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# Paraprofessional-Implemented Dialogic Reading and its Impact on Children with Autism Spectrum Disorders

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PARAPROFESSIONAL-IMPLEMENTED DIALOGIC READING AND ITS IMPACT ON  
CHILDREN WITH AUTISM SPECTRUM DISORDERS

by

ANNALISE D. IRVINE

A thesis submitted in partial fulfillment of the requirements  
for the Honors in the Major Program in Communication Sciences and Disorders  
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Thesis Chair: Dr. Jacqueline Towson

## **Abstract**

The purpose of this study was to evaluate the effectiveness of paraprofessional-implemented dialogic reading (DR) strategies on the interaction and attending abilities of a child with an Autism Spectrum Disorder (ASD). The secondary purpose was to understand whether the DR strategies utilized by the paraprofessional were judged to be helpful and beneficial to the child participant. A secondary analysis was completed from a larger study which implemented a single subject across participants design. For this study, effects were evaluated for one paraprofessional and her student with ASD. Judged from visual analysis of the graphical representation of the data, it was determined that there was a medium to strong functional relationship (depending on the individual DR strategy) between the education of the paraprofessional on DR and the utilization of DR during shared book reading. The child participant did not exhibit overt gains through traditional DR in appropriate verbal responding but did experience a shift towards more consistent correct responding as a result of the DR prompts. Joint attention capabilities showed no significant change between phases. These results provide preliminary evidence that paraprofessionals can effectively implement some aspects of DR in shared book reading with children who are not typically developing. Future research for this population should address certain aspects of traditional DR that could be adapted to more appropriately cater to the needs of children with ASD.

## **Acknowledgments**

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## CHAPTER 1: INTRODUCTION

### Statement of the Problem/Question to be Researched

The proposed research study aims to analyze the impact of dialogic reading on joint attention and verbal interaction between a paraprofessional and a preschool-aged child with Autism Spectrum Disorder (ASD). Interest for this study came from the relative lack of available paraprofessional-implemented therapy strategies for young children with ASD, and the preliminary studies referenced below that can be expanded.

### Review of the Literature

#### *Autism as a Disorder*

Autism is defined by Mayo Clinic (2018) as a developmental condition impacting how an individual perceives and interacts with others. It is characterized by limited and repetitive behavior patterns, and communication disorders. The Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5) has outlined several classes of diagnostic criteria based on age of the patient, however for the purposes of this study, the preschool diagnostic criteria for autism will be utilized. The criteria are as follows:

- a. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently, or by history:
  - I. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
  - II. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.

- III. Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.
- b. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):
  - I. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
  - II. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).
  - III. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
  - IV. Hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).
- c. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities or may be masked by learned strategies in later life).
- d. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.
- e. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level, (Center for Disease Control, 2016).

Autism Spectrum Disorders (ASD) were first described as developmental retardation by Dr. John Langdon Down in 1887 (Project Autism, 2018). However, from 1887 to 1943, the term "autism" was used instead to describe symptoms of schizophrenia. It was not until 1944 that Hans Asperger coined the term, "Asperger Syndrome," which outlined a disorder of

social interaction concurrent with high functioning language skills. Four decades later in 1987, "Autistic Disorder" earned its place in the Diagnostic and Statistical Manual of Mental Disorders – Third Edition (Project Autism, 2018).

While it took nearly a century to understand autism as a freestanding disorder, the recognition of its symptoms - and subsequent accommodations for children with autism in the school systems - did not occur until 1991 (Sole-Smith, 2017). Today, according to the World Health Organization (2018), ASD can be found in one out of every 160 individuals worldwide. However, in the United States, the prevalence is 1 in 68 (Center for Disease Control, 2016). ASD can exist within any racial, ethnic, or socioeconomic group and is about 4.5 times more prevalent in males than in females (Center for Disease Control, 2016).

#### *Autism in the Preschool Population*

While ASD symptoms may appear as early as 6 to 12 months in some infants, many professionals are reticent to diagnose the disorder until the child reaches 24 months, when they consider the diagnosis to be "stable" (Autism Speaks, 2012). However, some parents who are not familiar with the characteristics of autism may miss early developmental signs, therefore delaying the autism diagnosis months or even years. Inquiries completed by the National Survey of Children's Health indicate the prevalence of parent-reported autism nearly doubled between 2003 and 2007 (Schieve et al., 2012), indicating a promising increase in parent education and awareness and the potential for early intervention in the preschool years.

While only a few studies have investigated the prevalence of ASD in the preschool population nationally - as each of the states have slightly different reporting criteria - there

are several small-scale studies completed by individual states. A study done by the Medical University of South Carolina (MUSC) found that while the prevalence of autism in four-year-old children in 2006, in South Carolina was eight out of every one thousand, only twenty to twenty-nine percent of those students received autism-specific intervention in their preschool settings (Nicholas, Carpenter, King, Jenner, & Charles, 2009). Additionally, an investigation indicated that there was a significant increase in ASD between 2002 and 2006 in metropolitan New Jersey (Zahorodny et al., 2014). These studies emphasize state-specific initiatives in standardizing ASD prevalence reporting.

As more information on ASD has surfaced, it becomes increasingly apparent that experts are recommending early intervention and autism-specific support services as children enter the school system. However, these are not being provided on a large scale to the growing autism population due to lack of funding or lack of available personnel (American Speech-Language-Hearing Association [ASHA], n.d.). With the estimated prevalence of ASD rising to 2.24% in 2014, up from 1.25% in 2011-2013, it is necessary to provide therapy and intervention as soon as the child is diagnosed, as well as continued support through their childhood.

#### *Current Interventions for Preschool Aged Children*

Traditionally, the most common medical interventions offered for young children with ASD focused on the biomedical approach (Research Autism, 2017). This approach primarily targets physical maladies that are believed to "trigger" symptoms of ASD, with treatments such as: "diet, nutritional supplements, hormones, off-brand uses of other medications, and even chelation and hyperbaric oxygen therapy," (Research Autism, 2017). However, as controversy of the origin of ASD grew, so did the questions of what treatment, if any, was

effective and safe. This led to a new treatment option: psychodynamics. This option targets the child's unconscious childhood beliefs and perceptions, and how these occurrences impact their current behaviors (Research Autism, 2017). Treatments under this approach include psychoanalysis and hypnotherapy. These approaches can be viewed as more alternative than the biomedical set of treatments, but one is not recommended over the other. The decision is up to the preference of the parents and the physicians managing the child.

Recently, though, interventions have shifted towards a third category: psychoeducation. This school of thought acknowledges for any intervention to be long lasting and effective, the therapist or interdisciplinary team (including, but not limited to: Speech-Language Pathologists, Psychologists, Applied Behavior Analysis therapists, etc.) needs to account for every environment in which the child exists (Cervera, Romero, Mas, & Delgado, 2011). Implementation needs to be flexible and individual to the child and occurs in two stages: cognitive-behavioral and environmental. Interventionists need to involve the affected child's family, healthcare providers, and education professionals in routine therapy for maximum positive impact.

An example of a psychoeducational routine-based intervention is introducing visual supports for young children with ASD. A study completed by Meadan, Ostrosky, Triplett, Michna, and Fettig (2011) found that individuals with ASD process visual supports more easily than other forms of communication. By implementing a simple but flexible approach, parents, teachers, and therapists alike can encourage children with ASD to function more independently in natural environments with the aid of visual supports to anchor and structure their environment (Meadan et al., 2011).

### *Dialogic Reading and its Impact on Development*

Dialogic reading (DR) is one of several structured strategies to use when reading to children. It involves open-ended prompting questions about the content of a book, and the questions gradually request more detail from the participating child (Morgan & Meier, 2008). DR encourages strong oral language skills, which are important in early reading and further academic ability. Additionally, children who are at risk for academic failure can greatly benefit from DR strategies, as it increases their receptive and expressive language (Morgan & Meier, 2008). DR also creates a segue for parent interaction with children, which assists in early literacy and social skills.

Often, shared book-reading and DR are terms used interchangeably. However, they are two separate strategies. Shared book reading is both directly and indirectly adult-controlled, where the child sits passively and listens. DR focuses on making the child the primary storyteller and placing the adult in the position of active listening, guiding, and facilitating, (Pillinger & Wood, 2014). For this reason, DR can be extremely helpful in adult-child connections.

Two acronyms are used in reference to DR: PEER and CROWD. PEER reminds the adult of their role in the process, namely: *prompt, evaluate, expand, and repeat*. They will *prompt* the child with one of the five types of prompting questions, then the adult will *evaluate* the child's response and *expand* on the child's thoughts. Lastly, they will *repeat* the prompt to offer one more chance for the child to answer the question (Towson, Abarca, Fettig, & Fleury, 2017). CROWD refers to the types of prompting questions: *completion, recall, open-ended, wh- questions, and distancing* (Whitehurst et al., 1988). Utilizing these prompts has

been shown to improve children's interest and enjoyment of reading, as well as facilitate social and cognitive development (Pillinger & Wood, 2014).

Children with ASD typically display problem behaviors that make any type of shared book reading a challenge. While there are many studies that acknowledge the value of DR, it is often forgotten that skills like joint attention, sustained social interaction, and commenting on or recounting events – which are expected of typically developing children - are problematic for children on the autism spectrum (Fleury, 2015). Challenging behaviors - like tantrums - while parents attempt to engage in shared book reading can actively discourage the parents from reading to their affected child. Since the attributes mentioned above make up a large portion of the strategy, emerging evidence suggests DR should be adapted accordingly to continue to be beneficial for children with autism. As it stands, approximately "40% of children with disabilities do not display early or continued interest in book reading and actively resist storybook reading interactions," (Fleury, 2015, p. 4).

### *Triadic Intervention*

With DR showing such promise in increasing early literacy skills and social and cognitive development in typically developing children, it was a natural progression to look at implementing the strategy for children with ASD and other developmental disabilities. Researchers quickly realized that one of the most effective ways to deliver therapy to this population is through triadic intervention. Triadic intervention involves the therapist, parent or teacher, and child all working together to incorporate intervention into natural environments and everyday routines (Brown & Woods, 2016). The presumption of this style of intervention involves the therapist teaching the parent or teacher communication strategies, and the adult implementing those strategies when interacting with the child in

everyday life. This, in turn, bolsters the child's development since they are receiving intervention on a regular basis (Brown & Woods, 2016).

An important part of triadic intervention is teacher education; allowing the adult to become self-sufficient in intervention is what allows this strategy to be so helpful. Speech-language pathologists, paraprofessionals, and early childhood special education teachers are on the front lines of caring for children on the autism spectrum in their primary school years. For this reason, paraprofessionals are prime candidates for, "teacher coaching," which is a graduated learning and teaching process to build the confidence of the paraprofessional in conducting therapy and making decisions regarding intervention choices related to the individual child and their responses. Most often it involves three steps: discussion, demonstration with narrative, and adult practice with feedback (Brown & Woods, 2016; Sawyer & Campbell, 2012).

These teaching guides become especially important when "teacher coaching" the adult of a child with an ASD. Because children with autism often have poor social adaptive functioning and behavioral issues, the patience and adaptability of the above strategy can go a long way in making the paraprofessional, parent, and the affected child more comfortable and productive while attempting intervention (Boyd, McDonough, Rupp, Khan, & Bodfish, 2011).



## Research Questions

As evidenced by the review of literature, DR strategies show promise in assisting young children with ASD in joint attention and social functioning, in addition to verbal expression and participation. In this study, the aim is to study the effect of paraprofessional-implemented DR on a preschool-aged child with autism, via the following research questions:

**Research Question 1:** To what extent does a DR intervention taught by the researcher to the paraprofessional in a one on one setting affect their reading behaviors, as measured by their use of the DR strategies?

**Research Question 2:** To what extent does a paraprofessional-implemented DR intervention impact the joint attention of a preschool child with ASD during reading?

**Research Question 3:** To what extent does a paraprofessional-implemented DR intervention impact the verbal social interaction of a preschool child with ASD during reading?

**Research Question 4:** To what extent does the paraprofessional of the preschool child with ASD find the DR intervention acceptable?

## CHAPTER 2: METHODOLOGY

### Participants

For this study, a secondary analysis was completed on existing data. Consent was obtained from the student and paraprofessional from the original study. To be considered for the study, the following inclusionary criteria were met by the child: (a) a medical diagnosis of autism (DSM-5) or an educational qualification, (b) between three and five years of age, and (c) parent consent for participation. Exclusionary criteria were as follows: (a) non-verbal children with ASD, as the child must have - at minimum - a one-word consistent vocabulary as reported by the parent, and (b) children with comorbid conditions. The following inclusionary criteria for the paraprofessional were also met: (a) work in a self-contained or inclusive preschool classroom, and (b) be familiar with the child participant. The paraprofessional reported no prior experience with DR or any shared book reading strategy.

The child participant was five years of age at the time of the study, and he had a medical diagnosis of autism spectrum disorder. As a result of this, he was involved in speech, occupational, and play therapy. He also had an IEP which focused on communication and language skills, social and emotional goals, fine and gross motor objectives, and adaptive/self-help abilities. The verbal communication skills at the time the study began involved simple words and short phrases that averaged three to four words in length.

### Setting

The study was conducted at a public preschool program for children with ASD in a large urban school district. Baseline, intervention, and generalization sessions were conducted where there was semi-private space on that particular day, which could be a separate

classroom or a blocked off corner of a classroom. For reliability of the intervention, the sessions were conducted three days every week for the duration of the study, however, data was only collected from two of the three days.

### Independent Variable

The independent variable (i.e., intervention) in this study was the use of scripted books and training of DR strategies for the paraprofessional. The education session began with a PowerPoint presentation for consistency of information across intervention. A handout and a copy of the presentation were given to the paraprofessional after the session. The agenda of the session was as follows: (1) description of DR and its benefits for children's language and literacy skills, (2) definition of DR, (3) examples and definitions of the CROWD breakdown, (4) definitions and examples of all PEER aspects, (5) definition of intentional pause, (6) video example of DR (Video 6.8 from CONNECT Module; Buysse, Winton, Rous, Epstein, & Cavanaugh, 2011), (7) examples of how books would be scripted with ten CROWD prompts, (8) guided practice that utilized a pre-scripted book, (9) instruction for the paraprofessional on scripting their own books for generalization (CONNECT Video 6.5; CONNECT Handout 6.3; Buysse et al., 2011), (10) answering questions or concerns.

### Measures

#### *Child*

**Joint Attention.** Momentary Time Sampling (a visual check every minute), was completed to assess the joint attention functioning of the child. The criteria - based off a study completed by Mucchetti in 2013 - for judging whether the child was actively attending

was defined as: participating in page-turning, making eye contact with the book or the paraprofessional, or responding to the prompts. Data was collected for the child that covered each baseline, intervention, and generalization session. At the end of each minute period, a "yes" was checked if the child met the above criteria, or a "no" was checked if he did not. These were evaluated and counted for frequency to acquire baseline information and track improvement of joint attention following training in DR strategies.

**Verbal/Gestural Interaction.** The child's verbal interactions were measured via a coding schema that noted when the child completed an utterance (defined as speaking one or more words) or gestured or signed appropriately. The form also measured whether the communicative act was a result of teacher prompting (modeling the adult or responding to prompt), or an initiation on the child's part (any communicative act three or more seconds after last exchange). Echolalia was not accepted as a verbalization at teacher prompting, however when a repeat was requested by the paraprofessional, and the child responded accordingly, that was coded as a prompted verbalization.

#### *Paraprofessional*

**Paraprofessional Use of DR.** A coding schema was created to note when the paraprofessional utilized the DR strategies during shared book reading. It included what type of question was asked (from the CROWD acronym), and the use of any remaining PEER strategies. Coding was initiated when the paraprofessional read the title of that day's book and concluded after the paraprofessional read the final page of the book. Questions were only coded on the initial presentation, and repetitions and revisions were included in the coding of the original question.

Definitions for individual CROWD and PEER coding were important to note, as there was some overlap that existed between the questions represented by the acronym. Beginning with CROWD prompts, the differentiation between recall questions and wh- questions needed to be addressed. For this study, the researcher defined recall questions as requesting information that had already been addressed in the book - as opposed to wh- questions that could relate to any material, existing in the book or not. It was also necessary to note that distancing and open-ended questions can be phrased using a wh- word, but these are separate from the wh- classification within the CROWD acronym. Additionally, in the PEER acronym, the researcher defined evaluation as any verbal indication of correctness or incorrectness. Expansion was defined as any addition of semantic or morphosyntactic information, in relation to the child's original answer. Repetition was defined as repeating the exact or some variation of the original question from the paraprofessional.

**Social Validity.** A social validity survey was given to the paraprofessional at the end of generalization. The aim of the survey was to understand if DR strategies were beneficial to the child participant as viewed by the paraprofessional. Questions requested that the paraprofessional evaluate the DR intervention in the context of the child they were working with, as well as the applicability of DR across other populations, in other classrooms, and by other paraprofessionals. A Likert scale model from one to six was utilized to format this survey - it offered graded choice options from strongly agree to strongly disagree.

### Design

Data analyzed for this study was collected utilizing a single-subject, multiple baseline across participants design to measure the extent to which a DR intervention taught to four paraprofessionals affected their reading behaviors, as measured by their use of the DR

strategies. For this study, since the primary focus was on ASD and only one dyad met the inclusionary criteria, one participant's data was analyzed. Therefore, it is a case study A-B design, since there is no demonstration of control, as well as no replication of effect to be observed across participants. All video-recorded sessions across baseline, intervention, and generalization, for the single participant were coded according to the measures identified above. All phases of the intervention were compared so that the researcher could, "integrate all the information from all phases of the study to determine whether there are at least three demonstrations of an effect at different points in time (i.e., documentation of a causal or functional relation)" (Horner et al., in press; Kratochwill et al., 2010, 2013).

### Procedures

The original study began with recruitment of participants, obtaining parental consent, and collecting demographic information. Then the baseline was completed, followed by the intervention and generalization phases. The coding for this study was completed by the researcher, with IOA completed by a research assistant.

**Baseline.** Measurement took place more than three times during the baseline phase, and due to the original study's a priori design, baseline stability was not noted. For the baseline coding sessions, four picture books were provided for the paraprofessional to read to their child, a new one presented each week. The paraprofessional read the book to the child during each baseline measurement. The paraprofessional was instructed to read three times per week as they normally would for the baseline measure. No prompting questions or DR strategies were mentioned or implemented for the baseline.

**Intervention.** After baseline, the paraprofessional was trained on the DR strategies. The intervention was completed on a tri-weekly basis at the participant's school, although data was only collected twice weekly. Total length of intervention phase was three weeks. Each session lasted between 7 and 15 minutes. There were three books in total, with each book used one week during the intervention. There were ten prompts inserted into each book, five CROWD and five vocabulary prompts. The paraprofessional was instructed to read all the prompts inserted in the book. If the child did not respond, the paraprofessional was instructed to wait three seconds, then repeat the question. If no response was given, the paraprofessional was asked to model the correct response, and request the child to repeat after them. Any interaction with the child before the book was opened was not coded or used for analysis purposes.

**Generalization.** Following intervention, the paraprofessional was given two books, as well as a handout on CROWD and PEER implementation. She was instructed to create ten scripted prompts of her own (i.e., five CROWD and five vocabulary) for each book and utilize PEER strategies for each prompt. Two out of the three weekly generalization sessions were video-recorded. This phase lasted for two weeks.

### Materials

For this study, a total of six story books were used. All books came from the *Read Together, Talk Together* kit, (Pearson Early Learning, 2006). All books were adapted for DR by embedding prompts into the books via paper strips taped into the pages that had required prompts. The books included 10 prompts each – one prompt corresponding to each of the CROWD tenets, and an additional five questions that targeted vocabulary.

### Reliability

Interrater reliability (IRR) for each participant was judged by a trained research assistant via coding of 30% of the data across all three phases – that had been randomly selected - compared to the coding sheets that were completed following all phases by the primary researcher. For the adult implementation of DR strategies, IRR was 83.47 percent. The child’s appropriate response to prompting was judged to be 100 percent. The visual attending data from the child was judged at 85.19 percent. Discrepancies were resolved via discussion between the researcher and the research assistant.

### Training Fidelity

The ability of the intervention to remain consistent between participants and sessions, and adhere to the DR strategies outlined above, was of the utmost importance for the original study. Training fidelity was calculated by a research assistant via a reference outline illustrating expectations of the sessions. Thirty percent of sessions were scored from the video recording, according to the checklist. The training fidelity was determined by dividing the number of items completed by the total number of items and multiplying by 100. Eighty percent fidelity was required; ninety percent fidelity was achieved.

### Data Analysis

Data analysis intentions are discussed below by research question. Research questions one through three were judged by visual analysis. The four steps for conducting visual analysis are as follows: (1) “document a predictable baseline pattern of data”, (2) “examine the data within each phase of the study to assess the within-phase patterns,” (3) “compare the data from each phase with the data in the adjacent phase to assess whether manipulation of



the independent variable was associated with an effect,” (4) “integrate all the information from all phases to determine whether there are at least three demonstrations of an effect at different points in time” (which in this study are baseline, intervention, and generalization; Kratochwill et al., 2010, 2013). To examine the effect of the intervention, level, trend, variability, immediacy of effect, overlap, and consistency of data patterns must all be evaluated (Kratochwill et al., 2010, 2013). Data patterns across phases were evaluated to determine the effect size of intervention. Additionally, the changes in level, trend, and variability are displayed on each graph and examined.

**Research Question 1.** The extent to which DR intervention taught to a paraprofessional in a one on one setting affected their shared reading behaviors was measured by their use of the DR strategies during baseline, intervention, and generalization. The coding sheets referenced in Appendix B were used to code the data, and it was judged by visual analysis and displayed on a phased line graph to illustrate the across behaviors design and progression.

**Research Question 2.** The impact of paraprofessional-implemented DR on the joint attention capabilities of the child was judged by visual analysis. The attending sheets that were completed during each session were utilized to average data from each session within each phase. The data were plotted on separate line graphs, one for baseline, one for intervention, and one for generalization. Consistency of the data between similar phases was not evaluated in this study because each phase of the intervention was unique.

**Research Question 3.** The effect of DR strategies on the child's verbal interaction and appropriate response to prompts during reading was judged by visual analysis and analyzed by calculating the percent of correct responses out of total questions asked. The

measurements were plotted on a line graph. This served as an illustration of the effect of DR strategies for the child participating in this study.

**Research Question 4.** The social acceptability of the DR intervention was investigated via a survey given to the paraprofessional immediately following the intervention. The data was compiled and analyzed as a subjective measure of DR's impact on interactional dynamics between the paraprofessional and the child.

### CHAPTER 3: RESULTS

#### Research Question 1

The paraprofessional's use of DR strategies was evaluated in two parts: average number of prompts completed by question type (i.e., CROWD) within each phase, as well as the usage of PEER strategies across baseline, intervention, and generalization. In Table 1, the average number of each question type asked throughout the sessions in baseline, intervention, and generalization, respectively, is shown. It is evident that the most readily used CROWD classifications were wh- and recall questions.

Table 1. *Paraprofessional's Average Use of CROWD Prompts Across Phases*

	<b>Baseline</b>	<b>Intervention</b>	<b>Generalization</b>
<b>Completion</b>	0	1	1
<b>Recall</b>	0.625	6	4
<b>Open-Ended</b>	0	0.8	0
<b>Wh-</b>	1.875	4.4	1
<b>Distancing</b>	0	1	2
<b>Total Average</b>	<b>0.5</b>	<b>2.64</b>	<b>1.6</b>

Each of the PEER categories were coded individually so progress and implementation on the part of the paraprofessional could be evaluated accurately and effectively. This data is displayed in Figure 1 below. For the prompt category, there was a surprising degree of variability within the baseline, with a mean of 2.5 (range 0 to 7) and a moderate downward trend. Following baseline, the paraprofessional was educated on the DR strategies. During intervention, there was an immediate increase, with the variable mean rising to 13.2 (range 8 to 18). This phase displayed moderate variability and no overlap with baseline. The variable dropped ( $M = 8$ ) from intervention to generalization. These data points suggest a highly effective intervention for the prompting behavior on the part of the paraprofessional.

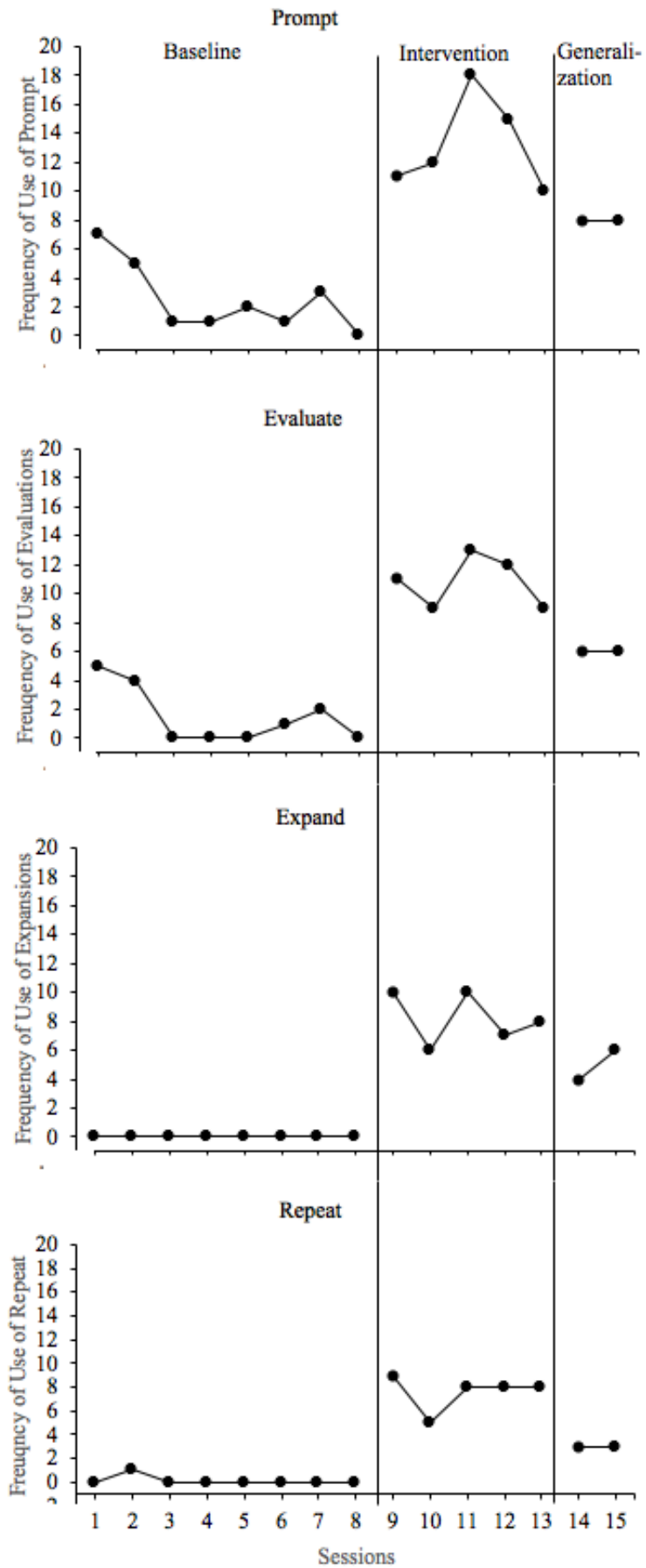
In the evaluate category, there was a low degree of variability within baseline, exhibiting a mean of 1.5 (range 0 to 5) and a slight downward trend. Once the paraprofessional was educated on the PEER acronym, the variable showed immediate increase with a mean of 10.8 (range 9 to 14). This phase displayed very little variability and did not overlap with baseline. The average of the variable dropped slightly with a mean of 6 for generalization, once again suggesting an effective intervention for the evaluation behavior from the paraprofessional.

With the expand category, there was no variation within baseline, as the paraprofessional did not exhibit this behavior, which made the mean 0. Therefore, an immediate increase happened following training, leading to an intervention mean of 8.2 (range 6 to 10), with little variability and no overlap with baseline. The average dropped somewhat in generalization to a mean of 5 (range 4 to 6). Overall, this suggests a successful intervention for the expansion behavior from the paraprofessional.

Lastly, the repeat category had a very low baseline, with a mean of 0.125 (range 0 to 1), since the paraprofessional only utilized this behavior once during the phase. Once again, an

immediate increase resulted following training, showing an intervention mean of 7.6 (range 3 to 9). There was very little variability and no overlap with baseline in this phase. The mean dropped in generalization to 3, which illustrated a somewhat effective intervention for the repeating behavior on the part of the paraprofessional.

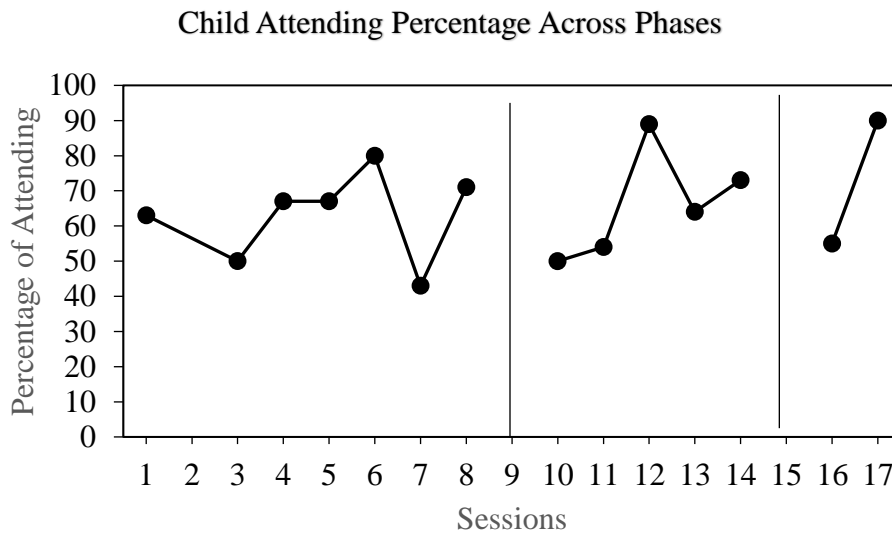
Figure 1. Paraprofessional's Use of DR Strategies Across Phases



## Research Question 2

Beginning when the paraprofessional read the title of the book, coding noted every minute, on the minute, whether the child was visually attending. The line graph in Figure 2 confirms that traditional DR does not have much of an impact on the child's attending throughout the sessions. While there was a large range for this set of data (43-90%), the mean for baseline was 63%, the mean for intervention was 66%, and the mean for generalization was 72.5%. There was the slightest positive correlation throughout baseline, intervention, and generalization for visual attending from the child participant. It should also be noted that visual attending data could not be coded for one baseline video, as the frame of the video only included the paraprofessional and not the child participant.

*Figure 2. Child Attending Percentage Across Phases*

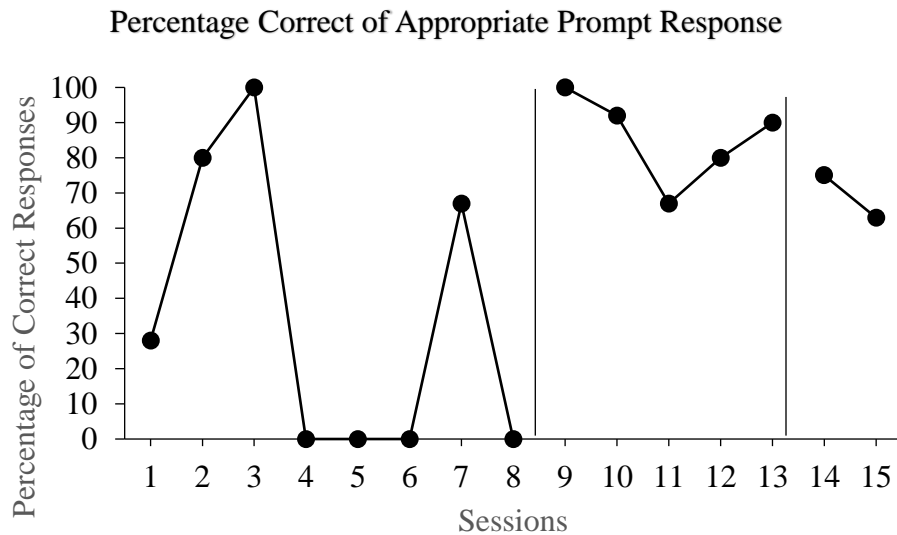


## Research Question 3

The third part of this study was an attempt to understand if DR positively impacted the child's appropriate responding to the paraprofessional prompts. The data was analyzed by

calculating the total number of correct prompt responses out of all prompts asked, then multiplying by one hundred. The baseline phase was highly variable, with no foreseeable trend. The mean was 34.375% (range 0 to 100%). The intervention phase showed an immediate increase following training, with a mean of 85.8% (range 67 to 100%). It displayed moderate variability and a somewhat neutral trend. With generalization, the mean dropped to 69% (range 63 to 75%). It exhibited moderate variability and a negative trend. As evidenced by the graph below, DR prompts - while not displaying an overtly positive correlation - seemed to positively affect the consistency of the correct responses given from the child during intervention and generalization.

*Figure 3. Percentage Correct of Appropriate Prompt Response*



Research Question 4

The final facet of the study involved asking the paraprofessional to respond to a survey about the effectiveness of the intervention. The survey responses were entirely positive from the paraprofessional, ranging from slightly agree to strongly agree on the scale used. She noted that

while DR is “great”, paraprofessionals are ultimately subordinate to the classroom teacher, so if the teacher does not believe DR would be helpful, it likely would not or could not be utilized. She also expressed the importance of abiding by Individualized Education Plans (IEP) in public school classrooms, and that the primary goal for teachers and paraprofessionals is to follow those. Therefore, if DR fits into that mold, then it can be implemented. However, if it does not fit into the IEP, it likely could not be used.



## CHAPTER 4: DISCUSSION

Classroom professionals have been trained on DR strategies for typically developing children, but the majority of research has ignored specific paraprofessional education for implementation of DR strategies with a child on the autism spectrum (Austin, 2013; Ledford, J.R., Zimmerman, K.N., Chazin, K.T. et al., 2017), and the potential impact on the child's appropriate responding and visual attending skills. The purpose of this study was to evaluate the effectiveness of teaching DR strategies to a paraprofessional who worked with a child on the autism spectrum, and its effect on the child's behaviors. The results of the study suggest a moderate to strong functional relationship between the training of DR strategies and the paraprofessional's implementation of those strategies during shared book reading. Additionally, the results of the analysis portray a moderately positive functional relation between the use of DR and the child participant's ability to appropriately respond to prompts in a consistent fashion. Finally, the results note that DR provides no impact on the child's joint attention capabilities while reading.

Research question one examined the effects of training the paraprofessional on DR strategies (i.e., CROWD and PEER) and the corresponding implementation of those strategies during book reading. The data illustrated that when the paraprofessional was trained on all DR strategies via a singular training prior to beginning of the intervention, the strategies were implemented and replicated during multiple book reading sessions across a number of different books with positive results. It may be important to note that the "repeat" strategy had the smallest immediate increase during intervention, which is likely due to the child wanting to proceed with reading rather than continuing to drill the same prompt. Similarly, as Fleury (2015, 2018) suggested, some of the books utilized could have fallen outside the child participant's

areas of interest, which leads to lack of participation or wanting to hurry through the book. Book selection is of great importance for children on the autism spectrum, due to their tendency towards strongly favoring specific subjects (Fleury, 2015). An example of this occurring was with the book *Spike in the City*, where the child participant enjoyed the word “splash” so much, that he succeeded on a large portion of the “repeat” strategy since he enjoyed saying the word over and over.

The generalization phase exhibited a decline in data values for all behaviors, with the “repeat” strategy once again showing the lowest usage in generalization from the paraprofessional. Because the child appeared to struggle to understand the expansion given during the previous part of the PEER prompt, he remained mostly echolalic instead of repeating the expanded version of the answer, which potentially led the paraprofessional to stop utilizing the “repeat” part of the strategy. This is consistent with findings from a study completed by Fleury (2014) which noted that some children with smaller vocabularies struggle with certain question types or prompts from traditional DR and may require further assistance from the adult reading. For baseline, the paraprofessional presented several questions targeting vocabulary or requesting the child point to a specific word or picture ( $M = 2$ ). However, during intervention and generalization this number dropped to zero, as the paraprofessional only utilized the CROWD prompts.

Research question two addressed the child’s ability to visually attend during the shared book reading sessions. Each video was standardized for coding by noting the start time based on when the title of the book was read. Unfortunately, the paraprofessional’s implementation of the traditional DR strategies did not seem to impact the attending ability of the child participant, as evidenced by the data displayed in Figure 2. The baseline, intervention, and generalization

phases all had similarly variable values in attending status. This might suggest that regular DR strategies do not promote increased attending capability in children who are not typically developing. However, because the data was coded in one-minute intervals, it is possible that the joint attention capabilities did improve overall but were missed as part of this study. A different study utilized momentary time sampling (MTS) to code engagement in interactions at ten second intervals in an inclusive classroom with half the population typically developing and half the population with ASD. They noted that the interval did not seem to matter because there was a high level of engagement across the board, so the sampling at ten second intervals was not entirely necessary (Ledford et al., 2017). Formal versus informal observation techniques have been debated for understanding joint attention in children with ASD, but ultimately it has been recommended that informal observation in a child's natural environment is preferred compared to offering a formal, standardized assessment in a non-natural environment (Merrell, 2001).

The third research question examined the effect of DR strategies (i.e., CROWD and PEER) on the child participant's ability to appropriately respond to the prompts. While the scores were highly variable within the baseline phase, they became more consistent throughout intervention, and remained consistent during generalization. This suggests that while there was not an overall positive impact, the stability of the data increased during intervention and generalization, indicating moderate success on the child's part. This could be explained by the paraprofessional becoming more understanding of what and how to ask throughout intervention, and ways she could assist the child participant in finding the correct response. Fleury notes that "adults who work with children with ASD will need to be more intentional in their reading style as children are more likely to require higher levels of support to verbally engage with the reading material," (Fleury, 2014, p.11). This could also be due to the difference in the prompts level of

targeting during intervention and generalization. In baseline, the majority of the questions asked were requesting the child participant point to a word or picture or repeat after the paraprofessional. While there is nothing inherently wrong with these types of questions, they do not require the level of engagement that DR prompts do (Lonigan, 2007). Once training took place and the paraprofessional demonstrated understanding in asking DR questions, the child's appropriate responding – while not perfect – became more consistently correct.

The lack of overt increase in the child's appropriate verbal responding as well as visual attending as a response to the traditional DR strategies could be addressed by adapting certain aspects of the DR process. Multiple studies have been conducted addressing different adaptations for children with various disorders, in addition to ASD. Responding to this need for adaptation, Fleury and Schwartz (2017) created an addition to the traditional DR structure. While still utilizing the CROWD and PEER acronyms for questions and prompting during reading, a third classification of questions were added to assist children in the autism population; these prompts were to be used if the child refused to respond to any of the previous DR prompts included in the above acronyms. From least to most intrusive, the interventionist would ask: (a) a binary question (e.g. "is it a cat or a dog?"), (b) a yes or no question (e.g. "is it a dog?"), (c) request the child repeat a target word (e.g. "say dog"), and (d) ask the child to point to the correct image (e.g. "point to the dog"). Finally, if the child does not respond to any of the above modified prompts, the interventionist would physically prompt the child to point to the correct answer (Fleury & Schwartz, 2017).

Another version of adapted DR was proposed by Whalon, Delano, and Hanline (2013), titled RECALL (Reading to Engage Children with Autism in Language and Learning). This study utilized DR strategies, but included additional prompts targeting several characteristics that

children on the autism spectrum tend to struggle with: emotion identification, secure attention, intentional pause, and initiation. Emotion identification was added because children in this population have difficulty with understanding the feelings of others in text. Requiring secure attention during the reading encourages joint attention. The intentional pause is placed to inspire initiation on the part of the child. If they do not initiate on their own after the intentional pause, they will be asked to initiate an interaction (Whalon, Delano, & Hanline, 2013). When this adaptation was studied in four young children, researchers found that all four participants decreased incorrect responding and gradually improved their spontaneous responding regarding storybook content, while three out of four participants increased the frequency of their initiations (Whalon, Martinez, Shannon, Butcher, & Hanline, 2015).

These adaptations proved helpful for verbally participatory children on the autism spectrum but did not cover the accommodations necessary for the minimally or nonverbal ASD population. Researchers at the University of California Los Angeles created a differently adapted version of shared book reading targeting the non or minimally verbal population. In this investigation, teachers utilized simplified books, visual supports, and three-dimensional objects to engage children on the spectrum (Mucchetti, 2013). While the study was only done on four children between the ages of five and six, the results were promising. Average story comprehension and engagement in the adapted sessions was between 87% to 100%, compared to between 41% and 52% during the baseline testing phase. Additionally, the average number of correct responses to comprehension questions during the adapted sessions was 4.2 to 4.8 out of 6, as opposed to 1.2 to 2 out of 6 during baseline, (Mucchetti, 2013).

Research question four addressed the paraprofessional's feelings on the study as a whole and the perceived level of helpfulness of the intervention. This survey utilized a Likert scale model

that overall suggested a positive acceptance of the intervention strategies. This is consistent with other studies measures of social validity, specifically paraprofessional coaching on engagement and social interactions with children on the autism spectrum (Ledford et al., 2017). The paraprofessionals in this study stated that they believed it to be a positive learning experience and readily implemented what they learned on a daily basis following intervention.

### Limitations and Future Directions

While data from this secondary analysis did show a preliminary evidence for a positive relationship with paraprofessional-implemented DR and child's appropriate responding, there are many limitations that must be discussed. This study included only one adult participant (the paraprofessional) and one child on the autism spectrum, which allowed for individual intervention with the participant. Individualized attention may have affected the learning ability of the participant – either positively or negatively – so future studies should include a larger population of paraprofessionals and children, either in a one-to-one ratio, or one paraprofessional to a small group of children.

All the data for this secondary analysis was coded off of the original videos obtained from a different study on DR strategies in the classroom. Therefore, for this study the researcher did not have the option to instruct the video recorder from the previous study. Unfortunately, for this reason, visual attending data could not be coded for one baseline video, as the frame of the video only included the paraprofessional and not the child participant. Additionally, recording angles were not standardized as the location of some sessions differed depending on the day, (i.e., in the corner of the classroom alone or in a room alone with the paraprofessional). Due to this, the control of the setting was a variable. Session length of time was also not standardized in the original study, which could have impacted data collection and analysis.

The design of future research should add or improve on the current specifics of this study. Primarily, the research would require more intervention and generalization points to understand the long-term effect of the study. In the current study, paraprofessional education only took place once at the beginning of intervention – this could be improved upon by adding education sessions throughout intervention to offer the paraprofessional increased support. Study design for future participants should also involve story book analysis in the beginning so that the researcher can select books of high interest to the child participant(s) or book that the participant(s) will not persevere on.

### Conclusion

This study demonstrated that paraprofessionals can utilize some traditional DR strategies appropriately following training of the DR protocol. However, overt positive changes in the child participant's visual attending and, to a lesser degree, appropriate verbal responding were not seen. Paraprofessionals ability to competently implement many aspects this new protocol when offered the support necessary should inspire continued research with this population to understand and assess potential interventions to benefit paraprofessionals and children they work with who are on the autism spectrum.

## **APPENDIX A: PARAPROFESSIONAL IMPLEMENTATION CODING SCHEMA**



Paraprofessional Observed: \_\_\_\_\_

Date: \_\_\_\_\_

Session #: \_\_\_\_\_ Time Spent Reading: \_\_\_\_\_

Person Completing Original Coding: \_\_\_\_\_

Person Completing IOA: \_\_\_\_\_

Book Title:

Condition (Circle One): Baseline Intervention Maintenance

Components Observed	Response (Yes, N = No)	
<b>During the Book Reading - Paraprofessional asks oral language prompts and implements PEER hierarchy for each.</b>		
<input type="checkbox"/> Completion <input type="checkbox"/> Recall <input type="checkbox"/> Open-Ended <input type="checkbox"/> Wh-? <input type="checkbox"/> Distancing <input type="checkbox"/> Vocab <input type="checkbox"/> Other Prompt/Question Question or Word: _____	Y	N
	Evaluates	Y N
	Expands	Y N
	Repeats	Y N
<input type="checkbox"/> Completion <input type="checkbox"/> Recall <input type="checkbox"/> Open-Ended <input type="checkbox"/> Wh-? <input type="checkbox"/> Distancing <input type="checkbox"/> Vocab <input type="checkbox"/> Other Prompt/Question Question or Word: _____	Y	N
	Evaluates	Y N
	Expands	Y N
	Repeats	Y N

Complete the chart below with total numbers across book reading:

Feature	TOTAL NUMBER
Completion Prompts	
Recall Questions	
Open-Ended Questions	
Wh-Questions	
Distancing Questions	

Complete the chart below with total number across each book reading:

Feature	Total Number Observed	Total Number Possible	Percentage
Pause 3-5 Seconds			
Repeat Prompt			
Evaluates			
Expands			
Asks Child to Repeat			

**APPENDIX B: VISUAL CHECK FOR ATTENDING FORM**



## **APPENDIX C: DEMOGRAPHIC INFORMATION**

Parent Name: \_\_\_\_\_

Race: \_\_\_\_\_

Name of Child: \_\_\_\_\_

Age of Child: \_\_\_\_\_

Gender of Child: \_\_\_\_\_

How many words does your child use on a regular basis?

\_\_\_\_\_

How often do you read to your child? (e.g., daily, once a week, never) \_\_\_\_\_

How often do you teach new words to your child? \_\_\_\_\_

How many picture books does your child have at home? \_\_\_\_\_

How often do you take your child to a bookstore or library? \_\_\_\_\_

## **APPENDIX D: PARAPROFESSIONAL SURVEY**

### Adapted Version of the Intervention Rating Profile-15

*Please circle the number which best describes your agreement or disagreement with each statement.*

	<i>Strongly disagree</i>	<i>Disagree</i>	<i>Slightly disagree</i>	<i>Slightly agree</i>	<i>Agree</i>	<i>Strongly agree</i>
1. This would be an acceptable intervention for the child's needs.	1	2	3	4	5	6
2. Most paraprofessionals would find this intervention appropriate for children with similar needs.	1	2	3	4	5	6
3. This intervention should prove effective in supporting the child's needs.	1	2	3	4	5	6
4. I would suggest the use of this intervention to other paraprofessionals.	1	2	3	4	5	6
5. The child's needs are severe enough to warrant use of this intervention.	1	2	3	4	5	6
6. Most paraprofessionals would find this intervention suitable for the needs of this child.	1	2	3	4	5	6
7. I would be willing to use this intervention in the classroom setting.	1	2	3	4	5	6
8. This intervention would <i>not</i> result in negative side effects for the child.	1	2	3	4	5	6
9. This intervention would be appropriate for a variety of children.	1	2	3	4	5	6
10. This intervention is consistent with those I have used in classroom settings.	1	2	3	4	5	6
11. The intervention is a fair way to handle the child's needs.	1	2	3	4	5	6
12. This intervention is reasonable for the needs of the child.	1	2	3	4	5	6
13. I like the procedures used in this intervention.	1	2	3	4	5	6
14. This intervention would be a good way to handle this child's needs.	1	2	3	4	5	6
15. Overall, this intervention would be beneficial for the child.	1	2	3	4	5	6

**Comments:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*Source:* Adapted from Witt, J.C. & Elliott, S.N. (1985). Acceptability of classroom intervention strategies. In Kratochwill, T.R. (Ed.), *Advances in School Psychology, Vol. 4*, 251 – 288. Mahwah, NJ: Erlbaum.



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