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Effects of the Integrated Symple Readers Curriculum on Expressive Vocabulary Acquisition in Elementary Students with Developmental Disabilities

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Effects of the Integrated Symple Readers Curriculum on Expressive Vocabulary

Acquisition in Elementary Students with Developmental Disabilities

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ABSTRACT

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Despite the emphasis society places on literacy, most students with developmental disabilities remain illiterate. One cause for this illiteracy may be that these students lack foundational language skills that contribute to being able to read. Research has shown that, among other contributions, multiple exposures across time increase students' abilities to acquire knowledge. The Symple Readers integrated curriculum plans for multiple exposures to novel picture vocabulary words by building them into all activities across the students' day and week. The purpose of this study was to determine the effects of the Symple Readers integrated curriculum on expressive vocabulary development. During the six-week study, eight elementary students with developmental disabilities were given the opportunity to acquire 27 novel expressive vocabulary words. A multiple probe design across word sets was used to determine the effects of instruction on word acquisition. While individual results varied, the average expressive vocabulary gain was 72% of the novel words, showing a clear functional relationship between the Symple Readers integrated curriculum and the acquisition of the 27 novel expressive vocabulary words.

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DESCRIPTION OF THESIS STRUCTURE

This thesis, Effects of the Integrated Symple Readers Curriculum on Expressive Vocabulary Acquisition of Elementary Students with Developmental Disabilities, is written in a hybrid format. This format brings together the requirements for both a traditional thesis and a journal publication.

The first pages of the thesis document fulfill requirements for submission to the university. The thesis is presented as a journal-ready document. It is written to meet proper length and style guidelines for submitting research reports to education journals.

A review of the literature is included in Appendix A. The consent form for participants is included in Appendix B. Instruments used for data collection are included in Appendix C. Sample lessons plans are included in Appendix D. Direct instruction lesson plans for training are included in Appendix E. The treatment fidelity checklist is included in Appendix F and the social validity scales are included in Appendix G. The recruitment letter is found in Appendix H.

This thesis format includes two lists of references. The first list includes references pertinent to the journal-ready article. The second list contains all citations used in the Appendix section entitled "Review of the Literature."

Background

Literacy permeates the school environment. Any student that intends to be successful in a school setting must access literacy as an essential skill. All students—including those with developmental disabilities—should be expected to become literate. However, despite the emphasis society puts on people becoming literate, little has been done to identify ways to teach students with Down syndrome or other developmental disabilities advanced reading skills; thus, most remain illiterate (Abbeduto, Warren, & Conners, 2007). For these students to access literacy, they must have foundational language skills in place (Nation & Angell, 2006).

Oral Language and Literacy

In order to understand the significance of oral language as a precursor to literacy, one must first identify the essential components of verbal communication. According to the National Institute of Child Health and Human Development (NICHD), essential components of verbal communication are receptive and expressive vocabulary or word knowledge, syntactic and semantic knowledge, and perceptual/conceptual knowledge or comprehension (NICHD Early Child Care Research Network, 2005). These components are inter-related and dependent upon each other. People cannot have fluent oral language skills if any of these components are missing.

Early oral language development plays a critical role in the development of subsequent literacy skills. Results from a longitudinal research study indicated that expressive language skills of 24-month old children is predictive of later language and literacy scores up to 11 years of age (Lee, 2011). Lee specifically asserted, "we have to place a strong emphasis on early vocabulary learning as young as age 2 if children (are) to become highly competent in later literacy skills" (p. 83).

Early oral language skills permeate literacy skills, not only in the early elementary years, but they also have far-reaching effects beyond high school. Dickinson, Golinkoff, and Hirsh-Pasek (2010) addressed language as more than just vocabulary instruction, and stated that programs that provide support for building vocabulary and conceptual knowledge will have lasting effects in later language and comprehension abilities. The authors concluded that language is essential for both early and later reading competencies, especially as student skills turn from decoding to meaning-making.

In their study examining reading comprehension, Nation and Angell (2006) stated that reading comprehension is dependent upon spoken language comprehension, and that "ultimately, an individual's spoken language comprehension limits how much he or she can understand written language" (p. 78). They referred to oral language as being the foundation of reading, and asserted that different oral language skills affect different aspects of reading. That is to say, phonological skills are closely related to decoding and word-level reading, whereas non-phonological skills are more critical for reading comprehension. They concluded that being proficient in oral language is of utmost importance to the development of reading skills, and that interventions designed to improve oral language will in turn improve reading comprehension.

Literacy Instruction for Students with Disabilities

The following paragraphs present a discussion of some instructional strategies shown to benefit students with developmental disabilities in the acquisition of literacy skills. While these strategies seem to be effective for teaching literacy to students with developmental disabilities, none of the studies cited research utilizing the strategies to increase oral language development directly. However, the strategies are of note due to the success that the researchers achieved through their intervention. These strategies included time delay, comprehensive approach to

reading instruction along with direct instruction, and integrated curriculum.

Time delay, an errorless learning procedure wherein there is a short time period between a stimulus presented by a teacher and a prompt given by the teacher that elicits a response, relates to teaching picture and word recognition to students with developmental disabilities. Browder, Ahlgim-Delzell, Spooner, Mims, and Baker (2009) found that time delay was an effective intervention for teaching sight words to students with mild to moderate intellectual disabilities, but also found promising applications for time delay in teaching picture recognition skills to students with severe disabilities.

Two studies added the importance of a comprehensive approach to reading instruction for students with developmental disabilities. Allor, Mathes, Champlin, and Cheatham (2009) and Allor, Mathes, Roberts, Cheatham and Champlin (2010) note that in the past, reading instruction for students with developmental disabilities has focused primarily on sight word instruction, but that recently research has shown that children with developmental disabilities should be instructed in reading in the same way that their peers without disabilities are taught, comprehensively, with instruction linked across five main categories: oral language and vocabulary, phonological awareness, phonics and word recognition, fluency, and comprehension. These are the same components that the National Reading Panel identified as essential components of any literacy program (National Institute of Child Health and Human Development, 2000). Both studies cited data obtained during the implementation of the Early Interventions in Reading program, which uses direct instruction, along with a number of other strategies, to help students gain essential skills in reading.

Allor et al. (2010) reported the importance of a comprehensive approach to reading instruction; however, they state that few studies have been conducted on comprehension of

readers with developmental disabilities. Allor et al. (2009) state that the lack of a comprehensive approach to reading instruction for students with developmental disabilities may be a result of teachers lacking instructional skills in reading themselves. They conclude by asking teachers of students with developmental disabilities to seek out additional resources that encourage a comprehensive approach to reading instruction, and urge teachers to make certain that reading instruction makes meaningful connections for their students.

In the report from the National Reading Panel (National Institute of Child Health and Human Development, 2000), vocabulary instruction was included as an essential component of comprehension. The Panel referred to specific ways to teach vocabulary, which included incidental encounters in the context of story book reading, learning words before reading, and including the words in various contexts so that the students have repeated exposure to the words. They concluded that although it is understood that vocabulary instruction is essential for comprehension, there is little research on the best method or combination of methods for vocabulary instruction.

Connor, Morrison, and Slominksi (2006) described instructional techniques that are shown to increase oral language skills as they relate to literacy. The non-exhaustive list of research-based instructional techniques includes use of difficult vocabulary, exposure to rare words, shared book reading, reading to students using dialogic reading, play, and playful activities related to learning.

While the research on vocabulary instruction may be slim, there is evidence to suggest that integrated curriculum, or an interdisciplinary approach to instruction, where instruction in all subject areas revolves around a common theme, can improve student motivation and give students a meaningful context for learning new information (Drake & Burns, 2004). Drake and

Burns refer to recent research on the brain that notes that information is best learned when students make connections--the more connections students make, the better they learn.

Research by Ozen and Ergenekon (2011) regarding activity-based intervention supports the concept of integrated curriculum. In their review of literature they found that when teaching children with developmental disabilities through activities, the students had increased motivation as well as increased generalization. They also found that because information was presented in multiple activities throughout the context of the day, students needed less individualized instruction outside of context to master skills.

Oral Language Development in Students with Developmental Disabilities

Research is clear in regard to oral language being the foundation of literacy. However, while development of oral language occurs naturally in typically-developing children, the process is greatly obstructed in students with developmental disabilities. An important key to oral language development, particularly in regards to vocabulary acquisition, is short-term memory. Short-term memory is especially hindered in students with developmental disabilities (Jarrold, Nadel & Vicari, 2008).

Several strategies have been researched in regard to increasing vocabulary skills in students with disabilities. In order to bypass the problem of short-term memory in relation to novel word acquisition, Mosse and Jarrold (2010) conducted a study examining the Hebb effect in children with Down syndrome. The Hebb effect, established by Donald O. Hebb in 1961, is a process whereby a person repeatedly recalling a list of items can begin to store that list of items in long-term memory rather than in the short-term memory (Mosse & Jarrold, 2010). For example, when teaching students novel words in a way that would take advantage of the Hebb effect, teachers would have students repeat a list of novel words in the same order rather than

explicitly teaching what each word means. Mosse and Jarrold (2010), conclude that the Hebb effect is evident in children with Down syndrome, and that in educational and therapeutic environments, when working with students who have short-term memory impairments, it may be more beneficial to present new information multiple times with indirect associations, rather than presenting that information one time with explicit instruction.

Another strategy, fast mapping, employed by McDuffie, Sindberg, Hesketh, and Chapman in their study of adolescents with Down syndrome (2007), also addresses the issue of short-term memory. Fast mapping is the ability to relate a novel word to a novel object with few incidental encounters. For example, teachers may use words students already know to teach words that are novel. Consider that students know what a pig is, but have never been introduced to the word horse. Teachers, while presenting both pictures, one of a pig, and one of a horse, may say to the student, "find the horse, not the pig." Given that students can identify the pig, the logical choice for the novel word is the other picture, the one of the horse. McDuffie and colleagues (2007) indicate that fast mapping is generally difficult for adolescents with Down syndrome. However, in their study, it was more difficult for students with Down syndrome to fast map novel words when they were introduced through stories, as compared to event-based interaction (e.g., in a game). Specific novel word categories were also found to be easier than others for students to acquire, as was the case for nouns versus verbs.

A strategy used to compensate for verbal communication deficits in students with developmental disabilities includes the use of pictorial vocabulary. The Picture Exchange Communication System (PECS, Bondy & Frost, 1985) is an example of a strategy that allows students to interact with high-preference and low-preference items by exchanging a simple pictorial sentence, which includes symbols of those items, for the items themselves. This system

is highly regarded for its ability to help students communicate through picture symbols. PECS was used in a study of acquisition of novel words in students with autism and severe linguistic impairments (Carr & Felce, 2008). The researchers determined that a procedure called the exclusion-based method was effective in teaching novel words to the students. According to Carr and Felce, the exclusion-based method showed more social validity for teachers and students alike than the typical application of PECS. During the exclusion-based method, when an error by the student occurred, the teachers presented the choice again and blocked the incorrect picture, thereby forcing the students to exchange the correct picture for the object. The student immediately received the object, thereby reinforcing the correct choice. The error-correction procedure for the traditional teaching in the PECS does not have the same immediate gratification for the student. The student must perform the entire exchange again before receiving the object, which sometimes elicits less desirable behavior.

Wilkinson, Carlin, and Thistle (2008) discussed the importance of visual processing when teaching students with developmental disabilities. They reported evidence about the importance of background color to categorize symbols, as well as to attract visual focus. They further discussed the significance of internal color cues, but cautioned clinicians to be selective as to which students are targeted with this intervention. They concluded that more research on visual processing and how this method might be used to facilitate communication is needed.

Allor et.al (2010) focused on a typical comprehensive approach to reading instruction, where phonemic awareness and phonics are the foundational skills, while research by Browder et al. (2009) addressed a strategy to develop sight words in students with developmental disabilities. Both approaches showed progress in regard to students' ability to acquire some basic reading skills; however, neither approach addressed the importance of oral language

development or expressive vocabulary development as prerequisite skills. As previously cited, various studies address the short-term memory problem that is common among students with developmental disabilities. This problem often inhibits their ability to acquire expressive vocabulary. Additionally, students who develop normally bring into their educational experience a wealth of expressive vocabulary, while students with developmental disabilities are often not so fortunate. Without aiding the development of early oral language skills, such as vocabulary development, syntax and grammar skills, and comprehension, in students with developmental disabilities, many of the strategies teachers employ, including the comprehensive approach to reading instruction and time delay may yield less productive results for these students.

Statement of the Problem

There is little research regarding the best models for teaching vocabulary or expressive language to students with developmental disabilities across contexts and environments, but its importance cannot be disregarded. If students' ability to read and comprehend is ultimately based on their ability to speak, then prior to any formal literacy training students should develop foundational language skills, such as vocabulary knowledge, syntactic and semantic knowledge and comprehension. This applies not only to typically developing students in general education classrooms, but also to students with developmental disabilities who are served in special education environments. While students with developmental disabilities have many factors that may impede the typical developmental process, one of the greatest areas of deficit is in the development of language. Within the current literature, there is evidence that direct instruction and comprehensive integrated curriculum can influence the development of reading in students with developmental disabilities, but research has not been conducted concerning whether these same instructional practices may positively influence the acquisition of vocabulary or expressive

language.

Statement of Purpose

The Symple Readers curriculum uses an integrated approach to literacy, and was developed for students with developmental disabilities. Its purpose is to increase foundational vocabulary, facilitate basic communication skills, augment syntax and grammar absorption, and aid in building comprehension. The purpose of this study was to evaluate the effectiveness of this program for teaching foundational expressive vocabulary to young students with developmental disabilities.

Research Question

This study addressed the following research question: What are the effects of the Symple Readers curriculum on the acquisition of expressive vocabulary of elementary students with developmental disabilities?

Method

This section will be discussed in the following order: participants; setting; materials; measures, including dependent variable and independent variable; data collection; research design; interobserver agreement; treatment fidelity; and social validity. Prior to implementation, the study was approved by the Institutional Review Board, and the parents of all possible participants were given a detailed description of the study, which they were asked to review prior to their signing a consent form. Signed parental consent was acquired for all participants. Due to the students' ages and developmental levels, they did not give written assent to participate in the study. See Appendix B for the Consent Form.

Participants

The sample for this study was one of convenience. The study included four male and four

female students, ages five to six, with various socioeconomic statuses, as well as ethnicities. Each participant was identified for special education services under the classifications of developmental delay, multiple disability, intellectual disability, or autism, as designated by an Individualized Education Program (IEP) Team, and was receiving services in a self-contained classroom for students with developmental disabilities. Since these students were only 5-6 years old, previous IQ test results were not considered valid; therefore, these scores are not reported. Present levels of performance were also a consideration, specifically in regard to matching ability. Participants in the study needed to have the following prerequisite matching skills at 75% accuracy or better: matching color cards to identical color cards; matching object to picture; and matching picture to identical picture, as these skills are requirements to being successful with the Symple Readers integrated curriculum. A recruitment letter was mailed to parents of all members of the primary researcher's class, and participants were selected based on the above criteria. See Appendix C for the Recruitment Letter. Table 1 provides a pseudonym and detailed demographic information for each participant.

<Insert Table 1 here>

Setting

The study was conducted in a self-contained classroom in a suburban elementary school. The general demographics of the city included a population of 18,150, with 87% Caucasian, 11% Hispanic, 1% mixed race/ethnicity, and 1% other. The study school was considered a Title 1 school, with a kindergarten through sixth grade student enrollment of 556, with an ethnic minority percentage of 25.5, and a low-income minority percentage of 19.8. The self-contained classroom consisted of 11 kindergarten and first grade students, with 1 of these students attending this school as their neighborhood school; the other students were enrolled in this school because

of the special education offerings. One full-time special education teacher and three full-time paraeducators were employed in the classroom. The classroom measured 21.37 meters by 5.18 meters with a permanent wall at 10.69 meters lengthwise, and was otherwise divided, using cupboards or room dividers, into different areas specified for reading, mathematics, structured play, writing or fine motor activities, gross motor activities, communication, art, cooking, and independent work. The instructional activities occurred across all areas of the classroom at different times during the study. The implementer sat across from or beside the students in all experimental activities.

Materials

The materials used were products of the Symple Readers Company including: "Communication Program"; "Literacy Program"; Supplementary Materials; and Data Collection Devices, as well as two iPad applications entitled "Symply Comprehension" and "Symply Speaking," created by the Symple Readers Company. All of the products within the Symple Readers curriculum have sentences color-coded according to the following code: Red: people (e.g., boy, girl, I, mom); Green: verbs (e.g., find, want, eat); Yellow: nouns other than people (e.g., bus, car, mouse, candy); Orange: descriptive words (e.g., red, yellow, more, big, little); and Blue: prepositions and articles (e.g., the, a, in, on). The data collection form (sample included in Appendix D) was used for identifying present levels of student performance prior to implementation of the intervention, as well as throughout the intervention, to determine effects of the intervention across the different word sets. An Apple iPad and an Apple iPad2 were also used during the implementation phase of the experiment to take pictures of students, as well as to supplement instruction by using the two aforementioned iPad applications.

Measures

  Dependent variable. The dependent variable in the study was the expressive vocabulary of each participant with developmental disabilities. Expressive vocabulary was defined as the number of words expressed in response to individual picture representations of 27 vocabulary words contained in the Symple Readers program that could be manifested verbally (e.g., spoken words), visually (e.g., sign language), or with a communication device or system. (In the event that a participant used a communication device, the symbols on the device were different from the symbols taught within the study to ensure that the participant was not simply matching picture to picture.). A pre-assessment including all picture vocabulary words taught across the study was given to each participant prior to the introduction of the first word set, and a post-assessment, including all picture vocabulary words was given to each participant following implementation of the intervention with the fifth word set. The picture vocabulary taught during the study included the following 27 picture symbols: Week One: boy, find(s), friend, girl, the; Week Two: bus, car, in, on, ride(s); Week Three: ball, candy, drink, more, toy, want(s); Week Four: cookie, give(s), mouse, red, yellow; Week Five: cow, horse, one, pig, see(s), and sheep.

  Independent variable. The independent variable in the study was the application of the integrated Symple Readers curriculum. The curriculum was taught daily by the classroom teacher and paraeducators in various whole class, small group, and individual activities throughout the duration of the intervention. This curriculum consists of books and activities that are designed to introduce high frequency picture vocabulary words to students in a systematic and foundational way. The program follows a weekly schedule of lesson plans to ensure that weekly picture vocabulary words are integrated into all lessons. Table 2 delineates all lessons and activities that were taught weekly.

<Insert Table 2 here>

The Symple Readers curriculum includes several components: The Communication Program; The Literacy Program; Supplementary Materials; and two iPad applications: "Symply Comprehension" Version 1.0, and "Symply Speaking" Version 1.0.

Communication Program. The Communication Program consists of 26 Picture Reader Books and 26 Comprehension Books introduced during the daily communication group. The communication group is an instructional group within the curriculum wherein several students are instructed simultaneously. The books are 8 ½" by 11" in size, spiral bound, appear in landscape and portrait formats, and are also in full color. The Picture Reader books have original text, as well as adapted picture sentences that concentrate on the "Focus Vocabulary" within the book (i.e., the weekly picture vocabulary words). Incidentally, 78% of the words from the Symple Readers "Focus Vocabulary" are found within the first 220 words and 95 common nouns of the Dolch sight word list (Answers 2000 Limited, 2007). Additionally, 81% of the words are found on Fry's first 300 words and picture nouns (McDonald, 2009) e. The Comprehension Books are introduced following the Picture Reader books for each week. They are identical to the Picture Reader books, except for several missing symbols within the pictorial sentences that students are expected to fill in while reading the book. The pictures students select from to complete the sentences are available through a pictorial vocabulary word bank, and students complete the sentences by placing pictures in the appropriate place within each picture sentence. The "Focus Vocabulary" words for each book in the series are introduced systematically throughout the program, and are then revisited after the initial introduction to ensure generalization and maintenance. The Communication Program was introduced through a series

of weekly direct instruction lessons during a communication group. Examples of the lesson plans are included in Appendix D. Although the Communication Program has 26 weekly vocabulary sets, only the first 5 sets were used during the intervention.

   Literacy Program. The Literacy Program consists of a smaller version of the Communication Program and is intended for use with individual students, rather than for whole or small groups. The books are 8 ½" by 5 ½", spiral bound, and appear throughout the program in landscape and portrait formats. The Literacy Program also includes "Sight Word Reader" books, which can be used following the Picture Reader and Comprehension books, but they were not used during the implementation of the intervention.

   Supplementary Materials. The Supplementary Materials include various weekly lesson plans and materials, focusing primarily on the words introduced through the Communication Program. An example of lesson plans for weekly story book comprehension lessons, phonics lessons, phonemic awareness lessons, art lessons, and cooking lessons, as well as examples of math activities and fine motor/writing activities are included in Appendix D.

   Apple iPad Application: "Symply Comprehension" Version 1.0. "Symply Comprehension" was used throughout the week to supplement and aid instruction in the Communication Group. The "Symply Comprehension" program gave students opportunities to generalize matching skills during the Monday communication group to an electronic rather than paper form of media. The "Symply Comprehension" program was the primary source of media used during the Friday communication group. Within the "Symply Comprehension" application, syntax and grammar instruction was supplemented by presenting various photos of previous communication group activities that had taken place during the intervention and maintenance

weeks. Students were expected to select from a preloaded bank of color coded picture symbols that described what was occurring in the loaded photo. Various screen shots of the application are included in Appendix E.

Apple iPad Application: "Symply Speaking" Version 1.0. *"*Symply Speaking*"* was used throughout various activities to aid students as a communication device. This application was designed for students who have limited communication skills and who have difficulty with categorization. A screen shot of the application is included in Appendix E.

Data Collection

Frequency counts were used to collect data across baseline and intervention phases, which represent the number of times a student correctly identified picture symbols, using verbal words, sign language, or a communication device/system. Frequency counts were later converted to percentages to reflect accuracy over the total word set. Students were tested on all 27 words as a pre-test and post-test. After the pre-test, the first word set of the intervention was introduced, and baseline data were taken for at least three days prior to introducing subsequent word sets. Data for expressive vocabulary were collected daily in the intervention phase of each word set. Each student was shown the five or six picture symbols in the intervention word set in random order, and was then asked to expressively communicate what each symbol represents. Data were collected at the end of the communication group for each participant. During the data collection process each participant was isolated from the other participants and from other students in the classroom, and a percentage of correct words was calculated. Maintenance data were collected on the last day of the week on all previously introduced word sets to determine whether initially acquired vocabulary had been maintained. During the intervention there was a three day week, as the intervention required five days for complete implementation, the students reviewed all

previously introduced vocabulary within lessons during this shortened week, and data was collected for three days on all previously introduced vocabulary. These three days also served as baseline days for the fourth word set. Upon completion of the intervention, each student was tested on all 27 words as a post-test. For further clarification see Table 3.

<div align="center"><Insert Table 3 here></div>

Research Design

The study employed a single subject research design to answer the study question. Data were collected on the number of picture vocabulary words expressed correctly, and intervention effects were evaluated within a multiple probe design across behaviors or word sets for the eight participants. A multiple probe design was selected rather than a multiple baseline design to avoid participant frustration with the study if they were required to be tested on the same words every day. The multiple probe design was implemented in the following manner. First, a comprehensive pre-assessment of each participant's ability to expressively identify the 27 picture vocabulary words was given to each participant in isolation. Then once weekly for the duration of the study a comprehensive assessment of all previously introduced picture vocabulary words was given to each participant in isolation. Second, there were five phases of intervention, where five or six words were introduced for each phase, totaling 27 words. Third, prior to each new phase of intervention, baseline data were collected for each participant on the new word set for at least three consecutive days, to determine if any of the participants had incidentally acquired the intervention picture vocabulary. Fourth, after baseline data were taken, the intervention took place, and daily assessment occurred to establish the intervention effectiveness. The same procedure was followed for implementation of the intervention in each subsequent word set across the five word sets. Fifth, a post-assessment, including all 27 picture vocabulary words

introduced throughout the study, was given to each participant in isolation, one week following the five phases of intervention, to determine overall expressive vocabulary acquisition and maintenance.

Interobserver Agreement

Training. Prior to the implementation of the study, the researcher trained two classroom paraeducators as secondary instructors and reliability observers, and on the data collection procedure as well, by following the direct instruction lesson plan included in Appendix F. For the purpose of achieving 90% agreement on the data collection procedure amongst reliability observers, permission was obtained from people who were not included in the study to be video-taped demonstrating a simulation of skills that the study participants might display, so that the reliability observers could practice the procedure during the guided practice and independent practice sections of the direct instruction lesson.

Data collection. Inter observer agreement for all data in the study was calculated by total agreement. Two observers calculated the total number of correct responses for each participant for at least 30% of all data sessions. The data collected from each observer were calculated, and the smaller number of total correct responses was divided by the larger number to determine the percentage of agreement (Kennedy, 2005). Inter observer agreement percentage was calculated at 98.5%. Random observations involving all participants were collected in 32.45% of total data sessions.

Treatment Fidelity

Throughout each week of the study two observers used a checklist of lesson plans to determine fidelity in implementing the Symple Readers integrated curriculum. The original goal for the checklist was to ensure at least 90% agreement between observers. Results for treatment

fidelity are included in the results section. The checklist is included in Appendix G.

Social Validity

In order to ensure that the intervention was feasible, useable and sustainable, a Social Validity Scale was administered to the paraeducators in the study environment. See Appendix H for the scale. The format of the scale was a six-point Likert scale, ranging from strongly disagree to strongly agree. Results for the social validity measures are reported in the results section. A second six-point Likert-type scale, ranging from strongly disagree to strongly agree, was administered to parents of the participants in the study to determine whether the proposed goals and benefits of the intervention were realized (Appendix H). Again, percentages of strongly agree, agree, slightly agree, slightly disagree, disagree, and strongly disagree are reported for each question or group of questions in the results section.

Data Analysis

The data were analyzed primarily through visual analysis in the multiple probe design. Percentage of non-overlapping data (PND) was calculated for each phase change from baseline to intervention by first determining the range of data points in the baseline condition, counting the number of data points plotted in the intervention condition, counting the number of data points in the intervention condition that fell outside the range of values in the baseline condition, then dividing that number by the total number of data points in the intervention condition, and, finally, multiplying that number by 100. This procedure was followed for each phase of baseline to intervention, and each baseline through maintenance in the multiple probe design (Gast & Spriggs, 2010). PND analysis was selected based on three advantages listed by Parker, Hagan-Burke, and Vannest (2007) which states that PND is easy to calculate, is acceptable to visual analysts, and it is highly applicable to single-case research design. While other nonparametric

calculations of effect size can be used and may be recommended for other single-case research where baseline or return to baseline may result in more variable data during the baseline phase (e.g. Percentage of data points Exceeding the Median, PEM)), for this study where the data during the baseline phases are consistently below the data points in the intervention and maintenance phases, the PND calculation is sufficient to show effect size. It is important to note that Scruggs and Mastropieri (1994) gave a general guideline to PND effectiveness where results higher than 70% would render the intervention effective, results between 50% and 70% would be considered questionably effective, and results under 50% would demonstrate no observable effect.

A z-score was also calculated for each participant to determine how each participant's expressive vocabulary gains compared to the average of the group. Z-scores, a parametric statistic, can accurately and statistically inform researchers who question the results of visual analysis and non-parametric measures, which students performed at levels significantly above or below in-group averages (Sauro, 2004). These scores can then be used to determine effectiveness of the intervention for each student within the group.

Results

The study investigated the effects of the Symple Readers integrated curriculum on acquisition of expressive vocabulary in eight elementary students with developmental disabilities. Participants were engaged in the Symple Readers integrated curriculum for five weeks with the opportunity to acquire expressive vocabulary of 27 words across five word sets. A multiple probe design across words sets was used to investigate a functional relationship between engagement in the Symple Readers integrated curriculum and acquisition of expressive vocabulary.

Participant results from pre-test to post-test ranged from a 24% increase in expressive vocabulary to a 99.86% increase in expressive vocabulary ($\overline{x}$ = 72.49%). Figures 1 and 2 graphically represent the pre- and post-test data respectively. Additionally, each participant's z-score was calculated to compare within the group participants' performance overall on the assessment following intervention. The lowest z-score was -1.82 standard deviations below the group mean and the highest z-score was 1.05 standard deviations above the group mean ($\overline{x}$= 72.49%). As individual results varied so greatly, a more in-depth analysis is described for each study participant. Average PND data for all students, from baseline to intervention, for each week, was as follows: Week One, 53%; Week Two, 60%; Week Three, 79%; Week Four, 68%; and Week Five, 78%. The average PND data from pretest to post-test of the intervention was Week One, 71%; Week Two, 73%; Week Three, 80%; Week Four, 68%; and Week Five, 78%.

<Insert Figures 1 and 2 here>

Individual Participant Data

The following information is provided in the individual participant sections: PND for each word set, percent of increase in expressive vocabulary from baseline through maintenance, and a z-score which indicates how the individual's expressive vocabulary gains compare to the group average of expressive vocabulary gains. For visual analysis of individual student data see Figures 3-10.

Student 1. Suzy's scores on the pre- and post-test were 15%, and 74%, respectively. The difference between the scores represents a 73.48% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=50% from pre-test to intervention, and 75% from baseline through maintenance; Word Set Two=80% from baseline to intervention, and

75% from baseline through maintenance; Word Set Three=60% from baseline to intervention, and 73% from baseline through maintenance; Word Set Four=100% through all three phases (i.e., baseline, intervention, maintenance); and Word Set Five=60% from baseline to intervention, and 67% from baseline through maintenance. The z-score was 0.038051, indicating a standard deviation slightly above the group norm.

<Insert Figure 3 here>

Student 2. Natalie's scores on the pre- and post-test were 4%, and 25%, respectively. The difference between the scores represents a 24.86% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=20% from pre-test to intervention, and 8% from baseline through maintenance; Word Set Two=40% from baseline to intervention, and 75% from baseline through maintenance; Word Set Three=100% through all three phases; Word Set Four=20% from baseline to intervention, and 29% from baseline through maintenance; and Word Set Five=100% from baseline to intervention, and 83% from baseline through maintenance. The z-score was -1.82812, which was significantly below the group norm.

<Insert Figure 4 here>

Student 3. Mickey's scores on the pre- and post-test were 0%, and 44%, respectively. The difference between the score indicates a 44% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=0% from pre-test to intervention, and 23% from baseline through maintenance; Word Set Two=20% from baseline to intervention, and 42% from baseline through maintenance; Word Set Three=0% through all three phases; Word Set Four=0% through all three phases; and Word Set Five=25% from baseline to intervention, and

20% from baseline through maintenance. The z-score was -1.09357, indicating a standard deviation below the group norm.

<Insert Figure 5 here>

Student 4. Mel's scores on the pre- and post-test were 4%, and 100%, respectively. The difference between the scores represents a 99.86% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=75% from pre-test to intervention, and 92% from baseline through maintenance; Word Set Two=60% from baseline to intervention, and 83% from baseline through maintenance; Word Set Three=100% through all three phases; Word Set Four=100% through all three phases; and Word Set Five=100% through all three phases. The z-score was 1.050551, indicating a standard deviation well above the group norm.

<Insert Figure 6 here>

Student 5. Julie's scores on the pre- and post-test were 4%, and 88%, respectively. The difference between the scores represents an 87.86% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=75% from pre-test to intervention, and 92% from baseline through maintenance; Word Set Two=100% through all three phases; Word Set Three=100% through all three phases; Word Set Four=100% through all three phases; and Word Set Five=40% from baseline to intervention, and 50% from baseline through maintenance. The z-score was 0.589963, indicating a standard deviation slightly above the group norm.

<Insert Figure 7 here>

Student 6. Kerri's scores on the pre- and post-test were 0%, and 84%, respectively. The

difference between the scores indicates an 84% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=25% from pre-test to intervention, and 75% from baseline through maintenance; Word Set Two=80% from baseline to intervention, and 92% from baseline through maintenance; Word Set Three=100% through all three phases; Word Set Four=100% through all three phases; and Word Set Five=100% through all three phases. The z-score was 0.441728, indicating a standard deviation slightly above the group norm.

<Insert Figure 8 here>

Student 7. Brian's scores on the pre- and post-test were 0%, and 70% respectively. The difference between the scores indicates a 70% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=100% through all three phases; Word Set Two=0% from baseline to intervention, and 9% from baseline through maintenance; Word Set Three=75% from baseline to intervention, and 70% from baseline through maintenance; Word Set Four=40% from baseline to intervention, and 29% from baseline through maintenance; and Word Set Five=100% through all three phases. The z-score was -0.09562, indicating a standard deviation slightly below the group norm.

<Insert Figure 9 here>

Student 8. Chris's scores on the pre- and post-test were 33%, and 97%, respectively. The difference between the scores indicates a 95.86% increase in expressive vocabulary after the five-week multiple-probe intervention and maintenance period. The percent of non-overlapping data for each word set was as follows: Word Set One=100% through all three phases; Word Set Two=100% through all three phases; Word Set Three=100% through all three phases; Word Set

Four=80% from baseline to intervention, and 86% from baseline through maintenance; and Word Set Five=100% through all three phases. The z-score was 0.890722, indicating a standard deviation slightly above the group norm.

<center><Insert Figure 10 here></center>

Vocabulary Word Grouping Data

Pre- and post-test data were also analyzed to determine if there was a significant difference in student ability to express words that had similar grammatical function. The focus vocabulary in the Symple Readers integrated curriculum can be grouped into five functional categories: people, actions, objects, adjectives, and prepositions/articles. All participants were given the opportunity to express each of the 27 words one time during the pre-test and one time during the post-test. The data for the individual word groupings are as follows. Students' scores for the three words in the people category on the pre- and post-test were 4.16%, and 54.16%, respectively. Students' scores for the five words in the actions category on the pre- and post-test were 0%, and 52.5%, respectively. Students' scores for the twelve words in the objects category on the pre- and post-test were 11.45%, and 84.375%, respectively. Students' scores for the four words in the adjectives category on the pre- and post-test were 9.375%, and 81.25%, respectively. Finally, students' scores for the three words in the prepositions/articles category on the pre- and post-test were 4.16%, and 54.16%, respectively.

Social Validity

Social validity was assessed with separate surveys for parents of participants and the paraeducators who helped to create the instructional environment in the classroom. The paraeducator survey was created to determine perceptions of feasibility, usability, and sustainability, as well as perceptions of benefit to the study participants, whereas the parent

survey was created to determine increase in expressive vocabulary/expressive sentence length and perceptions of overall benefit of the intervention to the participants. These surveys are available in Appendix H.

Paraeducator Survey. The paraeducator survey included results from the three paraeducators in the instructional environment, and was completed independently by each paraeducator. On questions related to perceptions of feasibility, usability, and sustainability (questions 1-6), results showed a 100% concurrence of strongly agree across the three survey participants. On questions related to perceptions of benefits to study participants (questions 7-8), results showed a 100% concurrence of strongly agree across the three survey participants.

Parent Survey. The parent survey included results from four out of eight parents of participants in the study, and was completed independently by each parent. Results ranged from slightly agree to strongly agree on all questions. On questions related to expressive vocabulary gains (1-2), 25% of survey participants slightly agreed, and 75% agreed. On questions related to overall benefit (3-4), 62.5% of survey participants agreed, and 37.5% strongly agreed.

Treatment Fidelity

During the six weeks of the intervention, five weeks introduced novel curriculum and one shorter week was used for review. During the intervention, 26 weekly lessons ensured the delivery of all components of the Symple Readers integrated curriculum to students in the study, and only one lesson was missed, an art lesson during the third week. This represents a 99.2% completion rate (129 of the possible 130 lessons taught).

Discussion

The purpose of this study was to ascertain the impact of the Symple Readers integrated curriculum on expressive vocabulary development in a sample of students with developmental

disabilities. Analysis of the data suggests a functional relationship between engagement in the Symple Readers integrated curriculum and the acquisition of 27 expressive picture vocabulary words. The average increase from baseline through maintenance was 72.49%. By the end of the study 75% (n=8) of students were expressing at least 70% of the targeted picture vocabulary words verbally, in sign language, or with a picture communication system during communication group, and during the daily assessment.

PND from baseline to intervention show a positive increasing trendline. This suggests that the intervention produced results in the expected direction, and that the effect on the students' expressive vocabulary increased as they were exposed to the curriculum over time. Additionally, PND results from pre-test to post-test demonstrate an effective intervention (i.e., PND 70% and above) (Scruggs & Mastropieri, 1994).

The difference in baseline to intervention data and also pre-test to post-test differences in each week are significant. The week one PND from baseline to intervention was 53%, but from pre-test to post-test was 71%. This is an 18% positive difference from the initial baseline to intervention to the final post-test. This suggests that students continue to have exposure and learn expressive vocabulary on information previously not acquired during the intervention. The increase in average PND scores from intervention to post-test for Weeks Two-Five were: Week Two, 13%; Week Three, 1%; Week Four, 0%; and Week Five, 0%. It is possible that if the intervention had continued, then results from weeks three, four, and five may have continued to increase.

The National Reading Panel (2000) listed five essential categories of reading instruction, including vocabulary development, but concluded that although vocabulary instruction is essential for comprehension, there is little research on the best method or combination of

methods for this instruction. This study examined the impact of the Symple Readers integrated curriculum on expressive vocabulary development for students with developmental disabilities. One of the essential components of the curriculum is the way in which vocabulary is introduced, through various direct instruction lessons imbedded in various content areas across the day (e.g., math, reading, art, cooking, fine motor/writing), and then systematically builds from one week to the next to ensure generalization and retention through repetition of the previously introduced vocabulary.

The integrated approach provided by the Symple Readers curriculum increases the number of connections that students have to focus vocabulary throughout the context of the day and week. This builds on the research by Drake and Burns (2004) in the area of integrated curriculum, and extends their research to students with developmental disabilities in the area of vocabulary development. Furthermore, Drake and Burns (2004) include the importance of themes to give context for student learning. Each week the Symple Readers integrated curriculum includes a story that gives context for student learning and provides a theme to create predictability for the other curriculum components.

Additionally, because the Symple Readers integrated curriculum is an activity-based curriculum, it provides for and is contingent upon having a group of students rather than a single student within the instructional context. One-on-one teacher to student instruction was minimal during the study, and although the majority of lessons taught during the six-week study were small group lessons rather than the typical one-on-one instruction seen in self-contained classrooms, student achievement was not adversely affected; students still gained an average of 72% expressive vocabulary from baseline. This outcome is consistent with research conducted by Ozen and Ergenekon (2011), demonstrating that information presented in multiple activities

increased student motivation and required less individualized instruction outside of context in order to gain skills.

This study supports a conclusion drawn by McDuffie, et al. (2007) that nouns or objects were more easily acquired than verbs and extends the research to show that adjectives are also easier to acquire than verbs when instructed with this particular curriculum. The participants in this study averaged an acquisition of verbs at 52% whereas they acquired adjectives and objects at 81%, and 84%, respectively. McDuffie, Sindberg, Hesketh, and Chapman also concluded that when teaching novel verbs, actions for those verbs should also be taught prior to teaching the word. This continues to lend support for the multiple modalities of vocabulary instruction included in the Symple Readers curriculum. When teaching new words within the Symple Readers curriculum, the instructor is encouraged to use sign language for all words, including verbs, as well as to implement lesson plans that encourage students to use the newly introduced vocabulary within an authentic context. This helps to make all words more concrete to students with developmental disabilities.

In a study by Mosse and Jarrold (2010) the Hebb effect was referenced as a method to bypass short-term memory deficits in students with disabilities. The Hebb effect uses repeating lists of words to encode this information directly into long-term memory. In contrast to this strategy, the Symple Readers curricular thematic approach, with its contextual repetitive exposures, provided a sufficient memory aid to increase student expressive vocabulary by at least 24.86%, in the case of Natalie and at most 99.86%, in the case of Mel. The Symple Readers curriculum also differed from methods such as fast mapping (McDuffie, et al., 2007), a method of using known words to learn novel words and the exclusion-based method of PECS (Carr & Felce, 2008), in which after the first trial incorrect choices are blocked to allow only one correct

choice, which is then immediately rewarded. These methods were not utilized as part of the Symple Readers curriculum. The current research therefore demonstrates that integrated curriculum may be utilized to help students with vocabulary acquisition and expression.

Limitations

This study is limited in its scope, due to the small sample size. While the results indicate a sizable gain in expressive vocabulary for most participants, a sample of eight students with developmental disabilities is far too small to indicate generalizability. In order to generalize these results to students with developmental disabilities, replications of the study are warranted.

Also, participants' personal variables may have confounded the results. Kerri had initial results that were poor. During word sets one and two, her progress was minimal. Two factors may account for her minimal progress. First, during the second week of intervention, Kerri received treatment in the form of corrective glasses for vision issues. Second, she arrived from another country just seven months before the intervention. Her status as a student with a developmental disability, and as an English language learner needing corrective glasses for vision, may have significantly contributed to her initial difficulties in the intervention.

Brian experienced strong results during intervention. However, his results may be confounded by the acceptable method for measuring his results. Brian has a significant hearing loss; therefore, he was tested mainly through technological means in the form of the iPad application, "Symply Speaking." The accuracy of his expressive vocabulary results during baseline and intervention phases may have been influenced by his learning of the "Symply Speaking" application at the same time that he was learning new words. When given the final post-intervention assessment, his scores may have decreased to a more realistic assessment of his actual expressive vocabulary.

Implications for Future Research

Due to the preliminary nature of the study, more research needs to be conducted on the specific components of the Symple Readers curriculum and accompanying instruction in order to determine the relevance of each component, and whether it directly affects learning outcomes. Additionally, the program in its entirety should be tested in multiple settings and with various populations to create a check point system for the validity of the curriculum and to determine to what degree it can impact not only students with developmental disabilities but other populations as well (e.g., preschool students, English language learners).

Future research on the curriculum used in this study should include other data points such as receptive vocabulary, comprehension, spontaneous expression in conversation, and increases in expressive sentence length. Studying these additional components would help researchers to determine the breadth of gains offered by the implementation of integrated curriculum. Additionally, a lengthier study would be warranted. Currently, the Symple Readers curriculum is comprised of 26 weeks of integrated curriculum. It could easily be implemented for longer periods of time to potentially obtain a broader range of positive outcomes.

Implications for Practitioners

This study found the Symple Readers integrated curriculum to effectively increase student expressive vocabulary when implemented with fidelity in a practical setting. This success can be a stepping stone to implementing more integrated curriculum in other subjects, not only in special education environments, but also in general education environments. Taking into consideration the gains made by students during this study, which focused on those with developmental disabilities, it can be expected that integrated curriculum will most likely positively affect other students without developmental disabilities to an even greater degree.

Integrated curriculum can potentially be added to the repertoire of strategies that may enhance students' acquisition of expressive language. Practitioners can use the information in this study to build upon the other tools and skills that have been established as effective for the population of students with developmental disabilities such as fast-mapping, use of picture symbols for communicative purposes, and the use of repetition to encode words into long-term memory so they can be accessed with automaticity.

Conclusions

It is clear that there is a functional relationship between the implementation of the Symple Readers integrated curriculum and the acquisition of expressive vocabulary in elementary students with a variety of developmental disabilities. Increases in the expressive vocabulary taught through this integrated thematic approach were on average 72 percent. The Symple Readers curriculum specifically uses literacy components suggested by the National Reading Panel. Further research is needed to not only validate the results of this study, but to also understand which components of the Symple Readers integrated curriculum have the greatest impact on student learning.

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Table 1

Study Participant Demographics

Name	Age	Sex	Ethnicity	IEP Classification	Medical Diagnosis
Suzy	5	Female	Caucasian	Developmental Delay	Down Syndrome
Natalie	5	Female	Caucasian	Developmental Delay	Autism
Mickey	5	Male	Caucasian	Multiple Disabilities	Chromosomal Irregularity
Mel	5	Male	Caucasian	Developmental Delay	Autism
Julie	5	Female	Caucasian	Multiple Disabilities	Down Syndrome
Kerri	5	Female	African	Multiple Disabilities	Down Syndrome
Brian	5	Male	Caucasian	Multiple Disabilities	Chromosomal Irregularity
Chris	6	Male	Caucasian	Developmental Delay	Chromosomal Irregularity

Table 2

Weekly Summary of Lessons for Integrated Curriculum

Week Day	Activity
Monday	Communication Group—Vocabulary Introduction
	Reading Group—Phonemic Awareness Word Hunt
	Reading Group—Phonics—Word Sort
	Math Group—Counting/Numbers
	Storybook Group—Comprehension—Prediction
	Fine Motor/Writing Group—Tracing
Tuesday	Communication Group—Authentic Vocabulary Activity
	Reading Group—Phonemic Awareness—Rhyming
	Reading Group—Phonics—WORD-O
	Math Group—Colors
	Storybook Group—Comprehension—Objects
	Fine Motor/Writing Group—Pinpoint
Wednesday	Communication Group—Authentic Vocabulary Activity
	Storybook Group—Comprehension—Characters
	Cooking Group
	Art Group
Thursday	Communication Group—Story
	Reading Group—Phonics—Word Wall—Sight Words
	Math Group—Colors
	Storybook Group—Comprehension—Actions
	Fine Motor/Writing Group—Coloring
Friday	Communication Group—Comprehension Activity
	Reading Group—Phonemic Awareness—Phunny Phonics
	Math Group—Counting Numbers
	Storybook Group—Comprehension—Summary
	Fine Motor/Writing Group—Dot Marker

Table 3

Research Plan

Phase	Setting	Materials	Baseline Probes	Data Collection Activity	Movement to Next Phase	Maintenance Probes
Pre-test	1:1 setting	All 27 picture symbols.	N/A	Show 27 picture symbols, one at a time, to student and ask "What does this say?" Collect data on accuracy.	Student is ready to go to Baseline with Word Set 1 after being tested on all 27 words.	N/A
Baseline – Word Set 1	Group of 5-6 students	5 picture symbols from Word Set 1	Once during intervention of Word Set 1, Probe Word Sets 3, 4 and 5. Take baseline of Word Set 2 at least 3 days prior to ending intervention in Word Set 1.	Show 5 picture symbols, one at a time and in random order, to student, and ask, "What does this say?" Collect data on accuracy. (Each student will be tested individually.)	Stable trend of percentage accuracy for at least 3 days required to move to intervention – Word Set 2.	N/A
Baseline – Word Set 2	Group of 5-6 students	5 picture symbols from Word Set 2	Once during intervention of Word Set 2, Probe Word Sets 4 and 5. Take baseline of Word Set 3 at least 3 days prior to ending intervention in Word Set 2.	Show 5 picture symbols, one at a time and in random order, to student, and ask, "What does this say?" Collect data on accuracy. (Each student will be tested individually.)	Stable trend of percentage accuracy for at least 3 days required to move to intervention - Word Set 3.	At least once during intervention of Word Set 2, probe student maintenance of Word set 1 in a 1:1 setting.
Baseline – Word Set 3	Group of 5-6 students	6 picture symbols from Word Set 3	Once during intervention of Word Set 3, Probe Word Set 5. Take	Show 6 picture symbols, one at a time and in a random order, to student, and ask, "What does this	Stable trend of percentage accuracy for at least 3 days required to move to	At least once during intervention of Word Set 3, probe student maintenance of

			baseline of Word Set 4 at least 3 days prior to ending intervention in Word Set 3.	say?" Collect data on accuracy. (Each student will be tested individually.)	intervention-Word Set 4	Word Sets 1-2 in a 1:1 setting.
Baseline – Word Set 4	Group of 5-6 students	5 picture symbols from Word Set 4	Take baseline of Word Set 5 at least 3 days prior to ending intervention in Word Set 4	Show 5 picture symbols, one at a time and in a random order, to student, and ask, "What does this say?" Collect data on accuracy. (Each will be student tested individually.)	Stable trend of percentage accuracy for at least 3 days required to move to intervention-Word Set 5	At least once during intervention of Word Set 4, probe student maintenance of Word Sets 1-3 in a 1:1 setting.
Baseline – Word Set 5	Group of 5-6 students	6 picture symbols from Word Set 5	N/A	Show 6 picture symbols, one at a time and in a random order, to student, and ask, "What does this say?" Collect data on accuracy. (Each student will be tested individually.)	Stable trend of percentage accuracy for at least 3 days required to move to complete the intervention.	At least once during intervention of Word Set 5, probe student maintenance of Word Sets 1-4 in a 1:1 setting.
Post-test	1:1 setting	All 27 picture symbols.	N/A	Show 27 picture symbols, one at a time, to student and ask "What does this say?" Collect data on accuracy.	N/A	N/A

Figure 1. Pre and Post-Test Results for All Study Participants
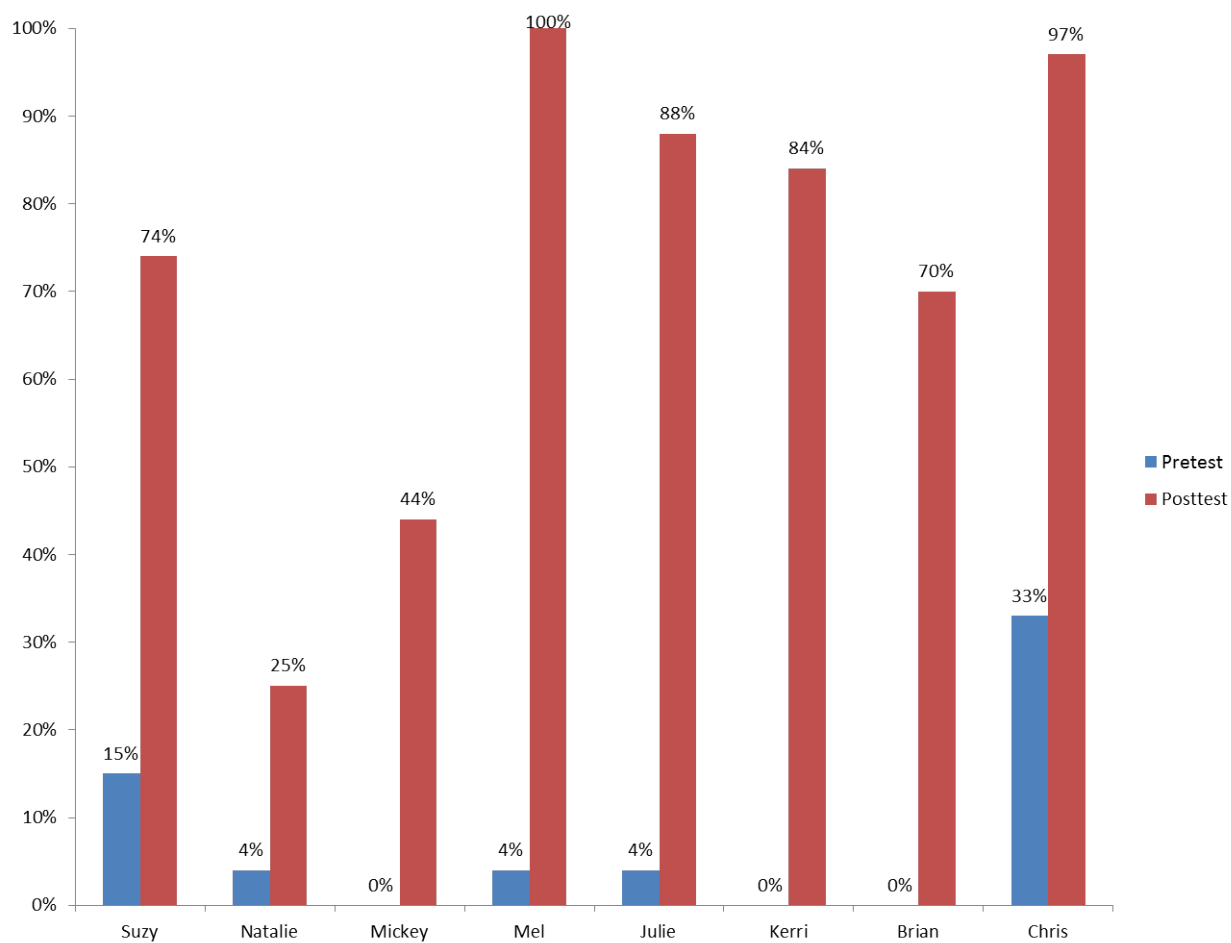
Figure 2. Pre and Post-test Group Average Results.
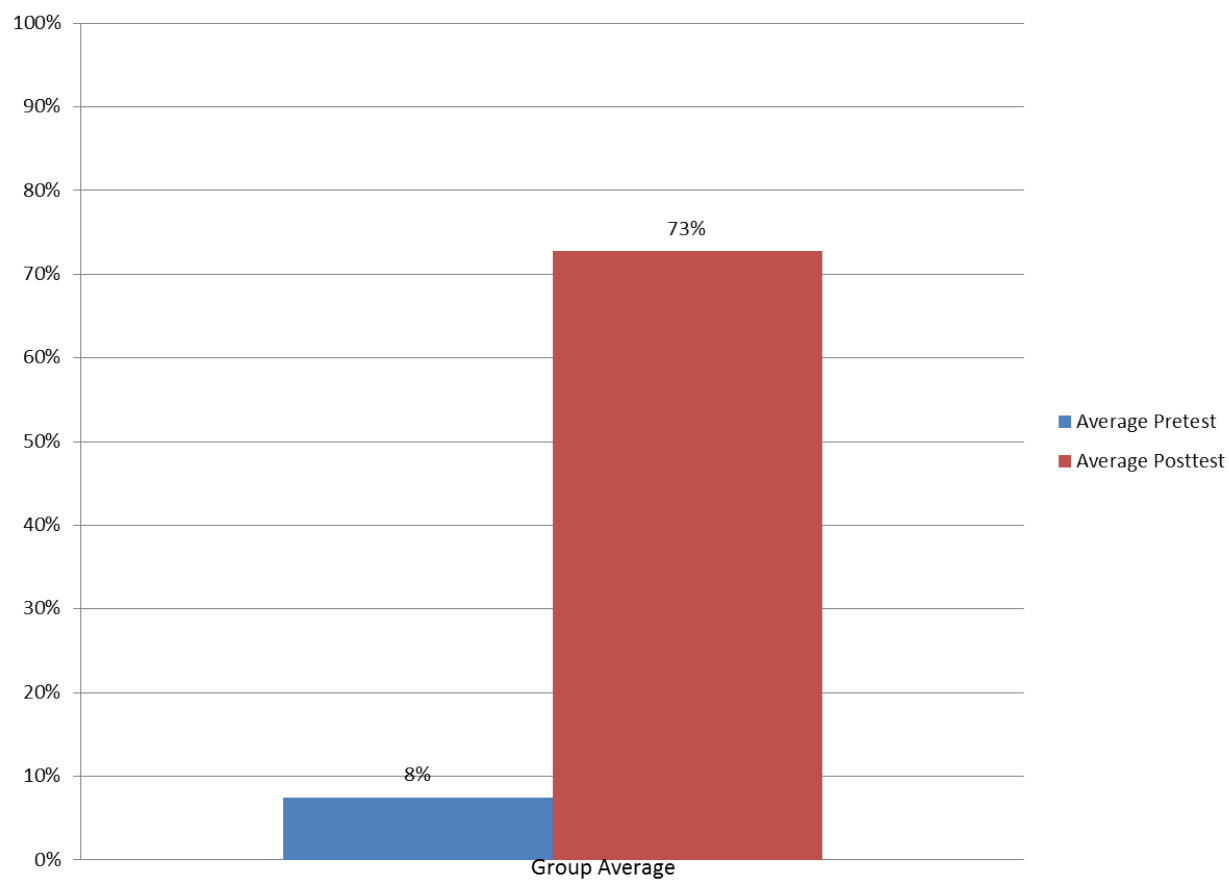
Figure 3. Multiple probe design results for Suzy across 5 word sets during the six week study.

Figure 4. Multiple probe design results for Natalie across 5 word sets during the six week study.
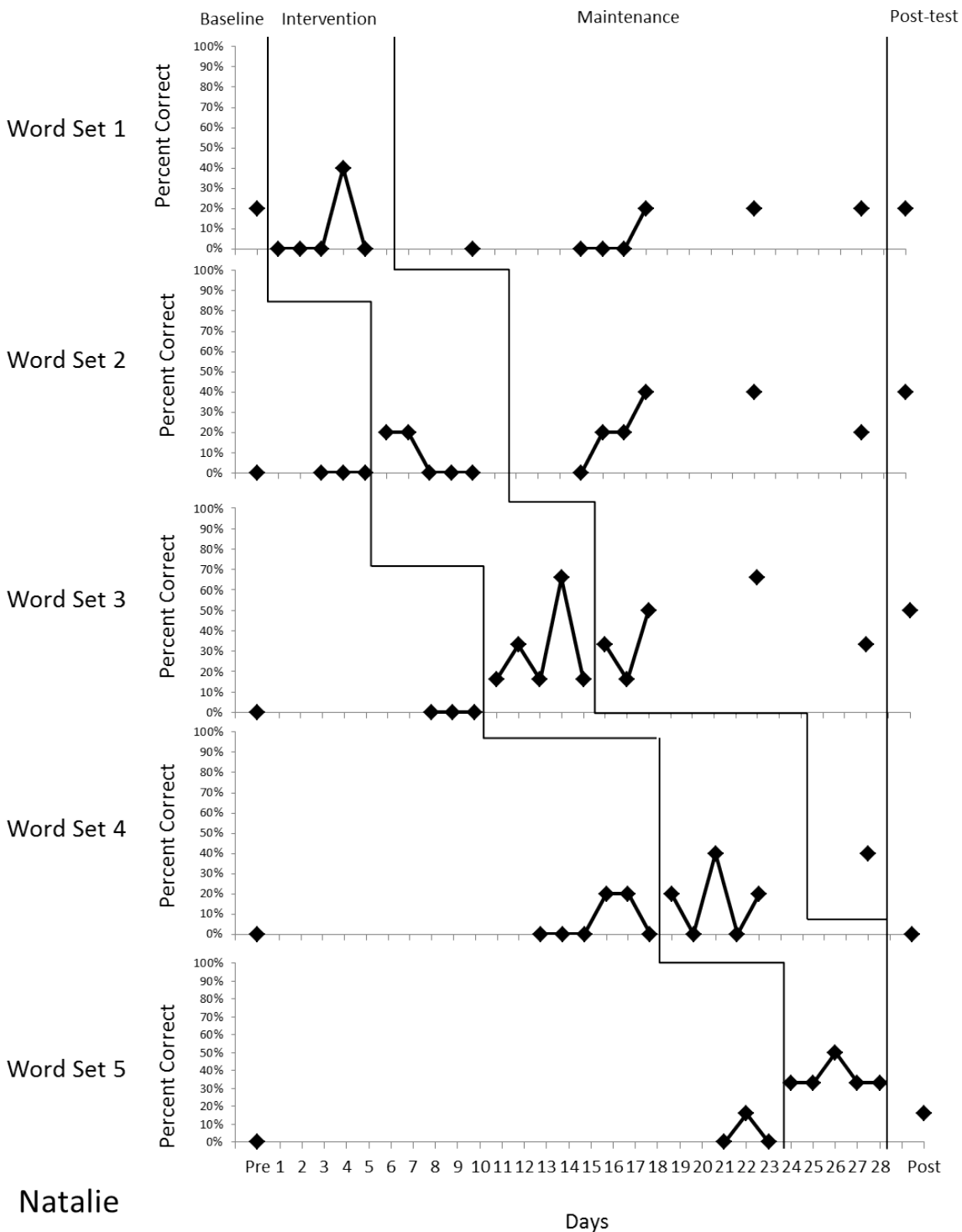
Figure 5. Multiple probe design results for Mickey across 5 word sets during the six week study.
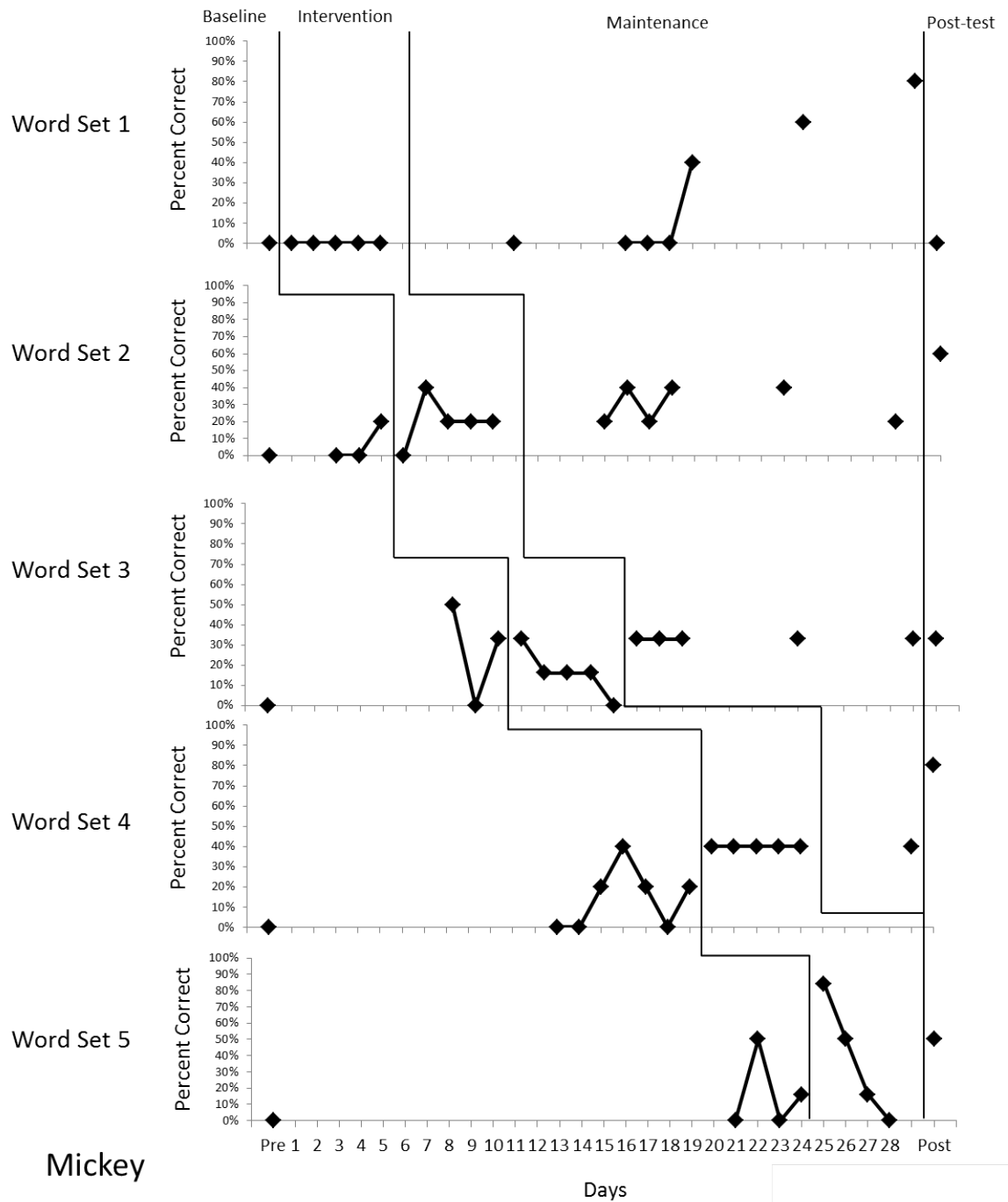
Figure 6. Multiple probe design results for Mel across 5 word sets during the six week study.
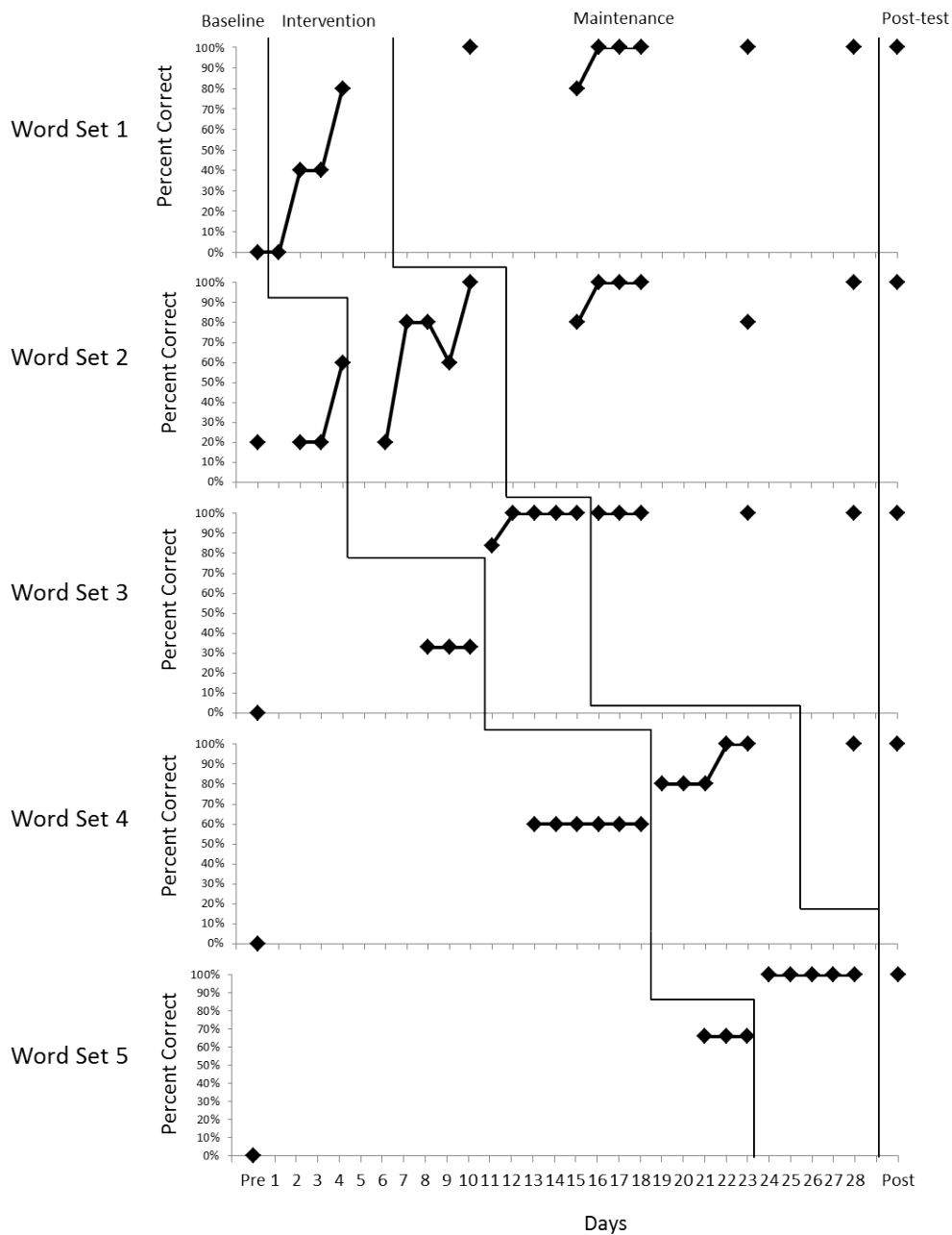
Mel

Figure 7. Multiple probe design results for Julie across 5 word sets during the six week study.
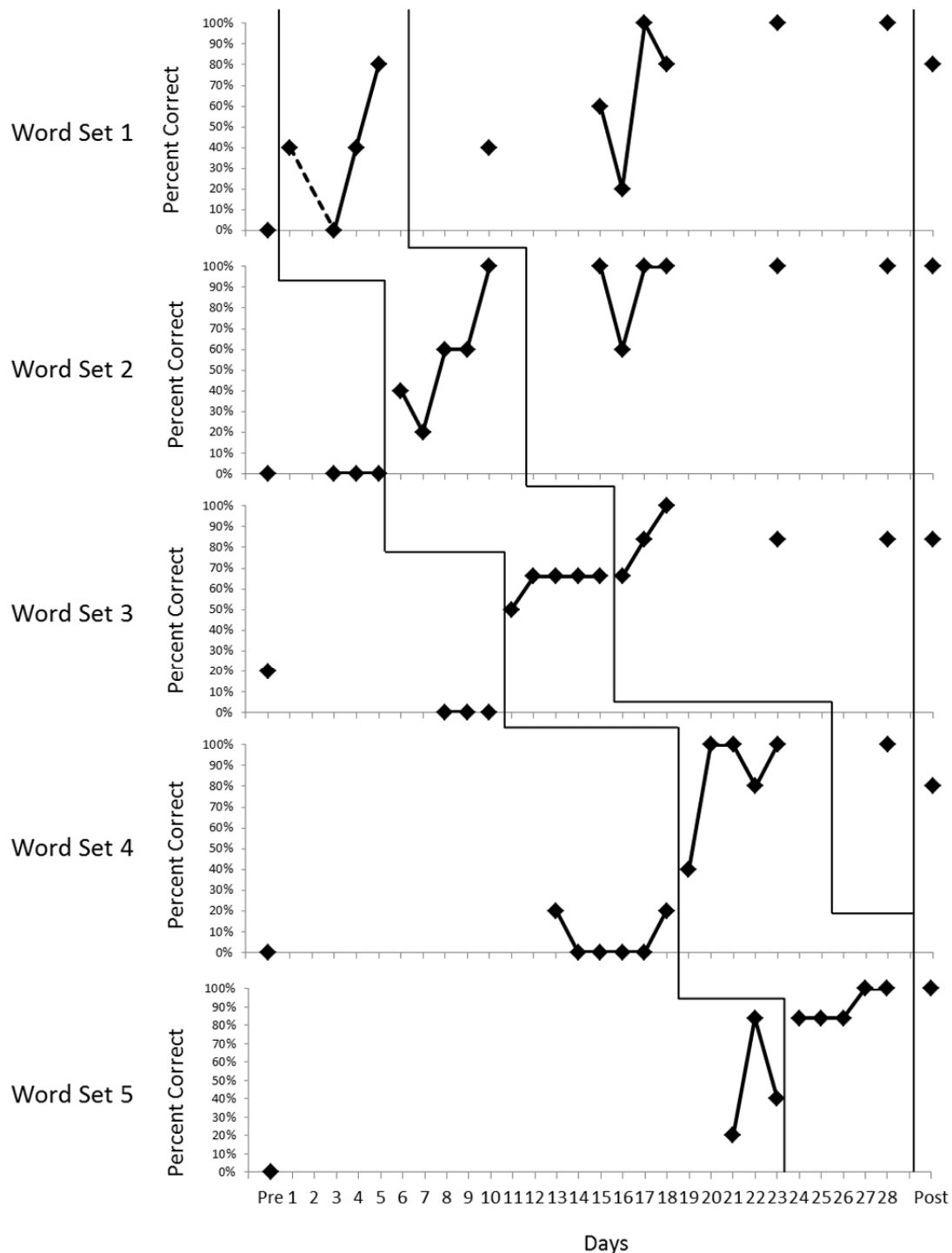
Julie

Figure 8. Multiple probe design results for Kerri across 5 word sets during the six week study.
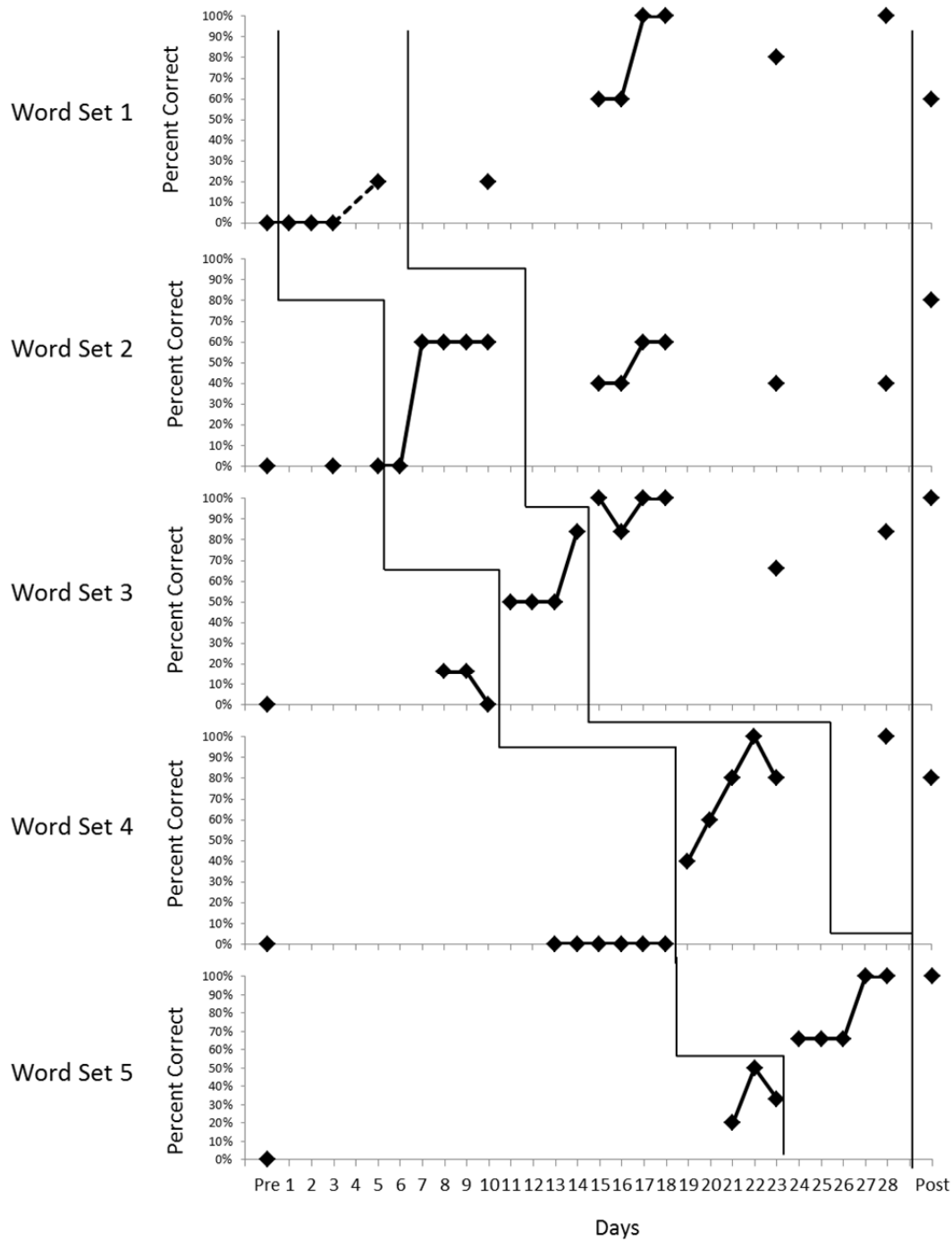
Kerri

Figure 9. Multiple probe design results for Brian across 5 word sets during the six week study.
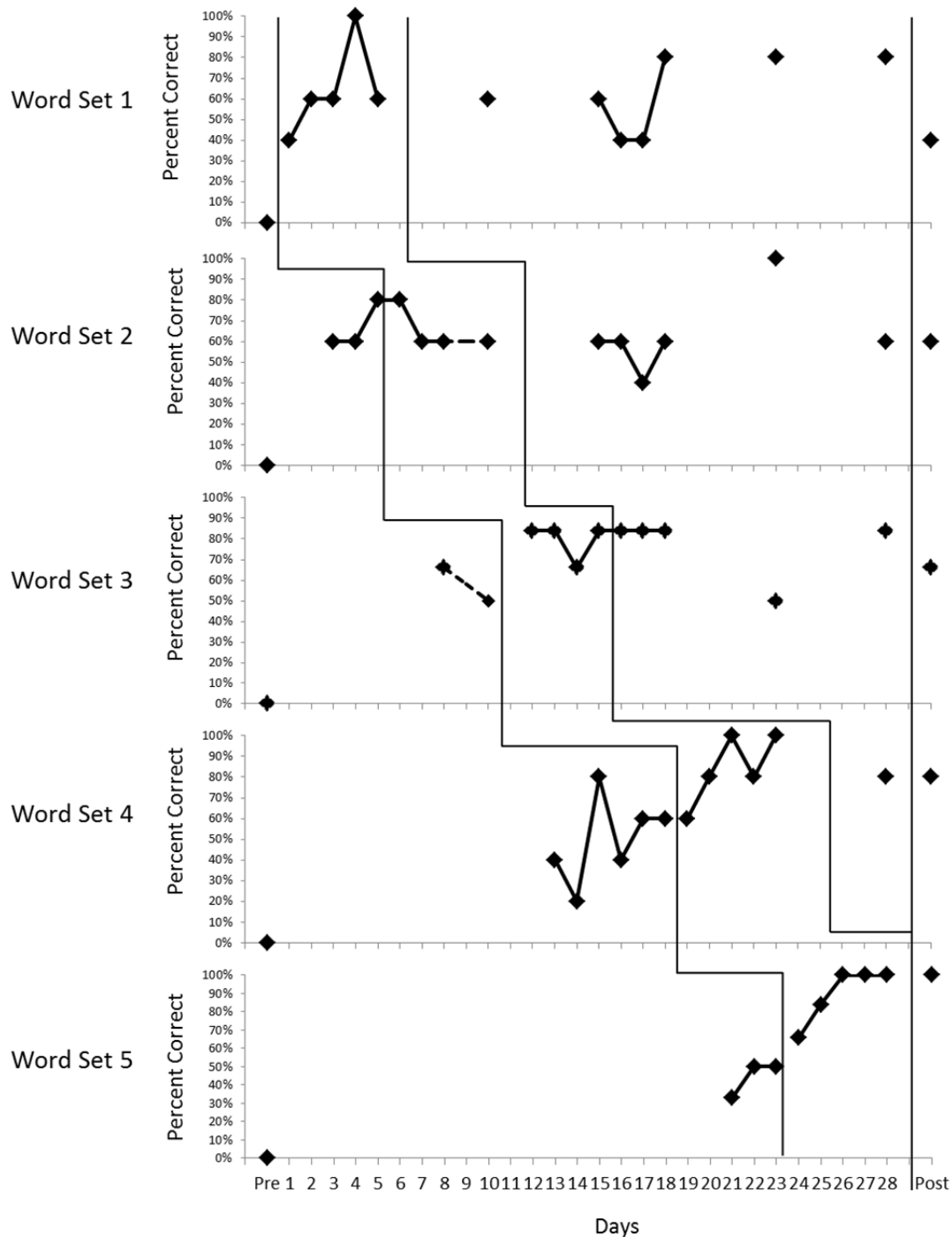
Brian

Figure 10. Multiple probe design results for Chris across 5 word sets during the six week study.
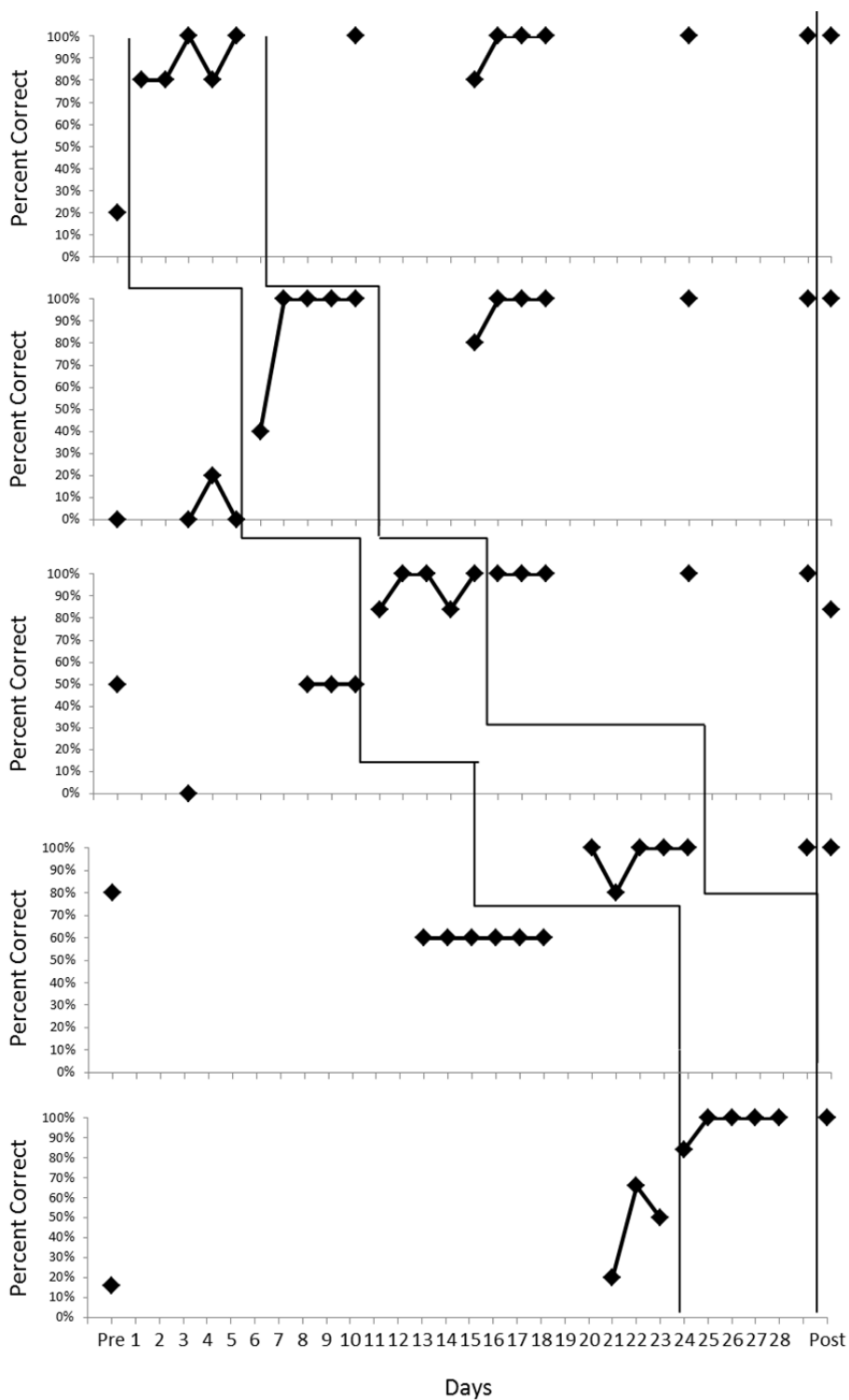
Chris

APPENDIX A: Review of Literature

According to the Merriam-Webster Dictionary, communication is "a process by which information is exchanged between individuals through a common system of symbols, signs, or behavior" (http://www.merriam-webster.com/dictionary/communication). In discussing communication it is important to note that there are both verbal and nonverbal processes within a communication exchange (Dyches, Carter, & Prater, 2012). This review will foc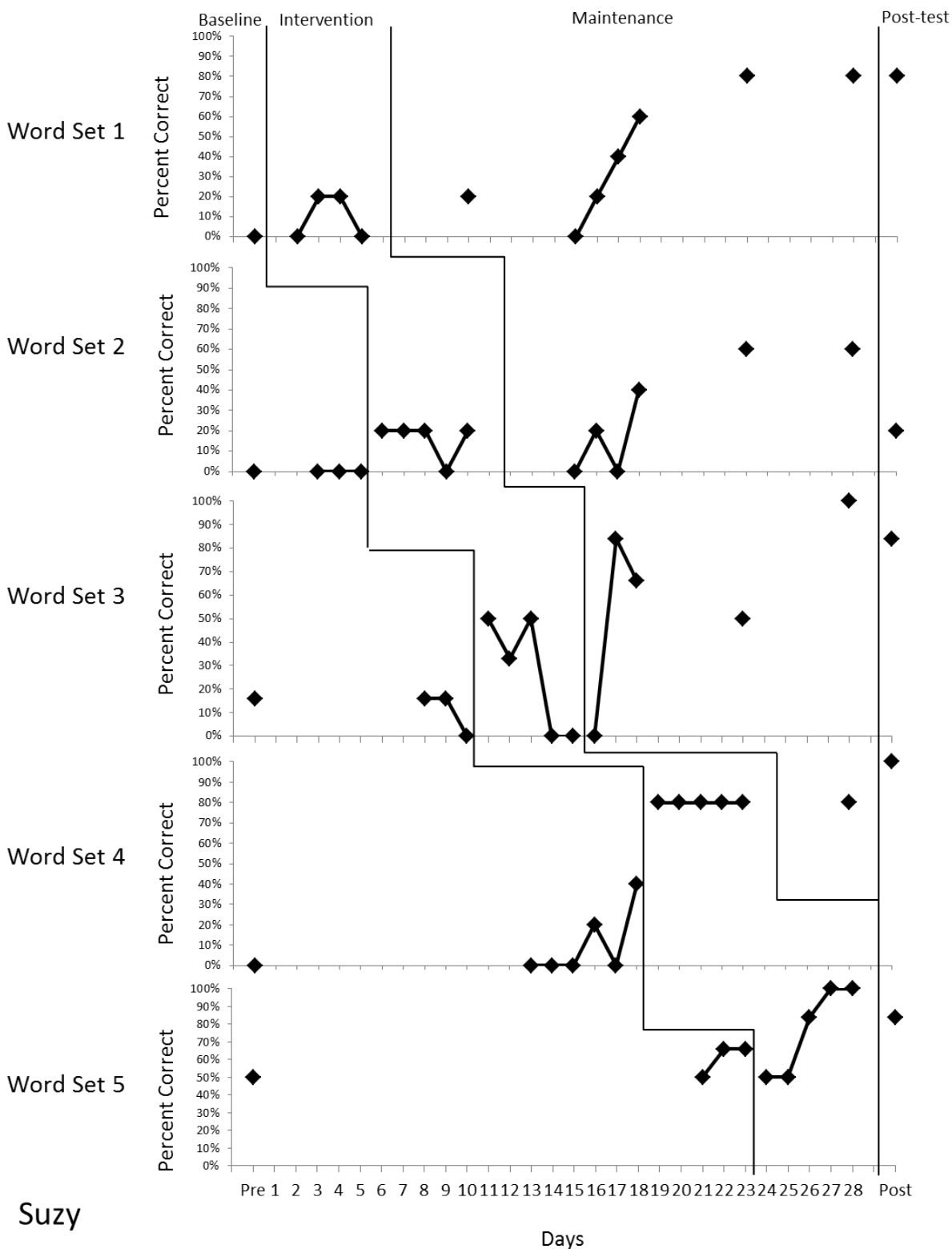us primarily on the importance of the development of verbal communication or oral language as it relates to literacy in students with severe disabilities. Nonverbal communication as it relates to literacy skills is beyond the scope of this article. The first concept that will be presented is research regarding the typical development of oral language, which will be followed by a discussion on how oral language relates to literacy skills for typically-developing students. Next, research on the development of oral language in students with severe disabilities will be presented followed by research on how oral language relates to literacy skills for students with severe disabilities.

Typical Development of Oral Language

Oral language is comprised of many components, all of which are required for an individual to have effective verbal communication. These components are interdependent and include word knowledge or receptive and expressive vocabulary, perceptual and conceptual knowledge, and knowledge of syntax and grammar (National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network, 2005).

Receptive and Expressive Vocabulary. According to Booth, Huang, and Waxman (2005), vocabulary, one of the essential components of oral language, along with comprehension, serves "as an efficient conduit for gaining information about individual objects, categories of

objects, and events, including information that is not readily available from observation and perceptual sources alone" (p. 491). Stated plainly, our vocabulary informs us about the world that we cannot empirically experience. For example, even though there are some people who have never seen the ocean personally, they can understand the concept through their vocabulary by being told that the ocean is a large body of water.

Perceptual and Conceptual Knowledge. Another essential component of oral language is comprehension, which is also described and will be referred in this review as perceptual and conceptual knowledge. Perceptual knowledge, is knowledge that comes from a readily observable source, this type of knowledge or comprehension plays a crucial role in language development, but it is not the only knowledge that young children have available to draw from as they acquire new vocabulary. Booth, Huang and Waxman (2005) have demonstrated that children as early as 1.5 years of age have conceptual knowledge -- that plays a role in language development as well. Conceptual knowledge is the way in which we interpret and classify our world based on information given to us after our perceptual experiences. This is demonstrated in their study where infants were given the name and description of novel objects (e.g. a Dax with a mom and dad or a Hod that was part of a spaceship) and were consequently able to categorize each object as animate or inanimate by relating it to their own life experience. The researchers note that this conceptual distinction is present in infants well before their second birthday, and well before their productive vocabulary reaches a word count of 50 or greater. They state that conceptual and perceptual sources of information work hand in hand, and conclude that word learning should include both perceptual and conceptual sources, and that very young learners should capitalize on a variety of inputs as they are learning new words.

An example of the interplay between perceptual and conceptual knowledge in language development is found in the concepts of fast mapping and slow mapping. In their foundational study of preschool aged children in 1978, Carey and Bartlett first coined the term "fast-mapping," which is the ability of a language learner to link a novel word with a novel object with few incidental encounters. One way that people may do this is by contrasting a novel word and its referent with a word and referent that they already know (e.g., Teachers may ask students to find the horse (novel) -- not the pig (previously mastered), but the horse. The students are able to link the word horse to the object horse because they already know that it is not the pig.) Later, in 1987, Carey enriched the understanding of this concept by introducing another phase of word learning, slow mapping. Slow mapping is the process by which a language learner increases understanding of words previously acquired in the fast mapping phase of vocabulary acquisition. An example of slow-mapping would be explicit vocabulary instruction, where the teacher defines the new word by exact definition and helps students make connections through prior knowledge etc. (as cited in Gershkoff-Stowe & Hahn, 2007 pp. 682-83).

Fast mapping can be viewed as an example of perceptual knowledge, in that learners use their sensory abilities to identify a previously unnamed object with its spoken referent. Slow mapping, in contrast can be viewed as an example of conceptual knowledge or giving additional meaning to newly acquired vocabulary through experiential interaction with the actual newly acquired vocabulary word (Gershkoff –Stowe & Hahn, 2007).

Gershkoff-Stowe and Hahn (2007) find that it is in this interchange, from fast mapping to slow mapping, that typically developing children around the age of two tend to experience a word explosion. Word explosion is a reference to the rapid word learning period around 16 to 24 months of age. In support of the concept of word explosion, they describe that children who

received repetitive training on the names of some unfamiliar objects were able to progress from learning words individually to learning many words at the same time. They further assert that as children incorporate new vocabulary and are able to make links to currently held knowledge and vocabulary the new acquisitions will be strengthened and retention of concepts will be stronger. As language learners use both fast mapping and slow mapping for word learning, they begin to organize words and concepts into larger units or systems, which accumulate into word explosion, which is the basis for vocabulary and grammatical development.

Knowledge of syntax and grammar. A final component of oral language is the knowledge of syntax and grammar. Dixon and Marchman (2007) in their study of grammar and vocabulary development, propose that grammar and vocabulary develop at the same time. Previous studies have suggested that vocabulary drives the development of grammar and that in order to develop grammar a child must have a critical mass of vocabulary. They claim that vocabulary and grammar could be within the same unified system and that the acquisition of both could be contingent upon a variable outside of that system. To support this conclusion, they assert that it is well known that the acquisition of language is influenced by the quality and quantity of speech that a child hears and that this single factor has consequences that effect a child's language and cognitive skills for years.

Role of Oral Language in Literacy

There is mounting evidence that literacy development begins long before children receive formal instruction in school, and that later reading skills are dependent upon skills acquired by children in formative years (NICHD Early Child Care Research Network, 2005). For example, Storch and Whitehurst (2002) discuss the importance of a number of prerequisite skills for reading. They state that reading requires such skills as recognition of individual letters,

translation of letters into sounds, determination of the meaning of a word and interpretation and understanding of the text as a whole. They further state that these skills, while integrated in the mature reader, initially develop separately. They point out a general disagreement in the literature on which skills (phonological abilities or oral language abilities such as semantic and syntactic abilities) play a more significant role in the development of literacy skills. They reconcile this disagreement in their study by demonstrating that although oral language ability does not play a direct role in reading ability during first and second grade, it plays an essential indirect role during the earlier stages of reading acquisition. They conclude that "early oral language abilities provide a foundation for development of advanced oral language skills necessary for successful comprehension," and that these skills should be an integral part of any preschool and elementary instructional program (p. 944).

Later, in a longitudinal study by the NICHD Early Child Care Research Network (2005), they found that comprehensive oral language skills (vocabulary, perceptual and conceptual knowledge, and knowledge of syntax and grammar) at age three were a better predictor of preschool decoding skills and subsequent reading achievement in first and third grade than vocabulary skills alone.

Nation and Angell (2006) in their study on reading comprehension state that reading comprehension is dependent first upon spoken language comprehension, and that "ultimately, an individual's spoken language comprehension limits how much he or she can understand written language" (p. 78). They refer to oral language as being the foundation of reading, and continue with the assertion that different oral language skills affect different aspects of reading. That is to say, phonological skills are closely related to decoding and word-level reading, whereas non-phonological skills are more critical for reading comprehension. They conclude that being

proficient in oral language is of utmost importance to the development of reading skills, and that interventions that are designed to improve oral language will improve reading comprehension.

Lee (2011) adds further support to the idea that early oral language development plays a critical role in the development of subsequent literacy skills. Results from her longitudinal research indicate that expressive language of 24-month old children are predictive of later language and literacy scores up to 11 years of age. She asserts that, "we have to place a strong emphasis on early vocabulary learning as young as age 2 if children (are) to become highly competent in later literacy skills" (p. 83).

Dickinson, Golinkoff, and Hirsh-Pasek (2010), in their analysis of oral language and literacy, state that early oral language skills permeate literacy skills, not only in the early elementary years, but they have far reaching effects beyond high school. They address language as more than just vocabulary instruction and state that programs that provide support for building vocabulary and conceptual knowledge will have lasting effects in later language and comprehension abilities. They conclude that language is essential for both early and later reading competencies especially as student skills turn from decoding to meaning-making.

Additional research that relates to the importance of early oral language skills refers to a Readiness Model, which implies that all prior oral language interaction is a primer for later reading skills. Connor, Morrison, and Slominkski (2006) refer to instructional techniques that are shown to increase oral language skills as they relate to literacy. Their nonexhaustive list of research-based instructional techniques include: use of difficult vocabulary, exposure to rare words, shared book reading, reading to students using dialogic reading, play, and playful activities related to learning.

Justice, Bowles, Turnbull, and Skibbe (2009) refer to school readiness as the minimal

development levels that children need to respond to the demands of school. Although the researchers mention that there is not an operationalized definition of school readiness the researchers explored six indicators of school readiness, including: language and literacy, mathematical thinking, academic competence, social skills, externalizing behavior and internalizing behavior. They propose that underdeveloped skills in any of these areas serve as risk factors that indicate poor academics and social outcomes in the later grades. While this article is not concerned with five of the six indicators of school readiness, it is important to note that according to their research, language as it relates to literacy is an important prerequisite skill for later academic success.

Oral Language Development in Students with Developmental Disabilities

According the Developmental Disabilities Assistance and Bill of Rights Act of 2000, a developmental disability means:

> "a severe, chronic disability of an individual that: is attributable to a mental or physical impairment or combination of mental and physical impairments; is manifested before the individual attains age 22; is likely to continue indefinitely; and, results in substantial functional limitations in 3 or more of the following areas of major life activity: self-care, receptive and expressive language, learning, mobility, self-direction, capacity for independent living, and economic self-sufficiency; and reflects the individual's need for a combination and sequence of special, interdisciplinary, or generic services, individualized supports, or other forms of assistance that are of lifelong or extended duration and are individually planned and coordinated."

Due to the vast variability amongst students with developmental disabilities, it is of utmost importance for the reader to understand which group or groups of students are the focus

of this review. Most of the current research on oral language development in this review, in regards to students with developmental disabilities focuses on one specific group of children, those who have been diagnosed with Down syndrome. Because of significant deviations and variability between individuals within the groups of children with Down syndrome and other unspecified developmental disabilities, researchers have found it difficult to establish oral language development patterns. That having been stated, the goal of this section of the review is to extrapolate from the research, a global understanding of oral language development in students with developmental disabilities. The following concepts will be explored: prelinguistic communication, vocabulary acquisition and memory, syntax and grammar, and pictorial symbols and communication.

Prelinguistic communication. Abbeduto, Warren, and Conners (2007) state there have been no studies of prelinguistic communication interventions on children with Down syndrome 15 months of age or younger. Given that children with Down syndrome are diagnosed at or before birth, the researchers conclude that if practitioners intervened earlier, the interventions could have the potential to be more effective than they currently are. They also state that although the developmental strengths and weakness of children with Down syndrome may suggest to educators and therapists that teaching nonverbal signs and symbols could be an effective means of intervention, there have been no randomized clinical trials that have addressed this issue.

Abbeduto and colleagues (2007) consider two topics of treatment and education regarding children and adolescents with Down Syndrome: prelinguistic communication intervention and acquisition of literacy skills. The researchers present other programs (e.g., Responsivity Education/Prelinguistic Milieu Teaching) that in randomized trials were not shown

to be highly effective, due to the low intensity of direct intervention (children were seen by the therapist for only one hour a week for a period of six months), and conclude that the best known prelinguistic communication intervention to date is the Hanen program. Within the program speech-language pathologists teach groups of parents a parenting style that is highly responsive to communicative attempts of their children which promotes communicative turn-taking and creates opportunities to model words and other language skills.

Recently, Zampini and D'Odorico (2009) found a positive correlation between communicative gestures and vocabulary development in children with Down syndrome. They cite research that discusses the importance that communicative gestures play in typical development of oral language around 8 to 10 months of development. This connection, though delayed in children with Down syndrome, was established in their study through an assessment of each child's verbal language comprehension level at 36 months and a subsequent assessment of vocabulary development at 42 months. The researchers conclude that nonverbal communication or communicative gestures are an important base for development of vocabulary in children with Down syndrome.

As an additional support for acknowledging communicative gestures in children with varying disabilities, Toth (2009) in her study of non-hearing impaired children with Autism, Down syndrome, Fetal Alcohol Syndrome, and Intellectual Disabilities found that the teaching of American Sign Language (ASL), through a DVD as well as individualized instruction, was an effective means of increasing communication skills. However, the degree to which each child acquired sign language did vary, and amongst the youngest group of children with disabilities studied, children with Down syndrome outperformed children with other disabilities. She also noted that children with severe Autism often needed real life representations of items rather than

the video screen representation of vocabulary. Additionally, she found that involving all stakeholders (e.g. parents, grandparents, siblings, teachers and other professionals) in the sign language learning process seemed to increase children's sign language acquisition rate.

Vocabulary acquisition and memory. An important component related to oral language development is the need to retain novel words in short-term memory in order to facilitate long term memory retention, which works unhindered in typically developing children. In children with intellectual disabilities, specifically children with Down syndrome, and children with Williams Syndrome this process is greatly impaired (Jarrold, Nadel & Vicari, 2008). This is one of the many obstacles that children with disabilities face in oral language development. In order to bypass this problem Mosse and Jarrold (2010) conducted a study on the Hebb effect in children with Down Syndrome. The Hebb effect, established by Hebb in 1961, is a process whereby a person repeatedly recalling a list of items can begin to store that list of items in long-term memory rather than in the short-term memory. Mosse and Jarrold (2010), conclude that the Hebb effect is evident in children with Down syndrome, and that in educational and therapeutic environments, when working with students who have short-term memory impairments, it may be more beneficial to present new information multiple times with indirect associations, rather than presenting that information one time with explicit instruction.

McDuffie, Sindberg, Hesketh, and Chapman (2007) studied adolescents with Down syndrome in regard to fast-mapping skills. As referred to previously, fast mapping is the ability to relate a novel word to a novel object with few incidental encounters. They postulate that because of their strengths in receptive vocabulary, children with Down syndrome may show a relative strength in fast-mapping, but due to their auditory processing difficulties, may have difficulty learning new words that are phonologically complex. Though their findings indicate

that fast-mapping is generally difficult for adolescents with Down syndrome, due to short-term memory issues, they found that it was more difficult for students with Down syndrome to fast-map novel words when they were introduced through stories as compared to event based interaction (e.g., in a game). The students were also more likely to acquire novel nouns than verbs, but the researchers explained that this could have been because of the complexity of learning a motor movement attached to the verb versus a forced choice task attached to the noun. They suggest that practitioners make novel actions familiar before attaching a word to the action, so that students with Down syndrome can "fast map" one component at a time.

Vandereet, Maes, Lembrechts, and Zink (2010), studied the predictability of expressive vocabulary acquisition in children with intellectual disabilities. Their findings indicate vocabulary comprehension as the only unique predictor of initial expressive vocabulary in children with intellectual disabilities.

Abbeduto, et al., (2007) studied language development from the prelinguistic period to the acquisition of literacy in children and adolescents with Down syndrome, and found results congruent with other research regarding specific deficits in short-term memory. They also report the relative strengths that children with Down syndrome have in the areas of imitation and gestural communication, and significant weaknesses in the areas of expressive language. When considering the development of vocabulary, they report findings in congruence with McDuffie, Sindberg, Hesketh, and Chapman (2007) where the area of vocabulary comprehension, but not sentence comprehension is an area of relative strength for students with Down syndrome.

Syntax and grammar. McDuffie, Sindberg, Hesketh, and Chapman (2007) identified that in students with developmental disabilities a coexisting link in fast-mapping comprehension was vocabulary comprehension. This link was not the same in typically developing students.

Their concurrent correlate of fast-mapping comprehension was syntax comprehension.

Abbeduto and colleagues (2007) reported that syntax is an area of special challenge for children and adolescents with Down syndrome and that there were no studies to date on the processes underlying syntactic learning in Down syndrome. Due to lack of research at the time they concluded that were no effective learning strategies that educators or therapist could employ to intervene in this area. McDuffie, Sindberg, Hesketh, and Chapman (2007) matched their conclusion that the language profiles of children with Down Syndrome generally have impaired expressive syntax and grammatical markers relative to their knowledge of vocabulary. However, they determined that fluctuating levels of hearing loss could account for their problems with production of grammatical markers, which could ultimately affect their expressive syntax as well.

Jarrold, Thorn, and Stevens, (2008) report the possibility that verbal short term memory is not the main cause of the lack of vocabulary acquisition in students with Down syndrome, and that when verbal short term memory is accounted for, phonological awareness becomes the deciding factor in new or novel word acquisition. Phonological awareness is the ability by which people process and manipulate component speech sounds in their language. In their study, individuals with Down syndrome were asked to either find the novel object when presented with three objects, upon hearing the novel word (they refer to this phase of trials as referent learning) or to identify the novel word linked to the novel object when presented with three novel words (they refer to this phase of trials as form learning). When given the names to novel objects in the referent group, the names of the objects were phonologically distinct (e.g. garb, joop), as opposed to names in the form group where the names of the objects were phonologically similar (e.g. deeve, teeve). Individuals with Down syndrome performed significantly better in the

referent group than in the form group leading the researchers to come to the aforementioned conclusion, that phonological awareness rather than verbal short term memory alone, could determine an individual's ability to acquire new vocabulary. McDuffie, Sindberg, Hesketh and Chapman (2007) show some support for this possibility in that they refer to children with Down syndrome as having issues with hearing loss that often impairs their ability to process phonological similar words. However, Jarrold and colleagues (2008), do state that a limitation of their study could be the complexity and phonological similarity of the words they used for students with Down syndrome to fast map, and recommend for further research that phonologically distinct words should be used.

      Pictorial symbols and communication. As stated previously, many students with developmental disabilities have difficulty with expressive language. Due to their deficits in expressive language, pictorial symbols are often used to compensate for the gap in their receptive understanding of language and their productive use of language. These symbols are representations of actual objects, actions, descriptive words, people, etc., and are used to help aide students in their communication attempts. Low-tech and high-tech devices are often filled with these symbols and are often referred to as augmentative and alternative communication (AAC) systems. Following is research that includes different strategies used to aide students in acquiring vocabulary via pictures.

      In studying the acquisition of novel words in students with autism and severe linguistic impairments, Carr and Felce (2008) compared the effectiveness of the Picture Exchange Communication System's (PECS) error correction procedure with an exclusion based method. The PECS is one form of AAC developed by Andy Body and Lori Frost in 1985. In the PECS, students are given the opportunity to ask for a high-preference or low-preference item with

pictures. When students react negatively to items, communication partners are instructed to show the correct picture, prompt for the correct picture, and praise without giving the item. After this the instructor or communication partner will have students perform a switch, or a distracting behavior such as imitating a gross motor movement, and then present both high and low preference items with corresponding pictures again. If students give the correct picture the item is then given. The exclusion-based method by Carr and Felce (2008) is simpler, where teachers present one target item with a corresponding picture plus a distractor picture. When students reach for the distractor, teachers block access to the picture, students are then forced to choose the picture that corresponds with the item, and then allowed to exchange the picture for the item. Their findings suggest that the exclusion-based method for teaching novel picture to object combinations is more effective than the error correction procedure in the PECS. Additionally, they suggest that the social validity for the exclusion-based method for teaching might be higher because it takes less time for teachers to help students form connections between nouns and their referents.

Wilkinson, Carlin, and Thistle (2008) discuss the importance of visual processing when teaching students with intellectual disabilities to use AAC devices. They report that there is some evidence for using background color to categorize symbols, as well as to attract visual focus, but that very little attention has been paid to the internal color of symbols. In their study of students with Down syndrome, they found that it was easier for the participants to locate a symbol when symbols that shared similar internal colors were grouped together. Internal colors refer to the colors within the actual symbol, rather than the background. They suggest to clinicians who create AAC displays that, at least when there are relatively few symbols for students to learn, they should cluster symbols with similar internal colors together. They talk about the

significance that the effect of coloring cuing might have in individual students but caution

clinicians to assess to what extent each student may benefit from color cuing and in what ways

(e.g., background color cues for categorization, internal color cues for actual items that have a

typical color). They conclude that much more research on visual processing of students with

varying intellectual disabilities is warranted, and that their study is just an initial step to defining

how appearance of curriculum might improve student communication.

Reading Instruction and Literacy of Students with Intellectual Disabilities

Abbeduto, et al., (2007) state that despite the emphasis society puts on people becoming

literate, little has been done to identify ways to teach students with Down syndrome or other

developmental disabilities advanced reading skills, thus, most remain illiterate. In the following

paragraphs a discussion of some instructional strategies that have been shown to benefit students

with developmental disabilities in the acquisition of literacy skills will be given. These strategies

include: time delay, comprehensive approach to reading instruction along with direct instruction,

and integrated curriculum.

Browder, Ahlgim-Delzell, Spooner, Mims and Baker (2009) have found that in teaching

students with developmental disabilities, there is strong evidence that time-delay is an effective

intervention. Time-delay is considered to be an errorless learning procedure wherein there is a

short time period between a stimulus presented by a teacher and a prompt given by the teacher

that elicits a response. The focus of their study was to determine if time-delay was an effective

intervention for teaching picture and word recognition skills to students with severe

developmental disabilities. In their review of 22 different experiments, they found strong

evidence to suggest that time-delay is an effective intervention for teaching sight words to

students with mild to moderate intellectual disabilities, but also promising findings of its

application for teaching picture recognition skills to students with significant developmental disabilities.

Two studies report the importance of a comprehensive approach to reading instruction in students with intellectual disabilities. Allor, et al. (2010) and Allor, Mathes, Champlin and Cheatham (2009) note that in the past, reading instruction for students with developmental disabilities has focused primarily on sight word instruction, but that recently, research has shown that children with developmental disabilities should be instructed in reading in the same way that their non-disabled peers are taught, with instruction linked across five main categories: oral language and vocabulary; phonological awareness; phonics and word recognition; fluency; and comprehension. These are the same components that the National Reading Panel identified as essential components of any literacy program (National Institute of Child Health and Human Development, 2000). Both studies provide data from the implementation of the Early Interventions in Reading program, which uses direct instruction along with a number of other strategies to help students gain essential skills in reading.

Allor, et. al (2010) report the importance of a comprehensive approach to reading instruction; however, they state that few studies have been conducted on comprehension of readers with developmental disabilities. Allor, Mathes, Champlin, and Cheatham (2009), state that the lack of a comprehensive approach to reading instruction for students with developmental disabilities stems from teachers lacking instructional skills themselves. They conclude by asking teachers of students with developmental disabilities to seek out additional resources that encourage a comprehensive approach to reading instruction, and urge teachers to make certain that the reading instruction that they give makes meaningful connections for their students.

The National Reading Panel,a meta-analysis of the research on reading instruction,

included vocabulary instruction as an essential component of comprehension. They referred to specific ways to teach vocabulary, which included: incidental encounters in the context of a story book reading, learning words before reading, and including the words in various contexts so that the students have repeated exposure to the word. They concluded that although it is understood that vocabulary instruction is essential for comprehension, there is little research on the best method or combination of methods for vocabulary instruction (National Institute of Child Health and Human Development, 2000).

While the research on vocabulary instruction may be slim, there is evidence to suggest that integrated curriculum, or an interdisciplinary approach to instruction, when instruction in all subject areas revolves around a common theme, can improve student motivation and give students a context for learning new information that is meaningful (Drake & Burns, 2004). Drake and Burns, refer to recent research on the brain that notes that information is best learned when students make connections --the more connections students make, the better they learn.

Research by Ozen and Ergenekon (2011) regarding activity-based intervention supports the concept of integrated curriculum. In their review of literature, they found that when teaching children with developmental disabilities through activities, the students had increased motivation as well as increased generalization. They also found that because information was presented in multiple activities throughout the context of the day, students needed less individualized instruction outside of context to gain skills.

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APPENDIX B: Consent Form

Effects of the Integrated Symple Readers Curriculum on Expressive Vocabulary Acquisition in Elementary Students with Developmental Disabilities

Consent to be a Research Subject

Introduction

This research study is being conducted by Loralene Edvalson, a special education teacher in pursuit of a master's degree in special education, at Brigham Young University to determine the effect of an integrated curriculum on expressive vocabulary development of elementary students with developmental disabilities. Because your child is a member of Loralene Edvalson's class during the 2012-13 school year, and has the required prerequisite skills for the study, you and your child are invited to participate. For the crucial need for your child to develop this communication skill, you and your child are invited to participate in this study in Loralene Edvalson's class during the 2012-13 school year.

Procedures

If you agree to allow your child to participate in this research study, the following will occur:

- Your child will be given a pre-test in which he/she will be asked to name 27 picture symbols either verbally, using sign language, or with a communication device.
- Your child will engage in various daily activities that reinforce the learning of specific sets of weekly vocabulary words contained in the Symple Readers Curriculum. Data will be recorded daily regarding your child's progress in learning vocabulary words. This curriculum was written by the researcher for students with developmental disabilities, and includes books and activities created specifically to focus on weekly vocabulary. These activities include:
  - o Daily communication groups taught by the researcher that last approximately 30 minutes.
  - o Daily storybook comprehension groups taught by the researcher that last approximately 30 minutes.
  - o Phonics and phonemic awareness groups taught four times during the week by the researcher or teacher assistants that last approximately 40 minutes.
  - o Math activities taught four times during the week by the researcher or teacher assistants that last approximately 10 minutes.
  - o Writing activities taught four times during the week by the researcher or teacher assistants that last approximately 10 minutes.
  - o A weekly cooking activity taught by the researcher that lasts approximately 40 minutes.
  - o A weekly art activity taught by the researcher that lasts approximately 40 minutes.
  - o A weekly gross motor activity taught by the researcher or teacher assistants that lasts approximately 30 minutes.
- Your child will be given a post-test in which he/she will be asked to name 27 picture symbols either verbally, using sign language, or with a communication device.
- The total time commitment per week for your child will be 10 ½ hrs. By participating in this study your child will not lose out on educational activities geared towards attaining his/her individualized goals.

- The research will take place within the special education classroom where your child receives his/her special education services in both group and one-on-one instruction.

Risks/Discomforts

There are minimal risks for participating in this study. You may feel that by allowing your child to participate in this study your child will miss out on his/her individualized services and opportunities to make progress on goals indicated within his/her Individualized Education Program (IEP). I ensure that your child will receive instruction on his/her individualized goals.

Benefits

While I cannot ensure that your child will benefit from this research study, there may be potential benefits that include an increase in your child's vocabulary, and ability to form and speak in longer sentences.

Confidentiality

Data will be collected by the researcher and teacher assistants and will be kept in a secure location. Only the researcher and the authorized teacher assistants will have access to the data. At the conclusion of the study, all identifying information will be removed and the data will be kept in the researcher's locked cabinet as well as on a password-protected computer.

Compensation

Participants in this study will not be compensated outside of the regular classroom reinforcement system.

Participation

Participation in this research study is voluntary. You have the right to withdraw your child at any time or refuse to participate entirely without jeopardy to your child's education.

Questions about the Research

If you have questions regarding this study, you may contact Loralene Edvalson B.S., at (801) 836-9845 or loralene.edvalson@nebo.edu or her advisor, Dr. Tina T. Dyches, Ed.D., at (801) 422-5045 or tina_dyches@byu.edu.

Questions about your Rights as a Research Participant

If you have questions regarding your rights as a research participant, you may contact the Institutional Review Board Administrator at (801) 422-1461, A-285 ASB Campus Drive, Brigham Young University, Provo, UT 84602, irb@byu.edu.

I have read, understood, and received a copy of the above consent and desire of my own free will for my child to participate in this study.

Parent Signature:_____Date:_____

Child's Name : _____

APPENDIX C: Recruitment Letter

Dear Parents/Guardians,

For the past year I have been working towards completion of my Master's Degree in Special Education. As a portion of the course work I have the opportunity to complete a thesis. For my thesis I have chosen to focus on the development of expressive vocabulary through using an integrated curriculum. As your child is a member of my class, I am hoping that you will give your consent for him/her to participate in the study. The goal of the study is to increase your child's ability to verbalize or communicate with these words as they will be added to his/her expressive vocabulary.

To qualify for participation in the study, your child must have the following pre-requisite skills at 75% accuracy or better:
- matching color cards to identical color cards,
- matching object to picture, **and**
- matching picture to identical picture,

These skills are requirements to being successful within the Symple Readers integrated curriculum which we will be using to teach expressive vocabulary.

If your child does not qualify for participation in the study, then your child will still participate in the Symple Readers Curriculum as it will still benefit them in the areas of reading, math, and writing, but data will not be taken as frequently on his/her expressive vocabulary.

See the attached consent form for a description of the study procedures. If you would like your child to participate in this study, please sign and date the consent form and return one copy to me by _____.

I sincerely thank you in advance for considering to allow your child to participate in this research study.

Loralene Edvalson
Special Education Teacher
Wilson Elementary
801-465-6060

APPENDIX D: Instrument

Pre-test/Post-test Vocabulary Acquisition Data

Objective: Students will expressively identify each word (sign/say/use a communication device), during a one-on-one probe session, with at least 80% accuracy across all words.

Student:		Date:		Examiner:	

Word Set 1			Word Set 2		
	Correct	Incorrect		Correct	Incorrect
boy			Bus		
find(s)			Car		
friends			In		
girl			On		
the			ride(s)		

Word Set 3			Word Set 4		
	Correct	Incorrect		Correct	Incorrect
ball			Cookie		
candy			give(s)		
drink			Mouse		
more			Red		
toy			Yellow		
want(s)					

Word Set 5			Directions to Examiner:
	Correct	Incorrect	
cow			1. In a quiet room or space in the classroom, sit across the table from the student.
pig			2. Present each symbol representing each word in highlighted word sets to the student in random order and ask, "What is this? or "What does this say?" (Pre/Post-test will not be presented in random order.)
see(s)			3. If the student answers correctly within 10 seconds, mark X in the correct column. If the student does not answer correctly within 10 seconds, mark an X in the incorrect column. If the student answers incorrectly, but corrects him/herself within 5 seconds, mark answer as correct and note self-correction (SC) and the word in the comments box.
sheep			
horse			
one			Comments:

- Acceptable forms of communication include, verbal, sign language, or AAC device. (The device's picture will not be an identical match to the picture symbols.)
- Highlighted word sets will have data collected on them. Leave the other words sets blank.

APPENDIX E: Sample Lesson Plans

Monday (Week 1): Communication Group (20–30 min.)

VOCABULARY INTRODUCTION: Lesson Objective: Given various materials and picture representations of boy, finds, friends, girl, and the, students will match picture to picture and attempt to sign or say each word across all words with at least 80% accuracy maintaining the skill for at least 2 months.

Materials:	Student Considerations:
• Communication Program Book 1 (Hide and Seek) • Apple Ipad/Ipad 2 • Symply Comprehension App • Hide and Seek Matching Activity	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today you will be learning some new words, it is important to learn new words because…)	Guided Practice: Give each student opportunities to match words both on paper as well as on the Symply Comprehension App. Take data on student ability to match picture to picture as well as on expressive (signing or saying the word) vocabulary attempts across all pictures.
Anticipatory Set: • Review classroom rules/expectations • I will show you a word and say/sign the word, then you will say/sign the word. • After we have seen each word, we will read the story "Hide and Seek." • While we are reading the story, I want you to listen for our words of the week. (READ THE STORY HERE)	When students can match picture to picture correctly across all pictures and attempt to sign/say each word, with at least 80% accuracy with prompting, they are ready to move on independent practice. Independent Practice: When students can match picture to picture across all pictures and will attempt to sign/say each word, with at least 80% accuracy, they are ready to move to the next activity.
Input/State skill in small steps: 1. Now you will have the chance to match all of our words. 2. When we match words we look at the picture, and find the same picture. 3. We say the word/sign and say that's a match or they are the same.	(NOT ALL STUDENTS WILL REACH INDEPENDENT PRACTICE WITH WORDS BEFORE TUESDAY'S ACTIVITY, IT IS COMMON FOR STUDENT'S TO PICK UP ON WORDS THROUGHOUT THE WEEK.)
Model: After reading the story without stopping model steps 1-3 making sure to THINK OUT LOUD as you model each step.	**Closing**: Review each word as a group before allowing the students to transition to their next work area. Transition students to next work area.

Tuesday (Week 1): Communication Group (20-30 min.) (Optional)

AUTHENTIC VOCABULARY ACTIVITY: Lesson Objective: Given various materials and picture representations of boy, finds, friends, girl, and the, students will participate in an authentic vocabulary activity to help increase their abilities to expressively identify and use the words with at least 80% accuracy maintaining the skill for at least 2 months.

Materials:	Student Considerations:
- Picture representations of: boy, finds, friends, girl, and the - Apple Ipad 2 1. With Camera - Various boys and girls placed around the room, some hooked together as "friends"	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today you will participate in an activity to help you remember the words that we are learning this week, it is important that we remember the words that we are learning so that we can use them through out our day.")	Each student will have at least 2 opportunities to find boys, girls, and friends. Take data on students' abilities to find a boy, a girl, or some friends as well as on their abilities to match the object of boy, girl, or friends with the picture. Guided Practice: When students can find and match boy, girl, and friends, to the correct picture with at least 80% accuracy with prompting, they are ready to move on to independent practice. Independent Practice: When students can find and match an object of boy, girl, and friends, to the correct picture with at least 80% accuracy independently, they are ready to move to the next lesson. ***NOT ALL STUDENTS WILL MEET THE DAILY OBJECTIVE BEFORE WEDNESDAY'S COMMUNICATION GROUP LESSON, IT IS COMMON FOR STUDENT'S TO ACQUIRE WEEKLY VOCABULARY WORDS ACROSS THE WEEK.
Anticipatory Set: - Review classroom rules/expectations - Review weekly words. - Tell the students you have put different boys and girls all around the room (or in the immediate group area) and that they will have some chances during the lesson to find them.	
Input/State skill in small steps: - I will call on you when it is your turn, and you will have a chance to find a boy, a girl, or some friends in our classroom. - As you find a boy, a girl, or some friends, someone will take a picture of you with the IPad 2. - After you have your picture taken you will get to identify whether you have found a boy, a girl, or some friends, by matching object to picture or by telling us with your words. - Then you will go back to your seat.	
Model: After reading the story model steps 1-4 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what the students have accomplished. Compliment each student on good behavior. Transition each student to his/her next work area.

Wednesday (Week 1): Communication Group (20-30 min.)

AUTHENTIC VOCABULARY ACTIVITY: Lesson Objective: Given various materials and picture representations of boy, finds, friends, girl, and the, students will participate in an authentic vocabulary activity to help increase their abilities to identify and use the words with at least 80% accuracy maintaining the skill for at least 2 months.

Materials:	Student Considerations:
- Picture representations of: boy, finds, friends, girl, and the - Apple Ipad 2 - Symply Speaking App - Including pictures of each child in your group and the weekly words. - Various boys and girls placed around the room, some hooked together as "friends" ***If you did not do a communication group on Tuesday, make sure to take pictures of students during this activity	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today you will participate in an activity to help you remember the words that we are learning this week, it is important that we remember the words that we are learning so that we can use them through out our day.")	Each student will have at least 2 opportunities to find boys, girls, and friends. Take data on students' abilities to form sentences on the Symply Speaking App that make sense with what they just saw. Guided Practice: When students can form a four-word picture sentence about what they saw with at least 80% accuracy with prompting, they are ready to move on to Independent Practice. Sentences should look like: (Student) finds the girl. (Student) finds the boy. (Student) finds the friends.
Anticipatory Set: - Review classroom rules/expectations - Review weekly words. - Tell the students you have put different boys and girls all around the room (or in the immediate group area) and that they will have some chances during the lesson to find them.	
Input/State skill in small steps: - I will call on you when it is your turn, and you will have a chance to find a boy, a girl, or some friends in our classroom. - After you find a boy, a girl, or some friends, you or one of your friends will make a sentence using our weekly words - The Symply Speaking App will help us make a sentence that uses some of the words we are learning this week. - We make a sentence by looking at the sentence strip, and finding words that match the color in the sentence strip, and that also make sense with what we just saw.	Independent Practice: When students can form a correct four-word picture sentence at least 80% of the time they are ready to move to using different words. ***NOT ALL STUDENTS WILL MEET THE DAILY OBJECTIVE BEFORE THURSDAY'S COMMUNICATION GROUP LESSON, IT IS COMMON FOR STUDENT'S TO ACQUIRE WEEKLY VOCABULARY WORDS ACROSS THE WEEK.
Model: Model steps 1-4 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what the students have accomplished. Compliment each student on good behavior. Transition each student to his/her next work area.

Thursday (Week 1): Communication Group (20-30 min.)

STORY: Lesson Objective: Given Communication Picture Reader Book 1 and Comprehension Book 1 from the Symple Readers Curriculum, students will read each word by signing/saying it across the Picture Reader Book 1 and will fill-in blanks in sentences across the Comprehension Book 1 with at least 80% accuracy maintaining the skill for at least 2 months.	
Materials: From the Symple Readers Curriculum: • Picture Representations of: boy, finds, friend, girl, and the • Communication Program Picture Reader Book 1 • Communication Program Comprehension Book 1 • Communication Devices for any child who needs an alternative means of communication	Student Considerations:

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today we will use our new words to help read our Communication Group story of the week. It is important that we learn to read our new words so that we can read them in different books…")	Each student will have multiple opportunities to read sentences. Take data on students' abilities to sign/say each word as you read through the Picture Reader, and abilities to fill-in word blanks correctly through the Comprehension Book.
Anticipatory Set: • Review classroom rules/expectations • Review weekly words. • Ask students if they remember anything about the story from when they listened to it on Monday.	Guided Practice: When students can sign/say each word in the Picture Reader and fill-in word blanks correctly with at least 80% accuracy with prompting, they are ready to move on to Independent Practice.
Input/State skill in small steps: Picture Reader 1. Each of you will take turns getting read a page in our story. 2. When it is your turn you will read the whole sentence from left to right making sure to read (sign/say) each word out loud. Comprehension Book: 1. It is time to show what you know by helping to fill-in blanks in sentences in the Comprehension Book. 2. When it is your turn you will get to pick from different pictures and see if you can make the picture match the sentence. 3. When you are picking a picture to complete a sentence make sure you are picking a picture that matches the color of the box that you need to fill-in.	Independent Practice: When students can sign/say each word in the Picture Reader and fill-in word blanks correctly with at least 80% accuracy independently, they are ready for the introduction of more words. ***NOT ALL STUDENTS WILL MEET THE DAILY OBJECTIVE BEFORE FRIDAY'S COMMUNICATION GROUP LESSON, IT IS COMMON FOR STUDENT'S TO ACQUIRE WEEKLY VOCABULARY WORDS ACROSS THE WEEK.
Model: Model for Picture Reader separate from Comprehension Book, making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what the students have accomplished. Compliment each student on good behavior. Transition each student to his/her next work area.

Friday (Week 1): Communication Group (20-30 min.)

COMPREHENSION ACTIVITY: Lesson Objective: Given various materials and picture representations of boy, finds, friends, girl, and the, students will participate in a comprehension activity by making picture sentences with at least 80% accuracy maintaining the skill for at least 2 months.

Materials:
• Picture representations of: boy, finds, friends, girl, and the
• Apple Ipad 2
• Symply Comprehension App
   1. Including pictures of each child in your group and the weekly words.
   2. Photos that you took of the students on Tuesday during the activity.
	Student Considerations:

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today we are going to look at pictures to make sentences…when we know all the words that we are supposed to have in our sentences, it helps us speak better…")	Each student will have multiple opportunities to make picture sentences that make sense with different photos that they are viewing. Take data on students' abilities to form sentences on the Symply Comprehension App that make sense with the photo/picture they are viewing.
Anticipatory Set: • Review classroom rules/expectations • Review weekly words. • Remind the students that on Tuesday they had their pictures taken doing finding boys and girls.	Guided Practice: When students can form a four-word picture sentence about the photo/picture with at least 80% accuracy with prompting, they are ready to move on to Independent Practice.
Input/State skill in small steps: 1. When it is your turn, you will get to look at picture of yourself or one of your friends in our class doing something. 2. After looking at the picture you will have a chance to make a sentence that matches the picture. 3. We will use the Symply Comprehension App to help us find the correct words to use in our sentence. 4. We will make a sentence by looking at the picture and then at the sentence strip, and finding words that match the color in the sentence strip, and that also make sense with the picture.	Sentences should look like: (Student) finds the girl. (Student) finds the boy. (Student) finds the friends. Independent Practice: When students can form a correct four-word picture sentence at least 80% of the time they are ready to move to using different words.
Model: Model steps 1-4 making sure to THINK OUT LOUD as you model each step.	**Closing**: Review what the students have accomplished. Compliment each student on good behavior. Transition each student to his/her next work area.

Wednesday (Week 1): Cooking (30-45 min.)

Lesson Objective: Given various materials, students will increase use of weekly vocabulary words in an incidental setting to at least 80% of all opportunities to use words, maintaining the skill across words and across weeks. (This objective will span several weeks of instruction.)

Materials:	Student Considerations:
• Rice Crispies • Marshmallows • Butter • Rice Krispy Treat Picture Recipe • Boy and Girl Cookie Cutters Hidden in baggies around the room. • Picture Vocabulary cards for "boy," "girl," and "find" • Apple Ipad • Symply Speaking App	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today we will be using our new words to make a fun snack. It is important that we learn to use our words in all sorts of places so that people will be able to understand us…")	Each student will have an opportunity to find a boy or a girl cookie cutter and a turn to cut out a Rice Krispie Treat Take data on students' abilities to build sentences on the Symply Speaking App about what other students are doing. (XXXX finds a boy…XXXX finds a girl.)
Anticipatory Set: • Review classroom rules/expectations • We have been working on some new words this week, three of those words are boy, girl and find. • After we make a pan of Rice Krispie Treats we are going to play a game to finish our snack with our new words. • (MAKE RICE KRISPIE TREATS HERE) • Help students follow picture directions to make the teats.	**Guided Practice:** When students can build a complete sentence with at least 80% accuracy with color, verba,l and partial physical prompting, then they are ready to move on to independent practice. **Independent Practice:** When students can build a complete sentence with at least 80% accuracy with only color prompting, they are ready to generalize the skill to other words and sentence structures.
Input/State skill in small steps: I have hidden boy and girl cookie cutters around our room. It is your job to find the cookie cutters so that we can finish our snack. 1. You will raise your hand to get a turn. 2. When it is your turn you will get to look around the classroom for a cookie cutter. 3. After you find a cookie cutter you will bring it back to the table. 4. One of your friends will get to tell us what you found. 5. Then another friend will get to use the cookie cutter to cut out a treat. 6. Then you will wait nicely by following our rules until each person has a turn.	
Model: Model steps 1-5 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what you have done in the group today. Compliment students are good behavior. Transition students to next work area.

Monday: Storybook Comprehension (20-30 min.)

Lesson Objective: Students will give a 3-5 word prediction of what will happen in the story upon seeing the title and cover to the story, prior to reading the story with at least 80% accuracy across 5 opportunities. (This objective will span several weeks of Mondays)

Secondary Lesson Objective: Upon seeing various letters, students will identify 26 letter names and sounds with at least 80% accuracy across 5 opportunities.

Materials:	Student Considerations:
- Storybook of the Week - Whiteboard - Markers/Eraser - Communication Device(s) for students who cannot communication otherwise - Picture that symbolize various predictions for students who may not attempt to communicate a prediction otherwise.	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing today. ("Today you be able to make a prediction about what YOU think will happen in a new story. While you do this we will be listening for the first letter in some of the words you say…")	Guided Practice: Give each student in the group an opportunity to make a prediction, (accept any answer and make sense of any communication attempt).
Anticipatory Set: - Review classroom rules/expectations - Access prior knowledge to activate vocabulary students will need for the story.	Walk each student through steps 1-6 making sure on step 5 to give the students letters that are **different, different, different: different on the lips, different to the ear, and different to the eye (the letters)**, as they try to identify the first letter of the first word of their prediction.
Input/State skill in small steps: 1. First we will look at the cover of the story 2. You will think about something YOU think the story is about 3. Then you will tell the teacher your prediction. 4. When you've given your prediction you will help write your prediction on the board by identifying the first letter of the first word of your prediction. 5. The teacher will give you some letters to choose from. 6. When you have identified the first letter of the first word, we will write your prediction on the board.	Take data on student ability to generate a coherent prediction that makes sense with the story. When students can make a 3-5 word prediction with prompting that makes sense with the story at least 80% of the time with prompting they are ready to move on to independent practice. Independent Practice: When students can make a 3-5 word predictions without prompting at least 80% of the time they are ready for higher level prediction lessons.
Model: Model steps 1-6. Make sure to THINK OUT LOUD all of the steps so that you can model how the students should be thinking.	Closing: Listen to story. Identify predictions that did and did not happen by having students vote. When votes indicate error go back through the story and see what really happened. Transition students to next work area.

Tuesday: Storybook Comprehension (20-30 min.)

Lesson Objective: After reading a story, students will identify an object that was in the story with at least 80% accuracy across 5 opportunities. (This objective will span several weeks of Tuesdays)
    Secondary Lesson Objective: Upon seeing various letters, students will identify 26 letter names and sounds with at least 80% accuracy across 5 opportunities.

Materials:	Student Considerations:
- Storybook of the Week - Whiteboard - Markers/Eraser - Communication Device(s) for students who cannot communication otherwise - Pictures that symbolize various objects that may or may not be in the story.	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. ("Today you will each get to tell me an object that you see in our story. While you do this we will be listening for the first letter in some of the words you say...)	Guided Practice: Give each student in the group an opportunity name an object (accept any answer and make sense of any communication attempt). Walk each student through steps 1-6 making sure on step 5 to give the students letters that are **different, different, different: different on the lips, different to the ear, and different to the eye (the letters), as they try to identify the first letter of the name of their object** Take data on student ability to generate an object that is in the story.
Anticipatory Set: - Review classroom rules/expectations - Access prior knowledge to activate vocabulary students will need for the story.	
Input/State skill in small steps: - First we will read our story of the week. - As you are listening and watching you will be looking for an object or something that is in the story. (Explain what an object is) - After the story, you will have a chance to tell me the object that you saw or heard in the story. - Then you will name the object and help me write the object on the board by identifying the first letter or letter sound of your object. - I will give you some letters to choose from. - When you have identified the first letter of your object, we will write your object on the board.	When students can name an object that is in the story at least 80% of the time with prompting they are ready to move on to independent practice. Independent Practice: When students can name an object at least 80% of the time without prompting they are ready to move on to the next lesson.
Model: Model steps 1-6. Make sure to THINK OUT LOUD all of the steps so that you can model how the students should be thinking.	**Closing**: Identify objects that were and were not seen in the story by having students vote. When votes indicate error go back through the story to help students learn how find objects that are in the story. Transition students to next work area.

Wednesday: Storybook Comprehension (20-30 min.)

Lesson Objective: After reading a story, students will identify a character that was in the story with at least 80% accuracy across 5 opportunities. (This objective will span several weeks of Wednesdays)

Secondary Lesson Objective: Upon seeing various letters, students will identify 26 letter names and sounds with at least 80% accuracy across 5 opportunities.

Materials:	Student Considerations:
• Storybook of the Week • Whiteboard • Markers/Eraser • Communication Device(s) for students who cannot communication otherwise • Pictures that symbolize various characters that may or may not be in the story.	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. ("Today you will each get to tell me a character that you see in our story. While you do this we will be listening for the first letter in some of the words you say...)	Guided Practice: Give each student in the group an opportunity name a character (accept any answer and make sense of any communication attempt). Walk each student through steps 1-6 making sure on step 5 to give the students letters that are **different, different, different: different on the lips, different to the ear, and different to the eye (the letters), as they try to identify the first letter of the character**
Anticipatory Set: • Review classroom rules/expectations • Access prior knowledge to activate vocabulary students will need for the story.	
Input/State skill in small steps: 1. First we will read our story of the week. 2. As you are listening and watching you will be looking for a character in the story. (Explain what a character is) 3. After the story, you will have a chance to tell me the character that you saw or heard about in the story. 4. When it is your turn, you will name the character and help me write the character on the board by identifying the first letter or letter sound of your character 5. I will give you some letters to choose from. 6. When you have identified the first letter of your character, we will write your object on the board.	Take data on student ability to generate a character that is in the story. When students can name a character that is in the story at least 80% of the time with prompting they are ready to move on to independent practice. Independent Practice: When students can name a character at least 80% of the time without prompting they are ready to move on to the next lesson.
Model: Model steps 1-6. Make sure to THINK OUT LOUD all of the steps so that you can model how the students should be thinking.	**Closing**: Identify characters that were and were not seen in the story by having students vote. When votes indicate error go back through the story to help students learn how find characters that are in the story. Transition students to next work area.

Thursday: Storybook Comprehension (20-30 min.)

Lesson Objective: After reading a story, students will identify a part of an action/verb that was in the story with at least 80% accuracy across 5 opportunities. (This objective will span several weeks of Thursdays)

Secondary Lesson Objective: Upon seeing various letters, students will identify 26 letter names and sounds with at least 80% accuracy across 5 opportunities.

Materials:	Student Considerations:
• Storybook of the Week • Whiteboard • Markers/Eraser • Communication Device(s) for students who cannot communication otherwise • Pictures that symbolize various verbs that may or may not be in the story.	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. ("Today you will each get to tell me a part of the setting that you see in our story. While you do this we will be listening for the first letter in some of the words you say…)	Guided Practice: Give each student in the group an opportunity name an action(accept any answer and make sense of any communication attempt). Walk each student through steps 1-6 making sure on step 5 to give the students letters that are **different, different, different: different on the lips, different to the ear, and different to the eye (the letters), as they try to identify the first letter of the character** Take data on student ability to generate an action in the story.
Anticipatory Set: • Review classroom rules/expectations • Access prior knowledge to activate vocabulary students will need for the story.	
Input/State skill in small steps: 1. First we will read our story of the week. 2. As you are listening and watching you will be looking for an action/verb in the story. (Explain what an action/verb is.) 3. After the story, you will have a chance to tell me an action/verb that you saw or heard about in the story. 4. When it is your turn, you will name action/verb and help me write it on the board by identifying the first letter or letter sound of your action/verb. 5. I will give you some letters to choose from. 6. When you have identified the first letter of your action, we will write it on the board.	When students can name an action/verb that is in the story at least 80% of the time with prompting they are ready to move on to independent practice. Independent Practice: When students can name an action/verb that is in the story at least 80% of the time without prompting they are ready to move on to the next lesson.
Model: Model steps 1-6. Make sure to THINK OUT LOUD all of the steps so that you can model how the students should be thinking.	**Closing:** Identify actions that were and were not seen in the story by having students vote. When votes indicate error go back through the story to help students learn how find actions that are in the story. Transition students to next work area.

Friday: Storybook Comprehension (20-30 min.)

Lesson Objective: After reading a story, students will identify the best summary for the story with at least 80% accuracy across 5 opportunities. (This objective will span several weeks of Fridays)

Materials:	Student Considerations:
- Storybook of the Week - Whiteboard - Markers/Eraser - Communication Device(s) for students who cannot communication otherwise - Pictures that symbolize various summaries.	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. ("Today you will each get to choose the best summary for our story. While you do this we will be listening for the first letter in some of the words you say...)	**Guided Practice:** Give each student in the group an opportunity to choose his/her (accept any answer and make sense of any communication attempt). Take data on student ability to choose the correct summary. When students can choose the correct summary at least 80% of the time with prompting they are ready to move on to independent practice. **Independent Practice:** When students can choose the correct summary at least 80% of the time without prompting they are ready to move on to the next lesson.
Anticipatory Set: - Review classroom rules/expectations - Access prior knowledge to activate vocabulary students will need for the story.	
Input/State skill in small steps: - First we will read our story of the week. - You will need to listen closely to all of the story so that you can pick the best summary. (Explain what summary is.) - After the story, you will have a chance to decide which summary of the story is the best. - When it is your turn you will get a chance to choose the best summary for the story. - I will give you two or three choices. (Make choices feasible enough that students have to listen to the story closely to identify which summary is the best, or do a combination where 2 choices are feasible and 1 choice is far-fetched.) - After each person has chosen a summary that he/she think fits the story	
Model: Model steps 1-6. Make sure to THINK OUT LOUD all of the steps so that you can model how the students should be thinking.	**Closing:** Tally how many students pick each summary if tallies indicate error go back through the story to help students understand how to pick the best summary Transition students to next work area.

Monday (Week 1): Phonemic Awareness—Word Hunt (20-30 min.)

Lesson Objective: Given bins with the letter "f" and the letter "b" and picture representations of words that start with "f" and "b" (or objects that start with "f" and "b"), students will find pictures/objects and will match them to the correct initial consonant sound with at least 80% accuracy across various sounds, maintaining the skill for at least 2 months.

Materials:	Student Considerations:
2 Bins 1 with the letter "f" and 1 with the letter "b". - Pictures or objects that start with the initial sounds of "f" and "b". (make sure to include pictures/objects of words of the week (boy, finds, friends)) - Place objects/pictures around classroom.	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today you will finding words that sound that same at the beginning. Knowing words that sound the same at the beginning is will help us be better readers...)	Each student will have multiple opportunities to put pictures/objects into the bin with the same beginning sound as the letter "f" and "b".

Take data on students' abilities match the objects to the correct beginning sound. |
| **Anticipatory Set**: Review classroom rules/expectations This week we will be working on new words two of the words are boy and finds. These words start differently. One word starts with the "b" sound and one words starts with the "f" sound We're going to go on a word hunt and see if we can find other words that sound the same at the beginning as those two words. | Guided Practice: When students can match objects/pictures to the correct beginning sound with at least 80% accuracy with prompting, then they are ready to move on to independent practice.

Independent Practice: When students can match objects/pictures to the correct beginning sound with at least 80% accuracy independently, then they are ready to move on to other pre-reading skills. |
| **Input/State skill in small steps**:
1. First I will find a picture/object in the classroom.
2. Then I will say the word, as I say the word I will listen for the first sound in the word.
3. Then I will match the picture or the object to the bin that has the same sound. ("f" or "b") | (THIS LESSON PLAN WILL SPAN SEVERAL WEEKS ALTERNATING WORDS TO ENCOURAGE GENERALIZATION OF THE SKILL OF UNDERSTANDING WHAT THE INITIAL SOUND IN WORDS IS.) |
| **Model**: Model steps 1-3 making sure to THINK OUT LOUD as you model each step. | **Closing**: Review what you have done in the group today. Compliment students are good behavior. Transition students to next work area. |

Tuesday (Week 1): Phonemic Awareness--Rhyming (20-30 min.)

Lesson Objective: Given the words and picture representations of girl and boy, and various pictures that rhyme with girl and boy, students will match the pictures that rhyme with girl and the pictures that rhyme with boy with at least 80% accuracy maintaining the skill across the week.

Materials:	Student Considerations:
- Words and Picture Representations of "boy" and "girl" - Pictures that rhyme with "girl" and "boy" (e.g. twirl, swirl, curl…toy, joy, annoy…) - Place picture around the classroom - Phonemic Awareness Worksheet	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today you will be finding words that rhyme. Rhyming is important because it shows when we know when words are the same and when words are different…)	Each student will have multiple opportunities to match rhyming words. Take data on students' abilities to match rhyming words across various words. Guided Practice: When students can match rhyming words across various words/pictures with at least 80% accuracy with prompting, then they are ready to move on to independent practice. Independent Practice: When students can match rhyming words across various words/pictures with at least 80% accuracy independently, they are ready for other pre-reading skills. (THIS LESSON PLAN WILL SPAN SEVERAL WEEKS ALTERNATING WORDS TO ENCOURAGE GENERALIZATION OF THE SKILL OF RHYMING TO MANY WORDS.)
Anticipatory Set: - Review classroom rules/expectations - We have been working on some new words this week, two of those words are boy and girl. - We are going to use those words to rhyme with	
Input/State skill in small steps: 1. First I will find a picture in the classroom. 2. Then I will decide which word my picture rhymes with. 3. When I look for rhyming words, I listen to each word very carefully. (all three words) 4. I know that the words rhyme when the ends of the words sound the same. 5. Then I will match my picture to the picture and word that sounds the same as my picture.	
Model: After reading the story model steps 1-5 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what you have done in the group today. Compliment students are good behavior. Transition students to next work area.

Friday (Week 1): Phonemic Awareness—Phunny Phonics
(20-30 min.)

Lesson Objective: Given various pictures/words and a Phunny Phonics story, student will correctly insert picture/words that rhyme into the story to complete the story with at least 80% accuracy maintaining the skill for at least 2 months

Materials:	Student Considerations:
• Words/Pictures that can be inserted to complete sentences. • Phunny Phonics Story #1	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today you will be finding words that rhyme to complete a silly story. Rhyming is important because it shows when we know when words are the same and when words are different...)

Anticipatory Set:
• Review classroom rules/expectations
• We have been working on some new words this week, we are going to use some of those words in our silly story of the week.

Input/State skill in small steps:
1. We will read a page together in our silly story. One of the words will be missing on our page.
2. You will find the missing word by listening closely to the story to figure out the rhyme.
3. When you know the rhyming word that completes our sentence you will raise your hand.
4. If you are called on you can put the word into the story.
5. We will read the story again to see if it rhymes.
6. If it rhymes we will move to the next page.
7. If it does not rhyme we will try again.

Each student will have multiple opportunities to find the word that completes the rhyme.

Complete the sentence with a rhyming word/picture.

Guided Practice: When students can complete various sentences with rhyming words with at least 80% accuracy with prompting, then they are ready to move on to independent practice.

Independent Practice: When students can complete various sentences with rhyming words with at least 80% accuracy independently, then they are ready to move on to other phonemic awareness activities.

(THIS LESSON PLAN WILL SPAN SEVERAL WEEKS ALTERNATING WORDS TO ENCOURAGE GENERALIZATION OF THE SKILL OF RHYMING TO MANY WORDS.)

Model: Model steps 1-7 making sure to THINK OUT LOUD as you model each step.

Closing: Review what you have done in the group today. Compliment students are good behavior. Transition students to next work area.

Monday (Week 1): PHONICS—Word Sort
(Initial Letter)
(20-30 min.)

Lesson Objective: Given various materials, students will find and match words that have the same initial letter with at least 80% accuracy across various sounds, maintaining the skill for at least 2 months.	
Materials: • Pocket Chart • Cards with Letters "g" and "t" • Words with pictures that start with the letter "g" and the letter "t" (make sure to include pictures/objects of words of the week (girl, the))	Student Considerations:

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today you will matching words that have the same first letter. Knowing when words have the same first letter will help us to be better readers…)	Each student will find words that start with the letters "g" or "t". Take data on students' abilities match the words to the correct beginning letter. Guided Practice: When students can match words to the correct beginning letter with at least 80% accuracy with prompting, then they are ready to move on to independent practice.
Anticipatory Set: • Review classroom rules/expectations • This week we will be working on new words two of the words are girl and the. These words start differently. • One word starts with the letter "g" and one starts with the letter "t". • We're going to sort words and see if we can find all the words that start with "t" and all of the words that start with "g".	Independent Practice: When students can match words to the correct beginning letter with at least 80% accuracy independently, then they are ready to move on to other pre-reading skills.
Input/State skill in small steps: 1. First I will find a word. 2. Then I will look at the first letter in the word. (It might be good to highlight the first letter as the students are learning this new skill.) 3. Then I will put the word in the pocket chart under the letter that matches the first letter in my word.	(THIS LESSON PLAN WILL SPAN SEVERAL WEEKS ALTERNATING LETTERS AND WORDS TO ENCOURAGE GENERALIZATION OF THE SKILL.)
Model: Model steps 1-3 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what you have done in the group today. Compliment students on good behavior. Transition students to next work area.

Tuesday (Week 1): PHONICS—WORD-O (Initial Letter) (20-30 min.)

Lesson Objective: Given a Word-o Game Board with the words girl, boy, the, friends, and finds, students will find words given a description of the words with 80% accuracy across various words and across various descriptions, maintaining the skill for at least 2 months.

Materials:	Student Considerations:
• I-Spy Board with: girl, boy, the friends, and finds. • Items to mark the words • List of "Find the Word Suggestions"	

Lesson Plan

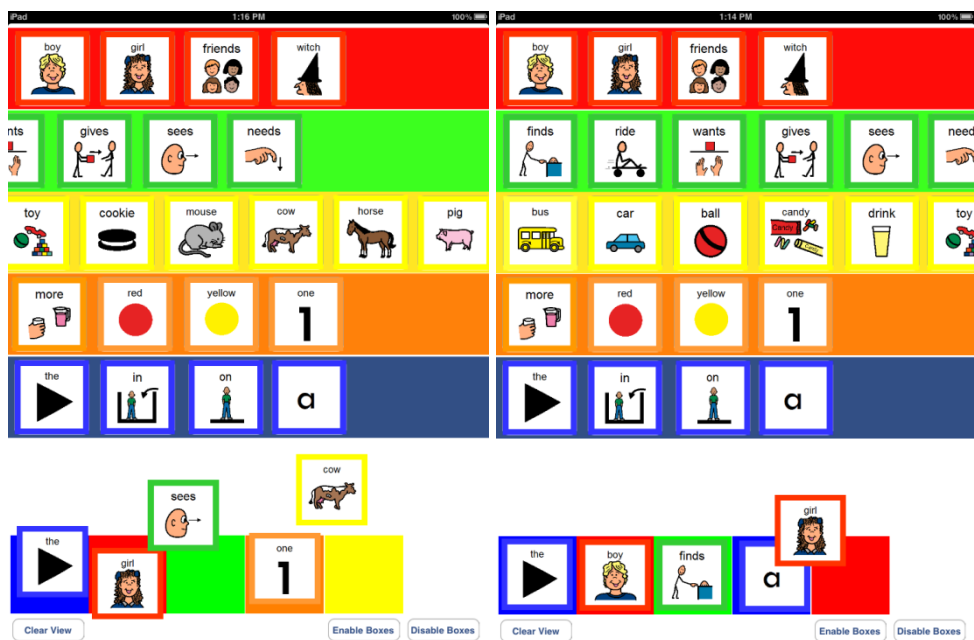|	
Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today we will be working on finding letters and sounds in words…it is important that we recognize letters and sounds that we can learn how to read better…)	Each student will have an opportunity to find each word that the teacher describes. Take data on student ability to find the words correctly. Guided Practice: When students can find words by the teacher's description with at least 80% accuracy with prompting, then they are ready to move on to independent practice. Independent Practice: When students can find words by the teacher's description with at least 80% accuracy independently, then they are ready to move on to different phonics skills. (THIS LESSON PLAN WILL SPAN SEVERAL WEEKS ALTERNATING WORDS TO ENCOURAGE GENERALIZATION.)
Anticipatory Set: • Review classroom rules/expectations • We have been learning some new words this week, and we are going to look for those words as we play "I-Spy"	
Input/State skill in small steps: 1. I will place my I-Spy board and markers (beans, candies, etc.) in front of me. 2. Then I will listen for the teacher to tell me what I am looking for. 3. Then I will point to the word that the teacher is describing. 4. The teacher will help me know if I am right or wrong. 5. If I am right I can place a marker on that word. 6. If I am wrong I will need to try again. 7. When I have a marker on each word, then I win, and I will get a reward.	
Model: Model steps 1-7 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what you have done in the group today. Compliment students on good behavior. Transition students to next work area.

Thursday (Week 1): Word Wall—Sight Words (20-30 min.)

Lesson Objective: Given various words on the word wall, students will match, sort, and select words, with at least 80% accuracy maintaining the skill for at least 2 months.	
Materials: • Copy "Alphabet Soup" flashcards of the word "the" • Copy "Alphabet Soup" flashcards of nonsense words (e.g. xx, ib, py…) • Bowl for words • Simon Sight Word Bag • Nancy Nonsense Word Bag	Student Considerations:

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. Today we will be learning our first sight word. It is important for us to learn sight words so that we can read them in books and around our community…)	Each student will have multiple opportunities to pick words out of the bowl and decide whether it is a sight word or a nonsense word. Take data on student ability to give sight words to Simon and nonsense words to Nancy.
Anticipatory Set: • Review classroom rules/expectations • One word that we are learning this week is "the". • This word cannot be sounded out the same way other words can be so we have to remember what it is when we see it. • We are going to play a game to help us remember the word "the". • We have a boy and girl. The boy's name is Simon Sight Word, and the girl's name is Nancy Nonsense word. Simon only eats sight words, and Nancy only eats nonsense words.	Guided Practice: When students feed words to the correct character (Simon/Nancy) with at least 80% accuracy with prompting, then they are ready to move on to independent practice. Independent Practice: When students feed words to the correct character (Simon/Nancy) with at least 80% accuracy independently they are ready for the introductions of more sight words. (THIS LESSON PLAN WILL SPAN SEVERAL WEEKS ALTERNATING WORDS TO ENCOURAGE GENERALIZATION.)
Input/State skill in small steps: 1. When it is your turn you will pick a word out of the bowl. 2. You will look at the word and decide if the word says "the" and is a sight word, or if the word is a nonsense word. 3. When you have made your decision, you can give your word to Simon Sight Word or Nancy Nonsense Word. 4. If the word is eaten then you have made the correct decision. 5. If the word comes back out, then you will know that you need to look at the word again to make the right choice.	
Model: Model steps 1-5 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what you have done in the group today. Compliment students on good behavior. Transition students to next work area.

Wednesday (Week 1): Art (30-45 min.)

Lesson Objective: Given various materials fine motor tasks, students will increase use of weekly vocabulary words in an incidental setting to at least 80% of all opportunities to use words, maintaining the skill across words and across weeks. (This objective will span several weeks of instruction.)

Materials:	Student Considerations:
• Paper Bags • Paper Bag Puppet Boy • Paper Bag Puppet Girl • Crayons/Markers/Paints • Scissors • Glue • Apple Ipad • Symply Speaking App	

Lesson Plan

Introduction/State objective with rationale: Explanation of what students will be doing during the group today. (e.g. "Today we will be using our new words to do an art project. It is important that we learn our new words well so that we can use them in all kinds of situations…")	Take data on students' abilities to read each directional sentence on the Symply Speaking App. (Find a boy. Find a girl.) Guided Practice: When students can read the complete sentence with at least 80% accuracy with prompting, then they are ready to move on to independent practice.
Anticipatory Set: • Review classroom rules/expectations • We have been working on some new words this week, three of the words are boy, girl, and finds. • I have placed boys and girls around the room and it is your job to find a boy if you are a boy or a girl if you are a girl.	Independent Practice: When students can read the complete sentence with at least 80% accuracy independently, they are ready to generalize the skill to other words and environments.
Input/State skill in small steps: 1. You will raise your hand to get a turn. 2. When it is your turn the teacher will give you a direction to read and follow. 3. It is important that you read each word so that you know what you are going to do. 4. After reading each word you will follow the direction. 5. Then you will come sit back down.	After everyone has had a turn to read and follow a direction students will have the opportunity as a group to read the picture directions for making the paper bag puppet (boy or girl) and construct the puppet.
Model: Model steps 1-5 making sure to THINK OUT LOUD as you model each step.	**Closing:** Review what you have done in the group today. Compliment students are good behavior. Transition students to next work area.

Symply Comprehension Version 1.0 Screen Shots

Symply Speaking Version 1.0 Screen Shots

APPENDIX F: Direct Instruction Lesson Plans for Training

Lesson Objective: Given various videos depicting skills that participants may exhibit during actual intervention, reliability observers will demonstrate ability of taking data that come within 90% agreement with primary researcher's, across the three different data collection forms provided.	
Materials: • iPad 2 • Videos depicting skills that participants are likely to exhibit during intervention • Data Collection Forms • Calculator	**Observer Considerations:** (List any considerations or accommodations that you need to make to scaffold the learning for your reliability observers.)
Introduction: Today you are going to learn how to take data reliably so that when we observe participants in the study together, we will know that we are watching for the same behaviors. It is important that we take data in the same way and are looking for the same behaviors so that the data that I submit is accurate	**Check Understanding:** Make sure reliability observers understand what to do on each step.
Anticipatory Set: I have taken several videos for each of the three data collection forms that you will be learning how to use. These videos are not of the participants in the study, but the behaviors are similar. (A separate lesson will be taught for each behavior/data collection form.)	**Guided Practice:** We will practice steps 1-6 together until each observer is able to come to at least 90% agreement with the primary researcher's data.
Input: 1. You will select the appropriate data form based on the lesson. 2. You will watch the video. 3. While watching the video you will look for the specific behaviors on the data form. 4. You will mark the data form during the video when you see behaviors associated with the behaviors on the data form. 5. You will calculate a percent correct. 6. You will compare it to the primary researcher's data form.	**Independent Practice:** Each observer will practice independently until she is able to come to at least 90% agreement with the primary researcher's data. When each observer is able to come to at least 90% agreement with the primary researcher's data independently, she is ready to be a reliability observer for the study.
Model: Model steps 1-6 making sure to think out loud as you see the various behavior and why you mark the data form the way that you do.	**Closing:** Thank reliability observers for their help in doing the research.

APPENDIX G: Treatment Fidelity Checklist

Treatment Fidelity Checklist		
Week of: **Observer:**	Check when lesson is complete	Observer initials
Monday		
Communication Group—Vocabulary Introduction		
Reading Group—Phonemic Awareness—Word Hunt		
Reading Group—Phonics—Word Sort		
Math Group—Counting/Numbers		
Storybook Group—Comprehension—Prediction		
Fine Motor/Writing Group—Tracing		
Tuesday		
Communication Group—Authentic Vocabulary Activity		
Reading Group—Phonemic Awareness—Rhyming		
Reading Group—Phonics—I-Spy		
Math Group—Colors		
Storybook Group—Comprehension—Objects		
Fine Motor/Writing Group--Pinpoint		
Wednesday		
Communication Group—Authentic Vocabulary Activity		
Storybook Group—Comprehension—Characters		
Cooking Group		
Art Group		
Thursday		
Communication Group—Story		
Reading Group—Phonics—Word Wall—Sight Words		
Math Group—Colors		
Storybook Group—Comprehension—Actions		
Fine Motor/Writing Group—Dot Marker		
Friday		
Communication Group—Comprehension Activity		
Reading Group—Phonemic Awareness—Phunny Phonics		
Math Group—Colors/ (Counting Numbers)		
Storybook Group—Comprehension—Summary		
Fine Motor/Writing Group—Stickers		

APPENDIX H: Social Validity Surveys

Social Validity Survey for Paraeducators						
	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1. The training that I received prior to implementing the integrated curriculum was sufficient, and I felt confident in my ability to implement the curriculum with fidelity.						
2. The lesson plans within the Symple Readers curriculum were easy to follow.						
3. The data collection procedure was easily implemented and required little explanation after initial training.						
4. The materials created by the Symple Readers Company were clearly marked designating which lesson they should be used for.						
5. The materials created by the Symple Readers Company were easily accessed.						
6. The materials created by the Symple Readers Company needed little adaptation when used for a lesson plan.						
7. I would recommend this curriculum to other teachers and staff who work with students with developmental disabilities.						
8. The progress made by the participants in the study in regard to vocabulary acquisition was due largely to the implementation of Symple Readers integrated curriculum.						
Comments:						

Social Validity Survey for Parents						
	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1. My child's expressive vocabulary (whether on a communication device, signed or vocalized) has increased due to his/her participation in this study.						
2. My child's expressive sentence length (whether on a communication device, signed or vocalized) has increased due to his/her participation in this study.						
3. My child's participation in this study was beneficial overall.						
4. I would recommend the Symple Readers integrated curriculum to other teachers and parents.						

Comments: