and effect and 1 main idea).

The following outcomes were found for the research questions that guided the investigation: (a) What is the effect of the system of least prompts on the number of comprehension questions answered during a story-based lesson for students with significant intellectual disabilities? The findings of this study demonstrated a functional relationship between the system of least prompts on the number of text dependent listening comprehension questions correctly answered. It is also important to note that students overtime in the intervention slowly progressed from requiring more intrusive prompting (e.g. physical, model) to less intrusive prompting (e.g., verbal) in order to correctly answer the comprehension questions.; (b) What are the effects of the system of

least prompts on ability to maintain text dependent listening comprehension among students with significant intellectual disabilities? All students were able to maintain data after a two week noninstructional period of time; (c) To what extent does the system of least prompts to teach comprehension skills during a story-based lesson generalize to additional comprehension during a different story? One student generalized the skills learned to additional books; (d) What value does the teacher place on using the system of least prompts to teach comprehension of a grade appropriate text? Teachers found the procedures to be useful and the outcomes to be worthwhile.

In general, these findings are consistent with previous studies on using the system of least prompts to teaching comprehension skills to students with significant intellectual disabilities (Browder et al., 2007; Browder et al., 2008; Mims et al., in press; Zakas et al., 2009). Findings are also consistent with previous studies on the use of shared stories to promote emerging literacy skills (Coyne et al., 2004; Crowe et al., 2004; Justice, 2002; Koppenhaver et al., 2001). A discussion of more specific findings is presented below, organized by themes discovered, followed by followed by limitations of the research, suggestions for further research, and implications for practice.

Comprehension Measures for Students with Significant Intellectual Disabilities

Overall, the results of this study support previous research related to teaching comprehension. The variables measured by other researchers include the acquisition of text dependent listening comprehension involving factual recall (Mims et al., in press), or prediction questions and main idea questions (Browder et al., 2007; Zakas et al., 2009). Although the above studies address comprehension, the current study was designed to extend the literature.

This study improved the comprehension measure for shared stories with students with significant intellectual disabilities. While other studies have focused primarily on foundational skills (e.g., turning the page, text pointing, identifying author/title) and have had little focus on comprehension skills (Browder et al., 2007; Zakas et al., 2009; Browder et al., 2008). In addition, the comprehension that was targeted was only factual recall questions or the ability to anticipate text in a repeated story line. For example, Mims et al. (in press), used the same strategy to teach 10 factual recall questions. In addition, this study only provided two response options, which provided the students a 50% chance of correctly answering the questions. Additionally, Browder et al. (2008) taught students with multiple significant intellectual disabilities to participate in the steps of a task analysis to progress through a shared story. Of the steps on the task analysis, five included indicators of early comprehension of text read aloud (e.g., prediction, summary question, recognition of repeated storyline, recognition of name embedded in text). The current study demonstrates a successful strategy used to target a variety of types of comprehension questions (i.e., prediction, recall, sequencing, identification, analysis, synthesis, and application).

In addition, the primary dependent variables have mostly included indirect measures of text dependent listening comprehension (Browder et al., 2007; Zakas et al., 2009). These prior studies had primary dependent variables that focused on training the use of task analytic instruction versus specific student outcomes dealing with comprehension only. Additionally, some of the studies focused on increases in communication rather than a specific academic outcome (Crowe et al., 2004; Koppenhaver et al., 2001). The current study focused on text dependent listing

comprehension skills that addressed multiple types of comprehension questions (e.g., prediction, application, synthesis). This study contributes to the field by providing research specifically on text dependent listening comprehension for students with significant intellectual disabilities during shared stories.

Prompting Systems for Comprehension

In the current study the system of least prompts used as the independent variable was not implemented in the format it has typically been demonstrated. The first level prompt used reduced the information, rather than providing a typical "verbal prompt" often seen in studies implementing the same strategy. Typically, the verbal prompt provides the student with an opportunity to initially respond independently, and only as needed the teacher provide a hierarchy of prompts (from less intrusive to more intrusive; Wolery et al., 1992). A verbal prompt typically involves naming the action required of the student (e.g., "Find what you need to eat food. Show me the fork."). A model prompt typically involves the teacher modeling the correct response (e.g., "Find what you need to eat food." Teacher models picking up a fork). A physical prompt typically involves the teacher guiding the student to the correct response (e.g., "Find what you need to eat food." Teacher physically guides the students to pick up the fork.). For example, the system of least prompts was used in a study by Spooner, Stem, and Test (1989) to teach first aid skills to students with moderate disabilities. They taught the students to progress through a task analysis of steps needed to dial 911, apply a bandage, take care of minor injuries, and first aid for choking. Each step of each task analysis was taught using the following hierarchy: verbal (e.g., "Pick up the phone."), model (e.g., Teacher models picking up the phone), physical (e.g., Teacher helps student pick up the phone). In this

example, the verbal prompt stated exactly what the student was required to do for a correct response. In the current study, the verbal prompt was less specific. The interventionist reread a portion of the text that contained the answer to the student rather than telling the student the answer. This strategy is important due to the skills it teaches the student to have in order to gain the information to answer the question correctly. Students need to be able to isolate the targeted information read to respond to the question.

For students who are proficient in answering the types of questions asked in the current study, different questions may need to be considered. For example, Bursuck and Damer (2007) and Vacca et al. (2006) suggest four different types of question-answer relationships (QAR). First, *In The Book* QARs are questions that are easy to find and in the text. Second, *Think And Search* QARs are questions that you would need to put together different parts of the text to derive the answer. Third, *In My Head* QARs are questions that the answer is not directly in the story. It requires the learner to think about what they already know. Finally, *On My Own* QARs are questions that do not even require the learner to read the story; rather they need to reflect on their own experiences. During the current study, most of the questions fell under the first level of QARs (In The Book). For learners that have mastered these types of questions, the practitioner may want to consider changing the type of QAR they are asking of the student. To teach questions at all of these levels, experts still suggest explicit direct instructional approaches (Bursuck & Damer, 2007; Gersten, Fuchs, Williams, & Baker, 2001; Sencibaugh, 2007; Vacca et al., 2006). The system of least prompts could still be used to teach these types of questions, but the prompt hierarchy may need to change depending

on the student. In addition, other strategies such as graphic organizers and story-mapping may be helpful during instruction.

<center>*Repeated Readings*</center>

Prompting for comprehension was found to be very successful in the current study, but another subtlety of the intervention was the use of repeated readings of the same story. Experts suggest that when children are provided with consistent exposure to shared stories improved comprehension and vocabulary development can occur (Justice, 2002; Justice, Meier, & Walpole, 2005; Vacca et al., 2006; Whitehurst et al., 1994; Whitehurst et al., 1988). This approach is similar to a systematic instructional approach in that both approaches promote the use of repeated trials until mastery of the target skills occurs. For example, in a study by Colyer and Collins (1996) where students were taught the next dollar strategy using the system of least prompts, students had to acquire mastery criteria of 100% accuracy for 3 consecutive days before instruction was discontinued. This approach is helpful with functional skills, but may be a problem in regard to academic skills due to the chance that students may memorize answers versus learning to listen to text read aloud. One strategy implemented in the current study in an effort to dissuade this problem was to present the response options in a random order each time they are presented.

<center>*Training for Generalization*</center>

One way to ensure students are learning listening comprehension skills rather than memorizing answers is to teach across multiple exemplars. To assess generalization across materials a different research design would have been needed. A multiple probe across materials design was used during this study versus a multiple probe across

participants design, where generalization to other materials could have been evaluated without sacrificing external validity. In the current study, the research design chosen included an assumption, based on the prior research with a similar population of students (Mims et al., in press), that participating students would not generalize the strategy to additional books. This assumption was accurate for 3 out of 4 of the participants. Charlie was able to generalize the strategy to the third book and fourth book, implying that he was able to gain the skills needed to find the information on his own in the text. Generalization to additional books is certainly an ultimate goal for use with this teaching strategy and therefore would be a goal for future research. Future research should replicate the current study using a multiple probe across student design and add a formal generalization measure to additional books.

In addition, students who may never develop the skills to generalize such information on their own may need to receive multiple exemplar training in order to gain such skills. Multiple exemplar training is the strategy of teaching multiple examples of desired responses to promote generalization outside an instructional setting (Hughes, Harmer, Killian, & Niarhos, 1995). Hughes (1992) found that students with significant disabilities were able to apply strategies in self-instruction to solve novel problems when initially practiced with multiple exemplars of problem situations during the training period. For example, in a study by Minarovic and Bambara (2007), the researchers sought to teach employees with intellectual disabilities to manage changing work routines using varied sight-word checklists. The intervention included sight word and comprehension training as well as self-management training consisting of both a consistent ordered sight word check list and a varied checklist with word order of job sequences across sessions.

Results indicated that the intervention was successful in teaching employees to use sight-word checklist to start their job tasks and when trained on the varied checklists, employees were able to initiate job tasks across novel varied job sequences.

In the above study sufficient exemplars were used in the initial training of the employees. For the current study, this same strategy may need to be taken with students who need additional assistance in generalizing the skills necessary to gain comprehension during a shared story. For example, multiple books should be used during training and additional untrained books should be used to probe for generalization.

<div align="center">Social Validity of Procedure</div>

The current study was conducted by both the teacher and the paraprofessionals in the classroom. This is important due to the idea that the strategy used to teach was easy enough for all interventionist to implement with high fidelity and can be used across books. Overall, the teacher and paraprofessionals reported liking the procedures used to teach comprehension across books as well as the overall outcomes seen.

Assessing the social validity of an intervention is important due to the information the results can provide to the researcher. Specifically, social validity data were collected to evaluate the "social significance of the goals," "the social appropriateness of the procedures," and "the social importance of the outcomes" (Wolf, 1978, p. 207). As recommended by Wolf, three measures of social validity (i.e., goals, procedures, and outcomes) were collected. Additionally, stakeholders included all three interventionists (teacher, teacher assistant one, teacher assistant two) who provided diverse viewpoints regarding the study. Social validity data were measured during the maintenance phase.

*Treatment acceptability (i.e., social validity of procedures).*Overall, teachers placed high value on the systematic instruction procedure used with the students during the study, suggesting that it was appropriate, important, and usable with the same and other students in the future. They did not agree with the three second wait time used between prompts for any of the students. The researcher followed up with the teachers regarding this statement and found that they agreed that the students needed a longer wait time (e.g., 5 seconds) before providing the next prompt in the hierarchy. The teachers felt this way even though the students were all able to show gains using the system of least prompts. This may be due to the fact that they often use a higher wait time during everyday instruction prior to this study being implemented.

Social validity of goals and procedures. Overall, teachers placed high value on the time and investment used to implement this study, suggesting the comprehension questions, picture symbols, and books were all important and adequate. Given these results, teachers may perceive the time and investment involved in preparing the materials and running the intervention a worthwhile practice.

Social validity of outcomes. Overall, the teachers felt neutral about the comprehension and participation in other activities, both functional and academic, suggesting that the students did not seem to generalize the new skills developed to additional activities during the day. In contrast, the teachers did feel that the students showed overall meaningful increases in the students' comprehension after the implementation of the intervention, suggesting that the study helped increase the students comprehension during that specific activity. These results suggest that teachers may perceive the outcomes to be important for the population of students. Teachers may want

to continue to use this strategy to increase student outcomes in comprehension of fictional material.

Limitations

Several limitations must be considered when analyzing results related to the current study. First, the small number of participants limited the generalizability of findings. In contrast, when considered with the overall literature on shared stories, the current study adds to overall evidence on using this method with students with significant intellectual disabilities. Currently, there are six studies on the use of shared stories that have been conducted with this population of students (Browder et al., 2007; Browder et al., 2008; Koppenhaver et al., 2001; Mims et al., in press; Skotko et al. 2004; Zakas et al., 2009). More research needs to be conducted on the use of shared stories. According to the criteria by Horner et al. (2005), a practice may be considered evidence-based when there is a minimum of five single-subject studies (they must meet the criteria of minimally acceptable methodological criteria and document experimental control); are conducted by additional researchers in at least three other regions (only one region is represented by the above studies; NC); and the studies must include a total of 20 participants (22 participants represented by the above studies; 26 with the current study included). Using these criteria, shared stories would be considered an emerging practice and therefore future research must occur to gain additional knowledge about this practice.

A second limitation was the format used for measuring comprehension. When the interventionists asked the designated comprehension questions to the participants, the participants responded by selecting one response from a field of three responses. For each question asked, the field of responses included picture symbols that depicted one correct

response and two incorrect responses (distracter options). Therefore, students had a 33% chance of selecting a correct response at random. One option to bypass this limitation is to ask the students to generate an expressive response to the question. This approach would allow the teacher to identify if the learner really has clear comprehension of the text read. The problem with this alternative is that this cannot be done with students who are nonvocal verbal or those who may have limited communication skills (e.g., are not able to articulate more than a one word response). Another alternative would be to increase the number of response options to four. This would reduce the chance for students selecting a correct response to 25%.

A third limitation was the type of comprehension question addressed. As reported in chapter 4 in the item analysis, some students tended to have more difficulty answering certain types of questions. This may have been due to how abstract the text or question asked was. The more abstract the comprehension question asked (e.g., synthesis, analysis), the less likely students were to answer it correctly. Future research may need to develop a new method of prompting.

Also, as noted earlier, the third content expert that performed a blind review of the questions after the completion of the study indicated that the cause and effect questions for the book *Alexander and the Terrible, Horrible, No Good, Very Bad Day* was more similar to a recall question. This type of cross check to validate questions should occur prior to a study being conducted. If this cross check had been completed before starting the study a more appropriate cause and effect replacement question could have been written. Future research should consider this limitation and plan for a blind review to be conducted by a content expert prior to the study being implemented.

A fourth limitation was the change in the interventionist for Dave in the book

Alexander and the Terrible, Horrible, No Good, Very Bad Day. In the current study all

interventionists were required to collect data on comprehension during the shared stories.

Prior studies (Mims et al., in press) the researcher collected the data. Implementing the

system of least prompts was shown to be teacher friendly due to the high levels of

procedural fidelity data reported and inter-observer reliability data collected with all three

interventionists. Although the second teacher assistant (paired with Dave) was removed

as the interventionist from the shared story readings of the book *Alexander and the*

Terrible, Horrible, No Good, Very Bad Day due to a lack of student progress and the

readings were reassigned to the teacher. This reassignment of the interventionist resulted

in an increase of independent responses for Dave. The second teacher assistant remained

the interventionist for the second and third books and Dave was eventually able to

demonstrate independent responding to the comprehension questions in these books as

well. One possible reason Dave was not initially responding correctly to questions in the

first book (*Alexander and the Terrible, Horrible, No Good, Very Bad Day*) may have

been due to a procedural fidelity issue. The researcher conducting procedural fidelity and

inter-observer reliability checks was only observing approximately 30% of all sessions

conducted. During the days the researcher did not check for fidelity, the second teacher

assistant may have not implemented the intervention with high fidelity. This needs to be

considered in future studies and for practitioner use. If the teaching strategy is not

implemented with high fidelity similar results may not be seen.

Another possibility for the lack of Dave's independent correct responses with the

second teacher assistant and the increase of independent correct responses with the

teacher in book one (*Alexander and the Terrible, Horrible, No Good, Very Bad Day*) may be due to the novelty of the teacher working with this student and ultimately becoming a motivation for the student to respond. This motivation may have eventually carried over to the second and third books that were delivered by the second teacher assistant. It was anecdotally reported by the teacher and second teacher assistant that Dave rarely worked with the teacher throughout the school day and most instruction for Dave was assigned to the second teacher assistant. This type of problem needs to be considered in future research.

Finally, the research design used in the current study assumed the students would not generalize the skill to new material. Charlie demonstrated that he was able to generalize the skills learned to two books. This should be a consideration for future research.

Recommendations for Future Research

The results of this study indicate that teachers are able to implement, with high fidelity, a teaching strategy to teach comprehension to students with significant intellectual disabilities. In addition, the results suggest that students with significant intellectual disabilities were able to acquire text dependent listening comprehension skills that were demonstrated through correctly answering a variety of comprehension questions including recall, analysis, application, sequence, identification, synthesis, and prediction. In order for this intervention to become an evidence-based practice in teaching comprehension, additional research must be conducted using the same intervention. This intervention needs to be replicated with at least two additional researchers in two or more locations. In addition, this study should be replicated with

students of different age groups in order to identify if the teaching strategy can be used to teach comprehension with different age groups. The current study was conducted in a self-contained classroom for individuals with significant intellectual disabilities and be replicated with the same populations of students in a general education classroom.

Future research should also examine the use of the intervention to teach chapter books. The current study only used books that were at the 2nd to 3rd grade level. More challenging text should also be used to determine the strength of the intervention. Browder et al. (2007) used chapter books for their primary materials, but the intervention and dependent variable were not the same as employed in the current study. In this study student outcomes focused on a variety of emerging literacy skills including some low levels of comprehension (e.g., prediction and recall).

Additionally, future research should include a replication of the current study but increase the response options from three to four. The current study only used three response options each time a comprehension question was asked. Providing the students with four response options would reduce the chance of the students guessing the correct response from 33% to 25% chance.

Future research should also identify a new prompting strategy that would be commensurate with more abstract comprehension questions. As mentioned above, the prompting strategy could still include the use of a least to most prompt hierarchy, as used in the current study, but may need to reflect a clearer verbal prompt versus just a reread of targeted material.

An additional target for future research may include the collecting more information on treatment fidelity. This would have helped in the current study when

addressing the potential confound of teaching style. If additional treatment fidelity had been collected and found to be low, this could have been addressed before changing interventionists.

Finally, future research should employ a multiple probe across participants design and a generalization measure using an additional book should be given. This will allow the opportunity to explore if students can generalize the skills develop to novel material. The intervention would be much stronger if the students were able to generalize the skills developed to correctly answer comprehension questions to new material.

Implications for Practice

There are a number of implications for special education teachers based on the findings of this study. Baseline data from this study indicate that students with significant intellectual disabilities that primarily communicated with picture symbols were not able to answer a variety of text dependent comprehension questions during a shared story. Suggesting if students do not have the skills to benefit from shared stories; they will need systematic instructional strategies in order to gain from this type of activity. The use of shared stories may provide a way to access content and skills if practitioners are able to replicate essential steps in this process.

First, the researcher adapted age-appropriate text to be used in a shared story format (e.g., added a repeated storyline, added picture support). Practitioners should adapt grade appropriate text to meet their students' needs.

Second, the researcher developed comprehension questions to reflect the following types of comprehension to be addressed during the shared story experience: (a) prediction questions; (b) knowledge questions (factual recall); (c) comprehension

questions concerning a sequencing question and identification; (d) application questions;
(e) analysis questions; and (f) synthesis questions addressing both cause and effect and
main idea. Practitioners should become familiar with the different types of
comprehension questions and be able to develop their own questions for the chosen
adapted book.

Third, the researcher developed response boards to be used to answer the
comprehension questions asked during the shared story. The response boards for each
question included the correct answer and two distracter options. These options were
designed to have the order switched around each time the question was asked.
Practitioners need to identify the best way for their students to respond (e.g., eye gaze,
point, pull off velcroed response, AAC device) and create response board to accompany
each question in each adapted book. This will ensure that students have the best chance to
communicate their response accurately.

Fourth, practitioners need to be able to successfully implement systematic
instructional procedures like the strategy used in the current study. The researcher
determined the wait time based on the target students for the study. Wait times between
prompts can vary depending on the student, but should remain consistent throughout the
implementation of the strategy. The system of least prompts that was used in the current
study has a strong evidence base behind it as found in the review by Doyle et al. (1988).
In this review the authors found that the system of least prompts was used in teaching a
variety of students across many different tasks and that in 85% of the studies the target
behaviors were taught to criterion. Practitioners need to employ this strategy not only to
teach comprehension, but to teach other skills as well (i.e., academic, functional).

Finally, practitioners need to be able to collect student data while implementing the shared stories with comprehension. This is important since the practice of shared stories is still emerging as an evidence-base. In addition, it is an overall good practice for practitioners to monitor student progress during instruction.

Summary

Currently, research related to teaching comprehension skills to students with significant intellectual disabilities is scarce. However, current legal mandates require that this population of students are exposed to and can acquire these types of skills. Teachers need to provide appropriate instruction that would allow students to successfully gain comprehension skills. The purpose of this study was to determine the effects of the system of least prompts on teaching text dependent comprehension to students with significant intellectual disabilities. Findings indicated that the intervention was successful in teaching students these types of skills. Additionally, replications of this intervention to teach comprehension may result in providing teachers with an evidence-based practice to teach comprehension to students with significant intellectual disabilities.

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APPENDIX A: DATA COLLECTION OF COMPREHENSION QUESTIONS

Student ID_____ Assessor _____ Date_____

1. Independently identifies correct answer after 1st comprehension question (prediction; what do you think the story will be about?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

2. Independently identifies correct answer after 2nd comprehension question (factual recall; e.g., who, what, where, how?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

3. Independently identifies correct answer after 3rd comprehension question (factual recall; e.g., who, what, where, how?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

4. Independently identifies correct answer after 4th comprehension question (sequence; what happened first, next, last)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

5. Independently identifies correct answer after 5th comprehension question (identification; what happened at the end of the story?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

6. Independently identifies correct answer after 6th comprehension question (application; e.g., how does the character relate to what you are doing?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

7. Independently identifies correct answer after 7th comprehension question (application; e.g., how does the character relate to what you are doing?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

8. Independently identifies correct answer after 8th comprehension question (analysis; what is the same about two characters?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

9. Independently identifies correct answer after 9th comprehension question (synthesis; related to cause and effect; e.g., what did character do when even happened?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

10. Independently identifies correct answer after 10th comprehension question (synthesis; main idea; what was our story about?)

Prompt level used: Independent	Verbal	Model	Physical	No Opportunity	Incorrect

APPENDIX B: PROCEDURAL FIDELITY CHECKLIST FOR SYSTEM OF LEAST PROMPTS

Date: _____ Student #: _____ Observer: _____

1st Comprehension Question		
1. After presenting the response options and asking 1st comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level prompt and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO
2nd Comprehension Question		
1. After presenting the response options and asking 2nd comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level prompt and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO
3rd Comprehension Question		
1. After presenting the response options and asking 3rd comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level prompt and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO
4th Comprehension Question		
1. After presenting the response options and asking 4th comprehension question, waits 3 seconds for a response	YES	NO

2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level prompt and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO

<div align="center">5th Comprehension Question</div>

5th Comprehension Question

1. After presenting the response options and asking 5th comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level prompt and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO

6th Comprehension Question

1. After presenting the response options and asking 6th comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO

7th Comprehension Question

1. After presenting the response options and asking 7th comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO

8th Comprehension Question

1. After presenting the response options and asking 8th comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO

9th Comprehension Question

1. After presenting the response options and asking 9th comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO

10th Comprehension Question

1. After presenting the response options and asking 10th comprehension question, waits 3 seconds for a response	YES	NO
2. If correct, praise student.	YES	NO
3. If incorrect or no response provides a first level and waits 3 seconds for a response	YES	NO
4. If correct, praise student.	YES	NO
5. If incorrect or no response provides a second level prompt and waits 3 seconds for a response	YES	NO
6. If correct, praise student.	YES	NO
7. If incorrect or no response provides a third level prompt.	YES	NO

Prompt Levels:
First level prompt- Reread and reask question
Second level prompt- Reread more specific information, model correct response and reask question
Third level prompt- Physically guide students to the correct response

APPENDIX C: PROCEDURAL FIDELITY CHECKLIST FOR TEACHER TRAINING
OF BASELINE AND INTERVENTION

Date: _____ Observer: _____

1. Provide teacher an opportunity to explore all three books and discuss the type of each comprehension question	YES	NO
2. Model baseline conditions	YES	NO
3. Teacher role play baseline conditions	YES	NO
4. Provide detailed description of System of Least Prompts	YES	NO
5. Model intervention conditions	YES	NO
6. Teacher role play intervention conditions	YES	NO
7. Discuss reinforcement and error correction	YES	NO
8. Discuss reinforcers for each student	YES	NO
9. Discuss response option presentation and individual student response mode	YES	NO
10. Model response option presentation	YES	NO
11. Role play response option presentation	YES	NO

APPENDIX D: SOCIAL VALIDITY QUESTIONNAIRE

Student:_____ Teacher: _____ Date:_____

This questionnaire consists of 14 items. For each item, you need to indicate the extent to which you agree or disagree with each statement. Please indicate your response to each item by circling one of the five responses to the right.

Questions	Responses				
1. The comprehension items selected for interventions for this student are important and adequate.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2. The books adapted to include pictures were a good investment for designing an effective intervention.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3. The systematic instruction procedure used with the student was appropriate.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4. The prompt hierarchy determined for this student was appropriate.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5. The 3 second wait time used between prompts was appropriate for this student.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6. Assessing the student's ability to correctly answer comprehension questions during a story-based lesson is a valuable practice.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7. I am considering using the system of least prompts to help increase my other students' comprehension skills during story-based lessons.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8. The intervention program is important and appropriate for this student.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
9. I noticed meaningful increases in the student's comprehension after the implementation of the intervention.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
10. I noticed meaningful increases in the student's comprehension in other activities after the implementation of the intervention.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

11.	I noticed meaningful increases in the student's participation in other activities with an academic focus after the implementation of the intervention.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12.	I noticed meaningful increases in the student's participation in other activities with a functional focus after the implementation of the intervention.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
13.	I am considering the continuous use of the instructional package with this student in the future.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
14.	I am considering the use of the instructional package with other students who have similar needs in my classroom.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree