THE EFFECTS OF CONDITIONAL STIMULI ON THE RETELLING BEHAVIOR OF STUDENTS WITH AUTISM

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Listening to the words spoken by others is a critical skill needed for students with disabilities. Listening comprehension has been identified as a problem of practice for students with Autism who would benefit from instruction that develops their ability to retell information provided by a speaker to improve academic and social outcomes. This study utilized an alternating treatment design to determine the most effective method for students in retelling stories. Stories were shared with students using three different listening presentation styles across 18 sessions. Data was analyzed for words retold per minute using a Standard Celeration Chart (SCC). Results of this study suggest that a presentation of listening with pictures and listening with words increases correct words retold per minute and the number of thought units over a listen only condition. However, no single condition was dominant across all participants. Further implications for practitioners and future research are discussed.

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1.0 INTRODUCTION

In 2000, the National Reading Panel (NRP) compiled a report about reading development. A total of five areas in reading were reviewed, including: phonemic awareness, phonics, fluency, vocabulary, and comprehension. Under the area of comprehension, research identified three areas of focus comprising vocabulary instruction, text comprehension, and teacher preparation/comprehension strategies. The purpose of reading is to comprehend what is being read and to understand the message from the author (Lane, 2014). Two important primary components of comprehension include word recognition and listening comprehension (Hogan, Adlof, & Alonzo, 2014). Although word recognition is a critical part of reading comprehension, listening comprehension is often an overlooked component in improving reading comprehension skills (Hogan, et al., 2014).

Improvements in listening comprehension have been recorded for typically developing students when students followed text as they listened to peers and teachers read aloud (NRP, 2000). A study of elementary and middle school students indicated that information can be presented through auditory means for stories read aloud as well as class lectures (Barnes, Kim, & Phillips, 2014). The relationship between understanding what is heard and what is read is considered to be reciprocal as each concept is equally important for student comprehension (Sears & Keogh, 1993) and one area may improve the other (Ricketts, Jones, Happé, & Charman, 2013).

For students with disabilities, metacognitive strategies affect the recall of events, thus increasing the need for information presented in visual and auditory formats (Sencibaugh, 2007). Several other instructional strategies have also shown to improve comprehension for students with intellectual disabilities including the retell of stories, slower-paced read alouds, and adapted grade level read alouds (Hudson & Browder, 2014). Further strategies for students with intellectual disabilities include the use of hierarchal prompts and pairing students with a peer tutor. In a study of middle school students with emotional disturbance, students were given a listen only condition and a listening while reading condition (Hale et al., 2005). Results indicated that students listening to stories as they read along showed improvement in comprehension (Hale et al., 2005).

As like students with other exceptionalities, students with Autism Spectrum Disorder (ASD) have been identified with specific strategies that work to improve their comprehension. The National Autism Center (2015) compiled research-based practices that work for students with ASD and identified 14 interventions as having sufficient evidence. The interventions identified as effective that related to comprehension included language training (production) and natural teaching strategies (NAC, 2015). Other strategies deemed effective include behavioral and social interventions. The report also noted that students with ASD have difficulty understanding questions or instructions given by a teacher (NAC, 2015).

Research in language training for production and understanding is part of the emerging literature for interventions to use with students with ASD (NAC, 2015). Language training focuses on assisting students with ASD to emit verbal communication (NAC, 2015), which is necessary for building language skills that will allow for interactions with others (Autism Speaks, 2016). This training incorporates prompting strategies by using “verbal, visual, and

gestural prompts" to teach a new skill by modeling language for students to imitate and increase independence (NAC, 2015, p. 40). The use of visuals has been shown to be effective not only for language development, but the development of reading skills (Broun, 2004).

The prevalence of individuals diagnosed with ASD has significantly increased since the 1990's (Christensen et al., 2012). In 2012, the Centers for Disease Control and Prevention issued a report indicating that 14.6 per 1,000 (or 1 in 68) children aged 8 years and older had been diagnosed with Autism (Christensen et al., 2012). Examples of social and communication impairments may present as language that appears "scripted," difficult to understand verbal and non-verbal communication, and unable to participate in pretend play (NAC, 2015, p. 20). Further challenges for students with ASD may include "difficulty initiating or maintaining a conversation" and displaying "poor or fleeting eye contact" (NAC, 2015, p. 20).

Although much of the difficulties that students with ASD experience are social and communicative, they may also struggle with academic tasks (NAC, 2015). Abilities may differ between students with ASD due to the varied "cognitive and linguistic skills" (Nation, Clarke, Wright, & Williams, 2006, p. 911). However, noteworthy outcomes were achieved in the literature in the area of listening comprehension for students with ASD mostly at the elementary and middle school levels. The literature on instruction in these grade levels assessed listening comprehension for students with ASD including shared reading with prompting (Whalon, Martinez, Shannon, Butcher, & Hanline, 2015), shared reading with the use of technology (Alison, Root, Browder, & Wood, 2017; Spooner, Ahlgrim-Delzell, Kemp-Inman, & Wood, 2014), and the use of visuals to prompt comprehension questions (Murdock & Hobbs, 2011). While cooperative learning showed indications that it could be successful for students with ASD, further research is needed in this area (Whalon & Hanline, 2008).

Due to the increase of individuals diagnosed with ASD, a need for early intervention and strategies used to combat deficits are being established (Webb & Jones, 2009). A challenge for educators is finding the appropriate strategies that will work with individual students and yield the most results. The use of visual supports is strongly supported in research for listening comprehension for students with ASD (Kovattana & Kraemer, 1974; Mucchetti, 2013; Whalon et al., 2015). Along with visual supports, technology has also been used to present information to students (Lucas, Thomas, & Norbury, 2017). Response boards for answering questions (Mucchetti, 2013) along with least to most prompts were also found to be successful instructional strategies (Alison et al., 2017).

Since listening comprehension is a needed skill for students with ASD in both academic and social contexts, the ability to interpret what is heard and then provide verbal feedback is a skill that needs further research. Retelling through listening to stories is way for students to practice this skill. It is also a way to assess a student's comprehension when their reading fluency level may not match their reading comprehension level (Roberts, Good, & Corcoran, 2005). Retelling is a strategy that has not been fully explored and shows a gap in the research for students with ASD.

In order to assess listening comprehension skills, the structured use of prerecorded stories across several conditions presented using technology may help in developing strategies to use with students with ASD to improve their recall of information. Assessing a student's listening comprehension should go beyond modeled instruction to promote independence in comprehension that students can use in academic settings (Hudson & Browder, 2014). Students may also be able to recall information during social situations that can add to the reciprocal nature of conversation (Fox & Wright, 1997). Through three listening comprehension conditions,

information can be gathered to assist practitioners in their delivery of instruction for students with ASD.

1.1 PROBLEM OF PRACTICE

A problem of practice that has been identified in my organization is regarding the teaching of listening comprehension to students in Autistic Support classrooms. Students with a reading fluency level are often asked to read out loud and answer comprehension questions. However, students should also listen to fluent reading and be able to explain what occurred in the context of what they heard. Instruction for students with ASD in Autistic Support classrooms centers around Applied Behavior Analysis with a focus on errorless learning and direct instruction. However, if a student is not mastering prerequisite content, it can be difficult for students to build academic skills. Therefore, the need for instruction on listening comprehension can help students achieve social and academic outcomes while continuing to build their skills in other areas (Autism Speaks, 2016). Notably, there is a gap in research in listening comprehension strategies for students with ASD and this problem of practice explores listening comprehension and the effects of conditional stimuli on the retelling behavior of students with Autism.

Several stakeholders are involved in this problem of practice. Each of these stakeholders brings their own experiences, beliefs and credentials. However, they each play an important role in understanding of the problem of practice and the underlying adaptive challenges. The various stakeholders involve the teachers, parents, the special education consultant, students, and

administrators. Within each classroom is a teacher and at least one paraprofessional who provide direct instruction to students with ASD. All the students have individual needs in one or more of the following areas: functional skills, behavior, social skills and academics.

There are several challenges in this problem of practice that can make implementation difficult for teachers. In each classroom, there is a maximum of eight students who have various levels of ability. To target listening comprehension, teachers need to find instructional levels for each student. This can be a challenge when there are several ways that listening comprehension can be assessed. It is imperative that teachers receive training in implementation to quickly assess and begin programming for students in listening comprehension. This problem of practice seeks to find ways of listening comprehension that are beneficial to practitioners for students with Autism.

Heifetz, Grashow, and Linsky (2009) discuss seeing a situation from a balcony view. As an administrator, academic instruction is seen from afar, but this problem of practice allowed the researcher to be on the practice field. The role of an administrator lends itself to defining the technical aspects of teaching but does not always know the adaptive challenges faced in the school setting. An adaptive challenge of this problem of practice is the implementation of an instructional task that teachers may not be confident in implementing within their classroom. It will take all the stakeholders making an investment in identifying their adaptive and technical dimensions as a starting point. From there, the administrator and teacher can work together to work through the adaptive challenges through support and procedural guidelines.

Listening comprehension is an area of instruction that is often overlooked as a skill needed for students with Autism. To build better academic and social skills, implementation of listening comprehension should be a part of the instructional practices used in the school setting.

This problem of practice and subsequent research provides an opportunity for further development in tools and practice that work for listening comprehension.

2.0 LITERATURE REVIEW

A component of comprehension called listening comprehension is the act of understanding speech (NRP, 2000). Improving the comprehension of learners to understand what is being read and what is heard is an essential part of reading instruction (Lane, 2014). In order to understand written language, a learner must first develop the meaning of oral language (Babayiğit, 2015). Listening comprehension can also be referred to as "auding" which are the "processes of perceiving, recognizing, interpreting, and responding to oral language" (Harris & Hodges, 1995, pp. 14, 140). Many oral language interventions have been designed to develop listening comprehension. Through improving vocabulary, figurative language, and oral narrative skills, reading comprehension can in turn be improved (Snowling & Hulme, 2012).

The NRP found 203 articles that met criteria for comprehension strategies for students without disabilities. Seven strategies have shown promise, including: "comprehension monitoring, cooperative learning, graphic and semantic organizers including story maps, question answering, question generation, and summarization" (NRP, 2000, p. 264). Sears and Keogh (1993) view the relationship of listening comprehension and reading comprehension as reciprocal since both of these types of comprehension have the same underlying linguistic processes. An overall analysis of literature by the NRP on listening comprehension found that listening for meaning rather than oral reading has shown to produce superior sentence recall (NRP, 2000). Further, listening comprehension can provide benefits for students as they listen to

their peers and teachers read as they follow along with text (NRP, 2000). Therefore, the use of the strategies by the NRP may show improvements for both listening and reading comprehension.

Thus far, the literature on listening comprehension has primarily focused on English Language Learners (Berne, 2004; Rubin, 1994; Schroeders & Wilhelm, 2011) and typically developing school age students (Lepola, Lynch, Laakkonen, Silvén, & Niemi, 2012; Tuman, 1980). In a child's development of literate language, they listen to others to learn how to use conjunctions and verbs in oral language (Barnes et al., 2014). In essence, a student's language ability serves as the foundation for skilled listening comprehension (Alonzo, Yeomans-Maldonado, Murphy, & Bevens, 2016). A longitudinal study showed that in grades two through eight, listening comprehension has shown to be more important than reading words as it relates to reading comprehension (Adlof, Catts, & Little, 2006).

In elementary listening comprehension studies, students are often read stories aloud and then asked to complete a narrative retell (Barnes et al., 2014), and/or answer comprehension questions (Barnes et al., 2014; Verhoeven and Leeuwe, 2008). In studies of older elementary and middle school students, listening comprehension in core content classes have shown that information students need to know is being presented in a lecture style format (Copmann & Griffith, 1994; Ward-Lonergan, Liles, & Anderson, 1998). Regardless of the grade level, listening comprehension is essential for "complex directions, stories, and conversations" (Hogan, Bridges, Justice, & Cain, 2011, p. 2).

Formal assessments have also been used to assess listening comprehension. Berninger and Abbott (2010) used the Wechsler Individual Achievement Test (WIAT) listening Comprehension subtest for grades 1-7. The measures of sentence comprehension, receptive

vocabulary and expressive vocabulary were assessed. Alonzo et al. (2016) assessed students using the Clinical Evaluation of Language Fundamentals-4 (CELF-4) by asking students to answer comprehension questions with inferencing after being read aloud paragraphs.

Although the research provided by the NRP does not provide evidence of comprehension strategies for "special populations such as children whose first language is not English and children with learning disabilities," the research provides a foundational basis for which to build further research for students with disabilities (NRP, 2000, pp. 4-120). Students with learning disabilities struggle with the semantics of words (meaning) as well as recalling of details, inferencing, conclusions, and outcomes. All of these are a challenge due to metacognitive difficulties (Sencibaugh, 2007) which Bender (2004) describes as the planning of a cognitive task. There have been several pieces of research in the area of listening comprehension for students with disabilities that contribute to the overall literature on listening comprehension.

Due to the close relationship between reading and listening comprehension, the research on reading comprehension yielded similar strategies to what is recommended for listening comprehension. Sencibaugh (2007) reviewed 15 journal articles in reading comprehension, with 439 students with learning disabilities, spanning elementary to high school. From these studies, two general strategies emerged. Visually dependent strategies are the first theme, which are approaches that involve pictures or visual ability. Some examples include illustrations in text and semantic organizers (Sencibaugh, 2007). Auditory/language dependent strategies are the second type of strategy and include pre-reading and post-reading activities. These strategies comprise summarization, main idea strategies, training in inference questioning, and story retelling (Sencibaugh, 2007).

Gersten, Fuchs, Williams, and Baker (2001) also found similarities in strategies for students with learning disabilities. Their recommendation for instructional strategies for teaching students with learning disabilities include: prior knowledge activation, vocabulary instruction, strategies instruction, peer programs, repeated readings and story grammar/structure instruction. In a study of narrative abilities, students with Attention Deficit Hyperactivity Disorder (ADHD) and typical peers listened to stories and were asked to retell those stories to a peer (Tannock, Purvis, & Schachar, 1993). The study consisted of 60 boys ages 7-11. Two folk tales were audiotaped and played for approximately four minutes while students listened. Students were scored based on recall and a series of questions. Results indicated that students with ADHD were able to recall story events, but lacked organization of the information. The researchers theorize that the lack of contextual support and the unpredictable nature of the stories factored into the information provided by students with ADHD. In another study by Seung and Chapman (2003), the story presentation rates on how they affected the story retelling of students with Down syndrome were explored. Short audiotapes were played for students at three different rates. The storyteller rate at 1.4-1.5 words/second provided more prosody than the slower rate. However, results indicated that listening at a slower rate resulted in the most words recalled by students with Down syndrome.

Hudson and Browder (2014) found that for students with intellectual disabilities, “peer delivered least prompts and adapted read-alouds of a grade level novel” (p. 11) increased the number of un-modeled correct responses to listening comprehension questions. Badian (1999) looked at students with reading disabilities and also used read alouds followed by comprehension questions. In an older group of students, Badian (1999) asked students to follow along as the passage was being read and students were asked comprehension questions. Likewise, a study of

students with emotional disorders indicated that when students listened to stories and followed along while listening, all four participants, ages 12-14, had higher rates of comprehension than when they read silently to themselves. Researchers indicate that listening while following along improves comprehension in content areas (Hale et al., 2005). Across several areas of exceptionality, listening comprehension is an area for focused instruction.

Listening comprehension, the action of understanding oral language, is also a challenge for students with autism spectrum disorder (ASD) (Knight & Sartini, 2015, 2014). Student scores in reading comprehension are correlated with scores in vocabulary and oral language comprehension for children with ASD (Nation et al., 2006). Therefore, listening comprehension is an area for students with ASD that should be addressed during instruction.

2.1 LISTENING COMPREHENSION FOR STUDENTS WITH AUTISM

Reading and communicating about texts is suggested by sociologists to be part of a "social system" (Luhmann, 1995, p. 165). For students with ASD, difficulties in oral language and comprehension can increase complications in social contexts (Autism Speaks, 2016; Knight & Sartini, 2015, 2014). Comprehension has significant importance for social skills. Further, the ability to apply learned social skills to novel situations may be a challenge for students with ASD (Kubina, Morrison, & Lee, 2002). Therefore, listening comprehension in structured and unstructured settings is a vital part of what students will need to learn and be able to do upon graduation from school-age programming.

Chiang and Lin (2007) note that only some instructional strategies suggested by the National Reading Panel have been researched. More specifically, vocabulary instruction and text

comprehension are areas where further research is needed for students with ASD. In their review, Chiang and Lin (2007) focused on 11 studies that looked at sight words and text comprehension. They found that the "time-delay procedures, discrete trial reading and writing, and incidental teaching procedures" were the ones that aligned with the instruction recommended by the NRP (p. 265). In another review of literature by Knight and Sartini (2015, 2014) they found 14 high quality studies that met the criteria for comprehension in core content areas for students with ASD. This review combines both listening and reading comprehension research that brings together the strategies from these two types of comprehension. Knight and Sartini (2015, 2014) indicated that 11 of the studies used response-prompting, while 8 used visual supports as part of their strategies. The replication of studies identified in the review should be conducted in various settings as part of future research.

Students with ASD experience difficulties in learning, including oral language and comprehension, which are important factors in reading comprehension (Cronin, 2014; Ricketts, Jones, Happé, & Charman, 2013). Complex skills are required to comprehend text in content areas as well as information in social-communicative contexts (Diehl, Bennetto, & Young, 2006). Students with ASD are often literal in their interpretation of language, whether oral or written, which makes inferencing and comprehending in a more global context difficult (Finnegan & Mazin, 2016).

Notably, there is a gap in research in understanding context through listening comprehension as a pathway to improved reading comprehension (Ricketts et al., 2013). A review of literature in this area will outline the research on the strategies used to improve comprehension for students with ASD.

2.2 METHODS

A search of the literature from four computerized databases (PsycArticles, Psychology Database, PsycINFO, and ERIC) was conducted. The following search terms, including truncations were used: autism, ASD, autism spectrum disorder*, Asperger's, oral language, listening, and compre*. A search was then conducted for all ancestral articles and literature reviews (Finnegan & Mazin, 2016; Knight & Sartini, 2014, 2015; Randi, Newman, & Grigorenko, 2010) relevant to the subject. Further, a hand search was conducted in the *Journal of Autism and Developmental Disorders* and *Focus on Autism and Other Developmental Disabilities.*

In order to meet criteria for review, an article had to meet these five criteria:

- Must be in a peer-reviewed journal (educational or medical)
- A public school, private setting (home, school, center, etc.), or clinical setting
- Have at least 1 student with Autism being studied including: High-functioning Autism, Asperger's, PDD-NOS (prior to DSM-V; APA, 2013)
- Have an independent and dependent variable
- Must have a component of comprehension being studied (including but not limited to: questions, inferences and recalls)

Inclusion criteria for comprehension included articles for listening comprehension. Group studies (participants with ASD and another subgroup) were included if the data was disaggregated. Three studies met the criteria of a group study. A study was included if a participant had ASD and a secondary disability or language as long as the study focused on listening comprehension. If the article had a student independently read text, they were excluded

from the review. Also, if a study had participants over the age of 21, they were excluded from the review (PA Public School Code, 2004).

2.3 RESULTS

2.3.1 Research Design

All 10 of the studies graphed their data and provided explanations for their use of a specific study design. Eight of the studies used a multiple baseline across participants design (Alison, Root, Browder, & Wood, 2017; Kobari-Wright & Miguel, 2014; Lucas, Thomas, & Norbury, 2017; Mims, Hudson, & Browder, 2012; Murdock & Hobbs, 2011; Spooner, Ahlgrim-Delzell, Kemp-Inman, & Wood, 2014; Whalon & Hanline, 2008; Whalon, Martinez, Shannon, Butcher, & Hanline, 2015). Conversely, two studies used alternating treatment designs to best fit the type of information they wanted to gain from the study (Mucchetti, 2013; Preis, 2006).

2.3.2 Participants

Seven studies included elementary age participants with ASD (Alison et al., 2017; Kobari-Wright & Miguel, 2014; Mucchetti, 2013; Murdock & Hobbs, 2011; Preis, 2006; Whalon & Hanline, 2008; Whalon et al., 2015). Another two studies included both elementary and middle school students (Lucas et al., 2017; Spooner et al., 2014) and one study had middle school students with ASD (Mims et al., 2012).

The ten studies that met criteria for the review included a total of 69 participants with a diagnosis of Autism Spectrum Disorder (ASD). The table in Appendix A displays detailed information from each of the studies. Participants ranged in age from an average of 4 to 14 years old. Five studies reported language or developmental abilities of the students, while the other five reported IQ scores for each participant. Two studies looked at participants with ASD who have an IQ below 55 or unable to be tested (Mims et al., 2012; Mucchetti, 2013). Another two studies had participants that had IQ scores between 49 and 62 (Alison et al., 2017; Spooner et al., 2014) while one study had participants within a normal IQ range (Whalon & Hanline, 2008).

Additionally, five studies used language scores or nonverbal measures to assess their participants (Kobari-Wright & Miguel, 2014; Lucas et al., 2017; Murdock & Hobbs, 2011; Preis, 2006; Whalon et al., 2015). The Clinical Evaluation of Language Fundamentals (CELF) (Semel et al., 2003), HELP for Preschools Assessment Strands (VORT Corporation, 1995), Verbal Behavior Milestones Assessment and Placement Program (Sundberg, 2008), Peabody Picture Vocabulary Test, Fourth edition (Dunn, Dunn, Williams, & Wang, 2007) and the Preschool Language Scales-Fifth Edition (Zimmerman, Steiner, & Pond, 2011) were the assessments used to assess participants on their language ability.

In the study by Alison et al. (2017) and Spooner et al. (2014) participants included students diagnosed with ASD and identified as English Language Learners. Since this study focused on listening comprehension, the results obtained from the study are relevant to the overall literature.

2.3.3 Settings

The locations for the studies included public schools, private/home schools, or both public and private settings. Four studies took place in public schools, most of which occurred in self-contained classrooms or small rooms located within the school setting (Alison et al., 2017; Mims et al., 2012; Spooner et al., 2014; Whalon & Hanline, 2008). Five studies occurred in a private setting, including schools, university centers and homes (Lucas et al., 2017; Mucchetti, 2013; Murdock & Hobbs, 2011; Preis, 2006; Whalon et al., 2015) while one additional study occurred in both public and private settings (Kobari-Wright & Miguel, 2014).

Typically developing peers were included in two of the ten studies (Lucas et al., 2017; Whalon & Hanline, 2008) and interventions occurred in small rooms located in quiet areas of the home or school. Several studies that did not include typically developing peers were conducted in self-contained special education classrooms, (Alison et al., 2017; Mims et al., 2012; Spooner et al., 2014; Whalon et. al., 2015) a speech and language pathology center located at a university, (Preis, 2006) and in a preschool classroom, located in a private facility (Murdock & Hobbs, 2011). Across all studies, interventions were given in a one-on-one setting.

2.3.4 Dependent Variables

The majority of the studies (n = 9) used a correct/incorrect and prompted/unprompted measure to determine the success of the intervention on participants (Alison et al., 2017; Kobari-Wright & Miguel, 2014; Lucas et al., 2017; Mims et al., 2012; Mucchetti, 2013; Preis, 2006; Spooner et al., 2014; Whalon & Hanline, 2008; Whalon et al., 2015). Listening comprehension questions were asked of participants in two elementary age studies (Mucchetti, 2013; Whalon et

al., 2015) and one with students ages 12-14 (Mims et al., 2012), and two involved the use of technology to ask questions (Alison et al., 2017; Spooner et al., 2014). In another study, participants were asked to generate questions that were coded to determine details related to the story read aloud (Whalon & Hanline, 2008).

Preis (2006) measured the number of commands that participants achieved across two treatments, including commands with and without picture symbols. In another two studies, data on the number of correct items named or selected were measured (Kobari-Wright & Miguel, 2014; Lucas et al., 2017). One study required students to report daily events reported through words, phrases, or sentences (Murdock & Hobbs, 2011).

2.3.5 Independent Variables

A wide variety of independent variables were used across the studies. Four of the studies including three at the elementary level and one at the elementary/middle school level used shared reading (Alison et al., 2017; Mucchetti, 2013; Spooner et al., 2014; Whalon et al., 2015). In shared reading, a student is read a story and the use of questions and discussions are interspersed throughout the session (Fisher, Frey, & Lapp, 2008). In Mucchetti (2013), comprehension questions were interspersed during reading so that students could answer using a response board with picture symbols, text, and objects. Data indicated that all four students showed higher story comprehension and task engagement during intervention compared to baseline. Similarly, Whalon et al. (2015) used an adapted version of shared reading called RECALL (Reading to Engage Children with Autism in Language and Learning) and used visual options for students to answer scripted comprehension questions. If a student did not answer, they were given a prompt using the PEEP (prompt, evaluate, expand, and praise) method. All participants decreased

incorrect responding and had higher spontaneous responding to fact and inference based questions.

Although shared reading was used in two other studies, the element of technology was added as a tool to deliver read aloud stories to students. Alison et al. (2017) used the Spooner et al. (2014) study as a basis for their study and a means for students to independently access information through technology. Alison et al. (2017) and Spooner et al. (2014) used the iPad 2 with the GoTalk Now application which read the stories aloud to students. Both studies asked students comprehension questions aligned to each book. However, in the Spooner et al. (2014) study, six comprehension questions were available but only one question per session was asked of students. Students were also given a task analysis to complete by activating voices on the iPad. Alison et al. (2017) asked students six literal comprehension questions per chapter and also paired WH vocabulary words with definitions and examples. Overall improvement from baseline to intervention were observed from listening comprehension questions in both studies. Alison et al. (2017) noted that the number of correct pairings of WH words increased across participants in the total of independent responses. Equally in the task analysis condition, Spooner et al. (2014) indicated that correct responses increased by more than 60% during intervention.

Another study of students who were given listening comprehension questions found that when students were read grade-level biographies, their unprompted responses to questions increased (Mims et al., 2012). During intervention, Mims et al. (2012) used a system of least to most prompts, also used by Alison et al. (2017) to increase independent student responses. One study asked students to complete a task as a response to a verbal command or prompt (Kobari-Wright & Miguel, 2014) and found that students with a naming repertoire were able to categorize events. They indicated that listener training may produce better speaker behavior. Murdock and

Hobbs (2011) also probed participants to use oral language skills by being provided with a visual cueing system that prompted students to report daily events. While participants generalized the skill of reporting daily events at home, a follow-up found inconsistent results across participants. A study of verbal commands yielded positive results when verbal commands were paired with visual prompts (Preis, 2006).

In the only study of its kind in the literature reviewed, Whalon & Hanline (2008) used the SCORE curriculum (Share ideas, Compliment others, Offer help or encouragement, Recommend changes nicely, and Exercise self-control) to see how students would be able to deliver and respond to reciprocal questioning with a peer. The data indicated that participants with ASD increased unprompted asking and answering of questions to typically developing peers from baseline to intervention. Likewise, the strategy allowed for both students with ASD and their typically developing peers to learn simultaneously.

2.4 DISCUSSION

A thorough search for literature in the area of listening comprehension yielded 10 results that met the inclusion criteria for students with ASD. A review of the articles from 2006-2017 show similarities and differences among strategies for improving listening comprehension for students with ASD. Although seven of the 10 studies have been conducted in the last five years, the three studies prior to 2012 built a basis for future research in this area.

Across the studies in this review, visual supports were used in some aspect of each of the interventions. Visual supports could be used as a means of increasing on-task behavior and question answering is a strategy that could be used across content and instruction for students

with ASD (Horner et al., 2005). Visual supports were heavily used to help students answer comprehension questions (Mucchetti, 2013; Whalon et al., 2015). Although the use of visual supports for students with ASD have been researched for more than 40 years, the ways in which visuals are presented have changed over time (Kovattana & Kraemer, 1974). Practitioners should continue to look for creative ways to engage students in meaningful instruction through the use of visual supports. The use of visual supports in all 10 studies, indicates that a visual element is an effective tool for teaching students with ASD to learn a new skill.

Prompting was used in a variety of ways across several studies. The use of least to most prompts (Alison et al., 2017; Mims et al., 2012) as well as specific prompt system (Whalon et al., 2015) showed promise for increasing independent student responses. The use of prompts is indicative of the high number of studies that were led by adults. Adult-led interventions accounted for seven of the 10 studies, while three of the 10 studies used some form of technology to disseminate information. Shared reading was used in four out of 10 studies, while cooperative learning was only used in one study to promote the use of peer collaboration. An element that all shared reading studies have in common is their consensus that shared reading should be interactive.

A wide range of strategies are used to teach listening comprehension to students with ASD in elementary and middle school. In looking at the types of strategies used at specific grade levels, several patterns emerge. Elementary age studies had had adult-led, cooperative learning, and technology based interventions. The study that incorporated middle school students used technology to teach vocabulary (Lucas et al., 2017) and an adult-led study where students were asked to answer comprehension questions (Mims et al., 2012). All of the studies allowed for

continued adult prompting and support while variation in the intervention types occurred in the elementary grades.

Interestingly enough, the use of the cooperative-learning strategy with reciprocal questioning (SCORE) at the elementary level indicates a need for exposing students at an early age to collaborative peer activities. The most diverse strategies occur at the elementary age level. Then as students get older, teacher-led interventions are the focus of instruction in listening comprehension. Students at any older age group may have experience with metacognitive strategies that would allow for independent completion of tasks, therefore teacher-led interventions are used more often. (Bender, 2004).

After a review of the current research for students with learning disabilities and also students with ASD, several similar strategies emerge for both groups of students. Strategies from the National Reading Panel (2000) that are deemed effective for students without disabilities can be compared to the literature found for students with Autism. The eight strategies identified by NRP (2000) are: comprehension monitoring, cooperative learning, graphic and semantic organizers including story maps, question answering, question generation, summarization, and multiple-strategy teaching.

Sencibaugh (2007) identified that students with learning disabilities struggle with word meaning and therefore have difficulty with inferencing. The National Reading Panel (2000) notes that "question generation may also be best used as a part of a multiple strategy instruction program" (p. 45). Through the literature, Sencibaugh (2007) was able to find a theme that inference questioning works as a strategy for students with learning disabilities. Students with learning disabilities and students with ASD are shown to have difficulty with questioning techniques, therefore the research promotes asking students questions without prompting

(Whalon & Hanline, 2008). In this study, students with ASD were asked to develop questions and respond to questions. They were given passages where they needed to interpret meaning from the text and use that information to generate questions. After this intervention, students with ASD were able to answer comprehension questions unprompted to a same age peer. For students without disabilities, Alonzo et al. (2016) asked students inferencing questions after being read paragraphs. This study also showed that improving questioning helps to increase comprehension for students without disabilities, with learning disabilities and students with Autism.

Cooperative learning is an effective strategy that has been identified in the research for both students with learning disabilities and students with ASD. At the middle and high school levels, Husdon and Browder (2014) found that peer-delivered instruction increased un-modeled correct responses. Cooperative learning is also a strategy that is used for students with Autism. In this strategy, students work on reciprocal questioning (Whalon & Hanline, 2008). These have both shown to have positive effects on listening comprehension for students with learning disabilities and ASD.

Retelling of stories has shown to be effective for elementary age students who are often read stories and then asked to tell about the story (Barnes et al., 2014). The complexities and nuances of language that students need to retell a story are a large part of why listening comprehension instruction is so valuable for students (Gabig, 2008). However, none of the studies that met the criteria for the literature review used retelling as the independent variable. Recall of events was the closest method to retell conducted in one study with young learners (Murdock & Hobbs, 2011).

There are many similarities in the areas of comprehension that are worked on for students without disabilities, students with learning disabilities, and students with Autism. As discussed, the strategies may vary slightly, but the conceptual ideas are the same. Question generation, question answering and summarizing interventions have shown to be effective for both students with learning disabilities and students with Autism (Barnes et al., 2014; Verhoeven & Van Leeuwe, 2008; Whalon & Hanline, 2008). On the other hand, more research is needed for students with Autism in the area of cooperative learning.

2.4.1 Future Research Directions

Based on the literature for students with Autism, there are implications for future research. One study by Mucchetti (2013) worked with students who are nonverbal in grades K-3 by asking comprehension questions (who and what) with objects, picture symbols and/or text response board. Then, Whalon and Hanline (2008) noted that their study was conducted with students with ASD who had IQs within the normal range and therefore their results may not apply to students who have lower IQs. This leads to a need for further research about students with ASD who are nonverbal or have IQs outside of the high-functioning Autism range.

Another research direction is for students at the middle school level around cooperative-learning strategies for listening comprehension. An indication that cooperative learning can be used for students with ASD was in the study by was evidenced in the study by Whalon and Hanline (2008). Although the students were 7.5-8.7 years old on average, they were able to successfully use reciprocal learning to ask and answer questions from their peers. This leaves consideration for how cooperative-learning in reading comprehension strategies would work for students with Autism in middle school.

Though the use of retelling did not occur in any of the studies, one of the studies asked for students to recall daily events (Murdock & Hobbs, 2011). Recall itself may be a complex task due to the need to use verbal working memory and children with ASD may experience "poor performance across a variety of tasks that are used to measure verbal working memory" (Gabig, 2008, p. 500). The use of summarization was shown to be effective mainly in grades 5 and 6 for students without disabilities (NRP, 2000). Therefore, there is a need for further strategies to support students with summarization and retell.

Although there are many strategies identified to improve listening comprehension for students with Autism, only one of the ten reviewed studies looked at nonverbal students with Autism at the elementary age. In addition, there were no cooperative-learning studies for students with Autism at the middle school age. This leaves room for future research for listening comprehension for students with Autism.

2.4.2 Conclusion

NRP (2000) indicates that "active listening can promote reading comprehension" (p. 296). Due to the challenges that students with ASD face in understanding oral and written language, further instruction in the areas of listening comprehension can help promote better reading comprehension. Therefore, when looking at the conclusions drawn by the National Reading Panel (2000) and the articles that met criteria in this review, there are indications that further research is needed in several areas of listening comprehension.

Students with ASD may have difficulty with verbal working memory that makes it difficult to remember what they heard and then provide information back the speaker (Gabig, 2008). For practitioners, the strategies that work for students with and without disabilities are a

good starting point to teach skills in the areas of retell as well as question generation and answering. It is imperative that future research addresses retell for middle school students with ASD.

2.5 RESEARCH PURPOSE AND QUESTION

The purpose of the current study aims to examine the effects of different presentation methods on listening comprehension. More specifically, what effect will varied presentations (listen only, listen with pictures, and listen with words) have on the retell behavior (i.e., words and thought units per minute) of students with Autism?

3.0 LITERATURE REVIEW

3.1 PARTICIPANTS AND SETTING

Five students ranging in age from 11-16 participated in this study. Two of the students attended separate middle school Autistic Support classrooms, one student on a full-time basis while the other on a supplemental basis. Three of the students attended separate high school Autistic Support classrooms on a full-time basis. All classrooms were in the Mid-Atlantic Region of the United States across four suburban school districts. There were four classroom teachers who participated in the implementation of the study. All of these teachers were the primary instructors for these students. They each were certified as a special education teacher. Due to a change in position, the last condition for one student was administered by a special education consultant, certified in special education. The subsequent information reported uses pseudonyms in place of actual student names to maintain student confidentiality and privacy of academic information.

The students in the study each had a reading fluency and comprehension score. In the Autistic Support classrooms they attended, Direct Instruction in reading was conducted, along with other functional, social, and academic instruction. The students had each done a retell prior to this study, but it was not a goal in any of their Individualized Education Programs.

Participants were screened based on the following criteria: primary disability designation of Autism, enrolled in an Autistic Support program (either as full-time or supplemental), 10 to 16 years of age, read at a minimum a first-grade text between an instructional level of 50-150 words correct per minute (Kubina & Starlin, 2003), have parental consent and provide assent.

Prior to conducting the study, IRB approval was granted (see Appendix B), site permission from each of the schools was provided in the form of a written letter, parental consent

Table 1. Student Demographic Data

Student	*Gender*	*Age*	*Grade*	*IQ*	*VB-MAPP (milestones)*	*Reading Grade Level*	*Reading comprehension Grade Level (DIBELS)*	*Primary Disability category*	*Secondary Disability category(s)*
Alex	M	16	9	SB- 49	167	6th	5th	Autism	ID, SPL
Brian	M	15	9	SB- 54	165.5	3rd	3rd	Autism	ID, SPL
Roger	M	15	9	N/A	99.5	3rd	3rd	Autism	SPL
Carrie	F	11	6	N/A	161.5	3rd	3rd	Autism	SPL
Jacob	M	11	6	N/A	131	1st	1st	Autism	SPL

Note: F= Female; M= Male; SB- Stanford-Binet Intelligence Scales- 5th edition; ID=Intellectual Disability; SPL=Specific Learning Disability

was granted (see Appendix C) and verbal student assent was obtained (see Appendix D). Table 1 details student information for the five participants in the study.

Each of the five students had a primary disability of Autism with a secondary disability of speech and language, while Alex and Brian also had a secondary diagnosis of an intellectual disability. For both of those students, IQ scores were reported using the Stanford-Binet Intelligence Scales-5th Edition. Alex has an IQ of 49, while Brian has an IQ of 54. A score under 70 with significant adaptive delays is indicative of an intellectual disability (NICHCY, 2011).

The results of a criterion-referenced assessment, the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP), is reported for each student. This assessment is used to determine verbal and other related skills for students with Autism and other developmental disabilities. In the milestones assessment, there are 170 language and learning skills based on three levels. The levels correspond to ages 0-18 months, 18-30 months, and 30-48 months (Sundberg, 2008). Alex, Brian, and Carrie are all on level 3 of the VB-MAPP and

have strong abilities in requesting missing items (mand), labeling items (tact), pre-academic skills, and interverbal communication. Jacob is an emerging level 3 learner who can request items (mand) when items are present and labeling the location of items (prepositions). He continues to need assistance when working with peers, responding as a listener and using intraverbal communication.

Roger is an early level 2 learner on the VB-MAPP and has strong abilities in requesting items (mand) but only when items are present, labeling items (tact) when not in a class or category and working on small groups. He continues to need support in interverbal communication and responding as a listener.

The study sessions took place in a separate area within the classroom or in the hallway. Each session was in a one-on-one format with both the teacher and participant facing the computer screen. The student, teacher, and computer were all visible to the camera.

3.2 MATERIALS AND EQUIPMENT

The experimenter acquired instructional level stories for study implementation. Stories numbering 150 words originated from the Dynamic Indicators of Basic Early Literacy Skills (Dynamic Measurement Group, 2008). The experimenter chose 54 passages, or 18 from three different grades levels (i.e., first, third, and fifth), that did not contain content overlap. Fry readability test results (Appendix E) confirmed the grade level of each passage (Fry, 1989). The percent of word overlap of unique words between passages at the same grade level averaged less than 23% with a range of 10% to 43% (Kostewicz & Kubina, 2010). Word overlap results

appear in Appendix F. The experimenter created a one-minute recording for each passage read at the rate of 150 correct words per minute and uploaded each into a separate PowerPoint slide.

The next step involved randomly dividing passages from each grade level into three groups. Slides from the first group contained only a recording of the passage with a blank screen. The second group contained three pictures that revealed as the recording played. The third group contained a copy of the passage which would appear during the playing of the recording. Pictures were gathered from internet stock images that related to the information provided in the text which could include actions, objects, and/or characters. More specifically, the pictures related to the information presented around the 25th, 75th, and 125th words within the passage and revealed themselves at those points. In all three groups, the screen went blank and the volume terminated at the end of one minute (i.e., the time of the recording). Appendix G provides an example of each of the three created powerpoints. Additional materials included a classroom computer with speakers to display powerpoints, a video recorder with a memory card, tripod, timer, a copy of the Teacher Implementation Integrity Checklist (Appendix H), and access to a password protected file sharing program.

3.3 DEPENDENT VARIABLE

During the one-minute retelling of DIBELS stories, the words spoken and the number of thought units showed the effects of the three conditions of the independent variable. During retelling, students were given one minute to retell the story they just heard. Using the DIBELS Retell Fluency 6th Edition, student retelling was scored for words correct per minute using the criteria outlined for words counted as correct from the administration and scoring guide (Good &

Kaminski, 2002). A count of total words correct were reported as the retell score and were graphed accordingly.

The criteria by Good and Kaminski (2002) for the DIBELS Retell was used to determine the number of correct words counted. Exclamations were not counted during retelling. That is, if the student did not say an actual word or made a sound, they were not counted in the words per minute. Then, if a student used a contraction, that was counted as one word. For example, if a student said "don't," that was counted as one word even though it means "do not," which is two words. Another part of the criteria is that songs and recitations were not counted, even if they were related to the retell.

Any "minor repetitions, redundancies, irrelevancies, and inaccuracies" were counted (Good & Kaminski, 2002, p. 32). Words were counted as long as the student stayed on track during the retell. If a student had any "rote repetitions of words or phrases," they were not counted. Furthermore, if a student repeated their retell or retold what they have already said, those repeated words or phrases were not counted. Finally, if the student told stories or was off track on the topic of the story, those words or phrases were not counted (pp. 35-37). All retellings were transcribed verbatim from the video recordings uploaded to a secure server. They were then scored based on the criteria by Good and Kaminski (2002).

In a second measure of the retellings, thought units were calculated. Thought units (t-units) are defined as "the equivalent of a simple or complex sentence. As a result, a compound sentence would be equal to two or more t-units and a complex sentence would equal one t-unit and two or more clauses" (Green & Klecan-Aker, 2012, p. 267). A thought unit must also have a subject and a verb (Hunt, 1965) and if they begin with the coordinating conjunctions *and*, *but*, or

or, they are a new t-unit (Puranik, Lombardino, & Altmann, 2006, 2007). Sounds or words that are not understood (garble) were not counted towards a t-unit (Hunt, 1965).

3.4 INDEPENDENT VARIABLE

In the independent variable, three conditions will be introduced to the students. Condition A was a listen only condition, condition B was a listen with pictures condition, and condition C was a listen with words (passage) condition.

3.4.1 Listen Only Condition (Condition A)

After setting up and starting a video recorder, the participating student and teacher were seen along with the computer screen. On the screen, the title of that day's story appeared. The teacher said, "You will listen to the story entitled <Teacher read the title on the screen>. When the story is over, I am going to ask you to tell me everything you remember about the story. You can hit the space bar when you are ready for the story to start." Once the student hits the space bar, a blank screen appeared, and a recording of the story played at a rate of 150 correct words per minute. At the end of the story, the screen went blank.

3.4.2 Listen with Pictures Condition (Condition B)

In the second condition, listen with pictures, the exact same procedures as the listen only condition occurred except for one change. Instead of a blank screen, pictures appeared while the recording played. Pictures appeared at the 25, 75, and 125-word marks. The pictures remained on the screen until the recording concluded. At that point, the screen went blank.

3.4.3 Listen with Words (Passage) Condition (Condition B)

In the third condition, listen with words (passage), the exact same procedures as the listen only and listen with pictures conditions occurred. Once the student hit the space bar, instead of only hearing the story or seeing pictures, the student also saw the text of the story. At the end of the story, the screen went blank.

3.5 EXPERIMENTAL DESIGN & DATA ANALYSIS

An alternating treatments design was used to evaluate the differing effects of conditions on retell performance (Kennedy, 2005). The design allowed for the examination of retell behavior across the three conditions (i.e., listen only, listen with pictures, listen with words). Each student experienced each condition six times. To control for multiple treatment interference and spillover, stories contained no content overlap, and the experimenter reported on unique word overlap. Each student experienced only one condition daily and no more than one of each

condition every three days. A chart of the sequence of the conditions is available in Appendix J. A counterbalancing of conditions per participant minimized any sequence effects between conditions. The primary data analysis method occurred through visual analysis of data. Data for words retold per minute and thought units was imported into a spreadsheet to translate all words and thought units to per minute. Differing condition effects were determined by stratification of lines of regression and median scores by condition displayed on the Standard Celeration Chart (SCC).

The SCC is a tool used for quick analysis of data, which provided a snapshot of each session and the words retold per minute (Kubina & Yurich, 2012). Due to the standard nature of the chart, change (i.e., celeration) is displayed in a numerical fashion as either multiplying or dividing over time (Calkin, 2005; Kubina, Morrison, & Lee, 2002). A x2.00 celeration means a doubling weekly or 100% improvement, while a ÷2.00 means a 50% reduction or half as many weekly. The median rate of responding (i.e., average) within a condition represents level (Horner et al., 2005; Kratochwill et al., 2010). Along with celeration and level, the bounce was calculated. Bounce quantifies the variability in the data with more bounce referring to greater variability and vice versa (Kubina & Yurich, 2012).

3.6 PROCEDURES

3.6.1 Reading Screening

Following consent and assent procedures, the experimenter conducted a reading screening to determine 1) if the potential participant met the reading inclusion criterion and 2)

which grade level passages the student would use during the study. Starting at the student's grade level, the experimenter had the student read for one minute. If the student read more than 150 correct words per minute (CWPM), the student advanced a grade level passage. If the student read less than 50 CWPM, the student read one grade level lower. If the student read between 50 and 150 CWPM, the student met the reading inclusion criterion and passages were read to the student at that grade level. The process continued until the student read a passage in the instructional range (50-150; Kubina & Starlin, 2003). Students were only given one opportunity to read the passage at each grade level. If they did not meet the CWPM at a specified grade level, the experimenter went down to the next grade level.

Based on the screening, the five students fell into three different grade levels. Table 2 shows the results of the screening based on correct words per minute (CWPM) and the grade level at which the stories would be read to the student during intervention.

Alex started reading passages at a 9th grade level. He did not meet the criteria until he reached the 5th grade reading passage where he achieved 117 CWPM. Brian also started with passages at a 9th grade level. He fell within the 50-150 CWPM at the 3rd grade level with 55 CWPM. The final 9th grader was Roger who met criteria at the 3rd grade level with 54 CWPM. Carrie, one of two sixth grade students, scored 65 CWPM at the 3rd grade level, while Jacob scored 53 CWPM at the 1st grade level.

3.6.2 Teacher Training

Classroom teachers who volunteered to participate in the study received training from the experimenter. The experimenter reviewed how to use and submit video recordings, how to administer the three conditions and retell tests (in procedures below) and how to respond to the

Table 2. Screening Results

Student	*Correct Words Per Minute (CWPM)*	*Grade Level (at which passages would be read to students during conditions)*
Alex	117 CWPM	5th grade
Brian	55 CWPM	3rd grade
Roger	54 CWPM	3rd grade
Carrie	65 CWPM	3rd grade
Jacob	53 CWPM	1st grade

student during experimental sessions. The teacher had to meet 100% of the experimental steps before the training concluded. If the teacher fell below 90% on the experimenter created treatment integrity checklists, the experimenter provided a follow-up training. During the first training session, all classroom teachers scored 100% on the Teacher Implementation Integrity Checklist. A second training session was not needed for the classroom teachers to begin the assessments.

3.6.3 Intervention Implementation

Following training, participating students entered the intervention. Once per school day, each participating student experienced one of the three conditions (i.e., listen only, listen with pictures, listen with words). Following the implementation of that day's session, the teacher conducted a daily retell assessment based on Good and Kaminski (2002). The retell assessment followed the same procedures following every condition.

At the conclusion of the recording and the screen went blank, the teacher set a countdown timer for one minute and said, "Please tell me everything you remember about the story." Once the student began to speak, the teacher started the timer. If the student spoke for the entire minute and the timer elapsed, the teacher said "Stop. Thank you for participating." If during the minute, the student went silent for three seconds, the teacher asked one time, "Try to tell me everything you can." If the student again went silent for five seconds, the teacher immediately said, "Stop. Thank you for participating." After the teacher said stop, they stopped the video camera and

returned the student to their normal routine. The teacher uploaded the video daily to a password protected file sharing program for the experimenter to view. Each student's participation ended in the study upon completing 18 sessions (i.e., experiencing 6 instances of each condition).

3.6.4 Treatment Integrity

To verify the experimenter and all teachers implemented the study as written, an assessment of treatment integrity occurred at three points during the study. Based on the Teacher Implementation Integrity Checklist, the experimenter verified all teacher training steps that occurred (Appendix H). The experimenter assessed via daily videos and experimenter created checklists to ensure the teacher implemented all steps of each condition daily. Preloaded/created PowerPoints were created to maintain consistency of 1) speed of the recordings, 2) voice heard on the recordings, 3) and consistency of presentation per condition.

The results of the integrity checks indicated that three out of four teachers followed the procedures with 100% accuracy. One of the teachers needed additional training due to providing an additional prompt to the student and praise at the end of the sessions. After session 3 the training was provided and the teacher completed the procedures with 100% accuracy for the remainder of the sessions.

3.6.5 Interrater Agreement and Reliability

The experimenter assessed the measurement of the dependent variables via reliability and interrater agreement. Each retell was transcribed by the experimenter. The primary scorer, the experimenter, rescored 20% of retells per participating student. Using a total agreement approach

(Kennedy, 2005), the comparison of the two scores (first and second scores) provided a measure of reliability. The experimenter had a 92% agreement among the rescored retells in correct words per minute and a 97% agreement in thought units. A second, trained retell scorer scored 20% of retells per participating student. Using a total agreement approach (Kennedy, 2005), the comparison of the two scores (The first and second retell scorer) provided a measure of Interrater agreement. An agreement of 20% of the retells from each participant yielded a 90% agreement between scorer 1 and 2 for correct words per minute and 94% agreement for thought units.

3.6.6 Social Validity

At the conclusion of the study, students and teachers were both asked to rate their experience of the cumulative sessions. Through the use of a rating scale, students and teachers scored five different components of their experience (Appendix K). The five components were different for both teachers and students. Teachers rated the ease of technology, clarity of procedural instructions, time of the sessions, perception of student interest, and belief of future use of study. Teachers were given these questions and asked to answer them in a paper and pencil format. Students were asked these questions orally to rate their level of interest in the sessions, time of the sessions, amount the sessions contributed to their learning, use of visuals to retell stories and use of audio to listen to story.

4.0 RESULTS

The results section contains three main parts. The first part reports the number of words per retell for each of the five participants. The second section focuses on the number of thought units per retell for each participant. The third and final section of the results convey the social validity findings.

4.1 WORDS PER RETELL

Figure 1 shows the number of words per minute each participant stated during each retell assessment across all three conditions: listen to the story (closed squares), listen to the story and see pictures (closed dots), and listen to the story with the passage in view (open dots). The data appear on Standard Celeration Charts (SCC) with time (i.e., calendar days) occurring along the horizontal axis and count per minute on the left vertical axis. The right or secondary vertical axis provides a referent for each time bar (black rectangles) as to the amount of time each session lasted. For example, the labeled time bar shows that the noted session lasted 20 seconds. The SCC, however, calibrates each score to count per minute to facilitate comparisons. Figure 2 shows the same data organized differently. The left vertical axis again represents words per minute (closed dots), however the horizontal axis shows retell assessments 1-6 for each of the

three conditions rather than time. Dotted lines show the average or median level per condition with the grey boxes showing the variability or bounce envelope around the median.

Four of the five students (except Carrie) appeared to show little difference in responding between the three conditions (Figure 1). Many of the data paths overlapped as the students moved from condition to condition. Two students, Alex and Brian, appeared to maintain similar data paths (Figure 1) occurring at similar levels (Figure 2). Looking closer at the data trends (i.e., celeration values on Table 3), Alex did displays some differences from Brian's

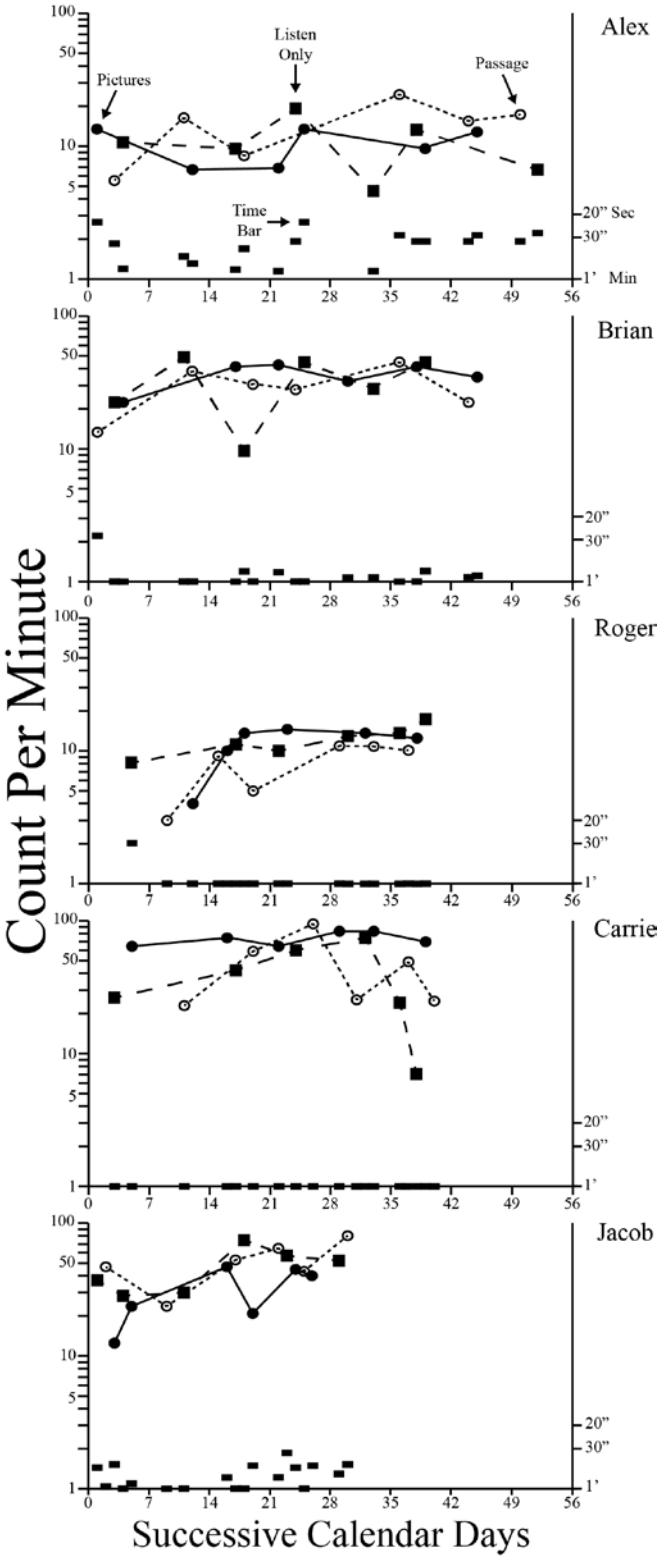


Figure 1. Words per Retell in Time

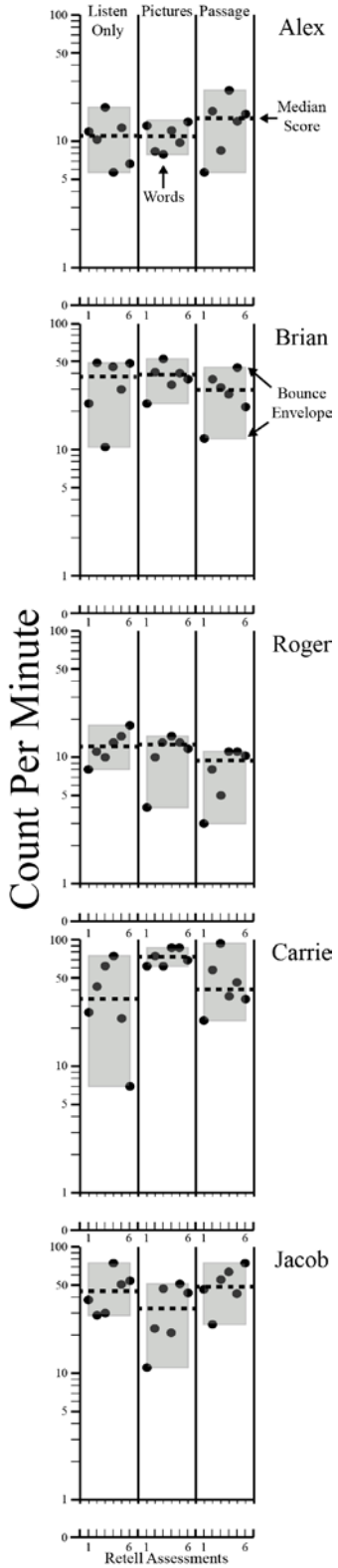


Figure 2. Words per Retell per Condition

Table 3. Words per Condition Celeration Values

Student	*Listen Only*	*Pictures*	*Passage*
Alex	÷1.09	X1.02	X1.14
Brian	X1.11	X1.06	X1.09
Roger	X1.16	X1.21	X1.31
Carrie	÷1.14	X1.04	X1.04
Jacob	X1.17	X1.40	X1.18

data. Brian showed slight growth in all conditions (x1.06-x1.11) with Alex displaying slight growth with pictures (x1.02) and words (x1.14) and decay when listening only (÷1.09). Regarding variability around the median, both Alex and Brian has the lowest bounces scores in the pictures condition.

Jacob and Roger maintained similar data paths but appeared to increase the number of words per retell in all three conditions faster than Alex and Brian. In other words, they completed the fewest amount of retell words early in the study and more in later assessments. Jacob and Roger showed gains ranging from x1.17 and x1.16 (listening only) to x1.40 (pictures) and x1.30 (passage), respectively (Table 3). Table 4 shows Jacob and Roger maintain similar levels and variability around the level for all three conditions.

Carrie provided an example of differential responding in the three conditions. Carrie showed similar data paths for retells under listen only condition and listen plus words (Figure 1). Number of words improved until the third or fourth assessment than sharply declined. With the pictures present however, Carrie maintained high, stable responding (Table 4) across all six assessments with only one data point from another condition overlapping the picture data path.

Table 4. Median and Bounce Scores for Words per Condition

	Listen Only		*Pictures*		*Passage*	
Student	*ML*	*BL*	*ML*	*BL*	*ML*	*BL*
Alex	11.4	X3.2	11.0	X1.9	16.2	X4.5
Brian	37.5	X4.8	38.9	X2.3	29.5	X3.8
Roger	12.0	X2.3	12.5	X3.8	9.5	X3.8
Carrie	35.0	X11.0	73.0	X1.5	42.0	X4.0
Jacob	44.7	X2.7	33.7	X4.8	49.1	X3.1

Note: ML = Median Level; BL = Bounce around Level

Table 5. Thought Units per Condition Celeration Values

Student	*Listen Only*	*Pictures*	*Passage*
Alex	X1.00	X1.08	X1.04
Brian	÷1.38	X1.07	X1.20
Roger	÷1.13	X1.09	X1.00
Carrie	X1.01	X1.24	X1.18
Jacob	X1.11	X1.35	X1.05

Celeration scores for Carrie (Table 5) showed little difference with the passage and pictures in place but decayed (÷1.14) when listening only.

4.2 THOUGHT UNITS PER RETELL

Figures 3 and 4 follow the same conventions established for Figures 1 and 2, respectively. Instead of words per retell, Figures 3 and 4 show thought units per minute per condition. Figure 3 shows thought units per condition occurring in time while Figure 4 pulls thought units together per condition to focus on the median and variability around the median.

Alex, Brian, and Roger shared similar low, stable thought unit responding for all three conditions (Figure 3). Table 5 shows that thoughts units in picture and passage condition retells grew between 0% (x1.00) and 20% (x1.20) for all three participants. However, all three participants provided fewer thought units within the listen only condition decelerating at a maximum of ÷1.38 (Brian). Figure 4 shows that outside of two conditions for Brian (i.e., pictures and words), all median thought unit levels occurred at 0 with some upward bounce (Table 6).

Table 6. Median and Bounce Scores for Thought Units per Condition

	Listen Only		*Pictures*		*Passage*	
Student	*ML*	*BL*	*ML*	*BL*	*ML*	*BL*
Alex	0	X7.6	0	X5.0	0	X3.7
Brian	0	X7.8	0.6	X8.2	1.0	X7.0
Rodger	0	X4.0	0	X2.0	0	X1.0
Carrie	2.0	X9.0	5.5	X4.2	5.5	X3.6
Jacob	3.0	X15.0	4.0	X9.5	3.6	X8.0

Note: ML = Median Level; BL = Bounce around Level

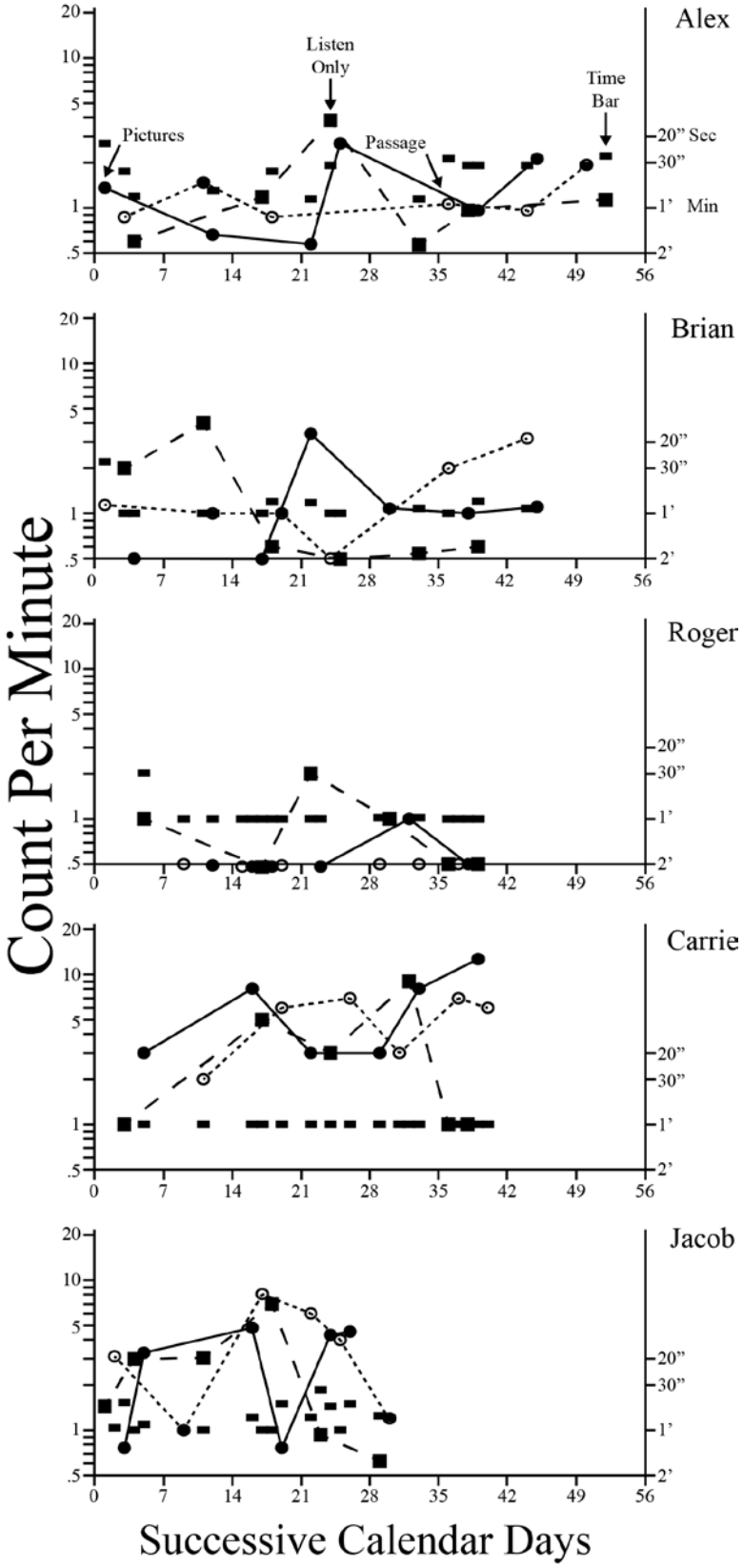


Figure 3. Thought Units per Retell in Time

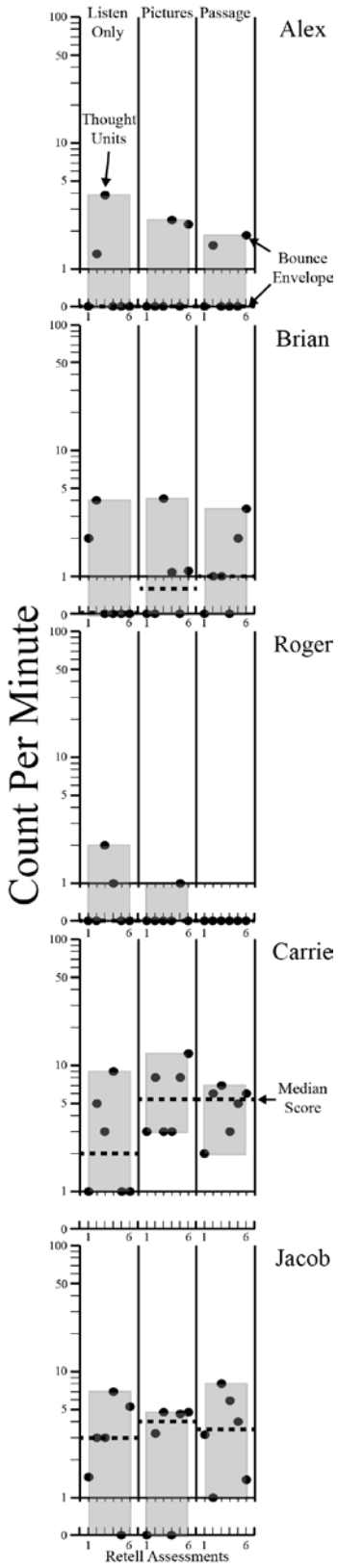


Figure 4. Thought Units per Retell per Condition

Retells for Carrie and Jacob contained more thought units than Alex, Brian, or Roger. Carrie and Jacob both demonstrated highest celeration values under the picture condition with accelerations of X1.24 and X1.35, respectively (Table 5). The lowest accelerations for both participants measured only 1% (Carrie, listen only) and 5% (Jacob, listen with words) gains weekly. While growth values differed, Jacob had similar median levels across all three conditions (Figure 4) ranging from three (listen only) to four (pictures) thought units (Table 6). Carrie displayed the same level of thought units per minute in passage and picture conditions (5.5) which almost tripled her thought units' level (2) in the listen only condition.

4.3 SUMMARY

Across all five students and both dependent measures some patterns emerged. Roger and Alex produced the fewest words per minute (i.e., less than 20) across all three conditions with little to no growth. Retells for both participants also maintained an average of 0 thought units. Carrie and Jacob, on the other hand, had retells averaging 30 or more words per retell containing an average of 2 thought units per minute or more. Brian fell in the middle on both accounts (i.e., words and thought units per minute). Differentiation of performance between conditions occurred only for Carrie with words per minute considerably higher in the picture condition and thought units per minute higher in picture and passage.

4.4 SOCIAL VALIDITY

To assess social validity, a questionnaire with a five-point scale was given to the classroom teachers and student participants at the completion of the study sessions. Information given by classroom teachers was also collected throughout the course of the study. Table 7 presents the results for the student and teacher questionnaires.

All four teachers who participated in the study returned the questionnaire. A score of "strongly agree" was given by all teachers for the statements, "The powerpoint presentation was easy to use" and "The time for each session was reasonable." The statement of "Students were interested in the sessions" drew more neutral responses than the other statements. During the study, one of the teachers indicated that he felt the student responded better to listening to someone else read the stories. The student previously would hesitate to answer questions or retell a story they read in the classroom.

All five student participants also completed a questionnaire. The highest score was 4.2/5 on the statement, "I liked participating in each session." The next highest score was for the statement, "I liked using text to help me retell." That statement scored higher than statements about the other two conditions. The lowest scores were 3.6/5 and were the statements, "Each session was just the right amount of time" and "There were just enough sessions for me."

Table 7. Student and Teacher Questionnaire Results

Teacher Questions	*Average Score (Scale 1-5, 5 = Strongly Agree)*
The powerpoint presentation was easy to use	5
Procedures for implementation were clear	4.75
The time for each session was reasonable	5
Students were interested in the sessions	3.75
The results of this study will benefit other practitioners	4.5
Listening to stories helped students retell.	4
Seeing pictures helped students retell stories.	4.75
Seeing text helped students retell stories.	4
Student Questions	*Average Score (Scale 1-5, 5 = Strongly Agree)*
I liked participating in each session.	4.2
Each session was just the right amount of time.	3.6
There were just enough sessions for me.	3.6
Listening to stories helped me retell.	3.8
I liked using pictures to help me retell.	3.8
I liked using text to help me retell.	4

5.0 DISCUSSION

The ability to read serves as a critical academic skill for all students (NRP, 2000). Students with Autism often experience difficulties across the spectrum of reading behaviors especially listening comprehension (Westerveld & Roberts, 2017). Research (e.g., Mims et al., 2012; Whalon et al., 2015) have conducted limited studies that aim to build listening comprehension, however continued work is necessary. The purpose of the current study examined the effects that different environmental conditions have on the listening comprehension of students with Autism. The specific research question asked what effect varied presentation style (i.e., listen only, listen with pictures, and listen with the passage present) has on the number of words and thought units provided by students with Autism during oral retells.

The students displayed mixed results with little difference between conditions. Some students (Roger and Alex) had very few numbers of words and thought units per retell regardless of condition. Brian and Jacob had retells with both more words and thought units per minute. Carrie provided the sole example of differential conditional responding by displaying more words in the picture condition and more thoughts units in both the picture and passage conditions. While the mixed results do not establish a clear functional relation between retells and condition, the overall findings contribute to the retell literature.

The use of retells has been used across several studies of reading and listening comprehension and is shown to be effective for typically developing students (Barnes et al.,

2014; Tannock, Purvis, & Schachar, 1993), students with learning disabilities (Sencibaugh, 2007; Hudson & Browder, 2014) and students with Down Syndrome (Seung & Chapman, 2003). In addition, presentation of stories using oral and pictorial stimuli made a difference in children's story recall such that kindergartners and second graders recalled more content when stories were presented orally and pictorially rather than either orally or pictorially (Schneider & Dubé, 2005). However, the literature for students with Autism is limited with little focus on retelling (Israelsen & Gilliam, 2016) and on the recall of events (Murdock & Hobbs, 2011).

Across the five participants, retells occurring in response to conditions with additional environmental influences (i.e., pictures or text) often had more words and thoughts units. Also, no students scored the highest thought units in the listen only condition. The results suggest students with Autism may find that understanding language and communicating a challenging activity (Rao & Gagie, 2006). To mitigate this, Browder et al. (2009) and Kashani, Sajjadi, Sohrabi, & Younespour (2011) have shown that visuals can promote comprehension. Also, the presence of words can also help with understanding unfamiliar content (Brown, Oram-Cardy, & Johnson, 2013). Thus, the presence of pictures and words may have promoted stronger retelling behaviors. However, other factors may also explain the mixed results.

Higher retell scores in the present of pictures (e.g., Carrie) may have resulted from the effective use of visuals to assist comprehension (Tillmann, Olguin, Tuomainen, & Swettenham, 2015). Unlike Wagner et al. (1999) who allowed students to refer to pictures during storytelling to promote retells, participants in the current study saw pictures only during the reading of the story and not during the retells. The pictures may have served to help create/understand the story and set the stage for Carrie's retells. However, not all participants may have had the retell ability necessary to benefit from the different environmental conditions.

Differing skills levels as well as a mismatch of decoding and comprehension also contribute the mixed results. Students with Autism can often decode words fluently but have difficulty with comprehension (Brown, Oram-Cardy, & Johnson, 2013; Flores & Ganz, 2009). In other words, the relationship between the retelling behavior of students did not always align with reading fluency level (Nation & Norbury, 2005). Alex, who read a screening passage at 117 CWPM at the 5th grade level, provided retells with the fewest words and thought units. Thus, students reading fluency may not have served as the clearest indicator of retell ability.

5.1 RETELL DATA COLLECTION

Retell behavior in the current study consisted of collecting the quantity within the retell (i.e., words) and quality of the retell (i.e., thought units). Preferred data collection of retells often involve only a measure of correct words per minute (Fuchs, Fuchs, & Maxwell, 1988; Reed & Vaughn, 2012). This measure allows the information obtained to be a reliable way to see change in performance over time and across students (Shapiro et al., 2014). Roberts, Good, and Corcoran (2005) used an alternate form of the Dynamic Indicators of Basic Early Literacy System (DIBELS) called the Vitals Indicators of Progress (VIP) system by pairing oral reading fluency with retell with first grade students. Others have measure retells in the form of words alone (e.g., Noltemeyer, Joseph, & Watson, 2014). However, simply tallying words may not serve as the clearest measure of retells.

In addition to the word metric, the current study included a quality measure of thought units. The use of thought units looked at how the words were being spoken and if they included a subject and a verb to create identifiable clauses in their speech (Green & Klecan-Aker, 2012;

Hunt, 1965). Adding thought units fits with previous literature expanding the retell measure to include such things as frequencies of content words (Seung & Chapman, 2003), number of propositions and longest utterance length (Gabig , 2008), and syntactic complexity of story retells (Israelsen & Gillam, 2016). The additional measure of thought units highlighted retell performance outside of retell alone. For example, Carrie had more words in retells after the picture alone condition, but about the same number of thought units in both supported conditions (i.e., pictures and passages). While not included in many previous studies, the measurement combination of word and thought units provided insight into student performance in the different conditions.

5.2 USE OF TECHNOLOGY

A difference among much of the research and the current study is the use of technology. An audio recording of each story was completed and placed into a powerpoint presentation. In some research, participants hear live audio (Curenton, Craig, & Flanigan, 2008) and others hear audio recorded stories (Westerveld & Gillon, 2010; Seung & Chapman, 2003). The use of audio-recorded stories reduces inconsistency and variabilities that could come from live audio (Kim, 2016). Students with Autism may benefit from the use of technology as it allows for audio and visual strategies to be used without peer knowledge which will allow them to access inclusive settings (King-Sears, Swanson & Mainzer, 2011), thus further increasing their motivation and engagement of instructional activities (Spencer & Smullen, 2014).

5.3 LIMITATIONS

Given the mixed, yet positive results, the study does contain some limitations. While the settings and teachers were held consistent as much as possible, the settings and teachers did differ for most students with multiple teachers for one student. While limiting, each student did act as their own control providing strong internal validity, but hindering external validity. In addition to the settings and teachers, each student only completed 6 instances of each condition. Additional sessions may have produced clearer results.

Another limitation revolved around the presentation of the title. Based on retell transcription, Alex consistently used title of the story as the first word(s) of his retell in 9 out of 18 sessions regardless of condition. The title was presented visually at the beginning of the all powerpoints. Thus, Alex may have simply remembered the title from the visual presentation inflating his retell numbers as in Sarokoff, Taylor and Poulson (2001). The limitation is mitigated as only Alex showed this pattern.

Although the use of technology was an element to create consistency in the audio, it was also a limitation. Audio recordings were read at 150 CWPM. After reviewing the audio, stories were heard at this rate. However, during review of the sessions, one word in two different passages were not able to be heard due to a technical error. Although the students had six conditions of each condition, this error caused a limitation on the consistency of the recordings. Upon initial listening, stories were confirmed to be read at 150 CWPM, however a technical error in two of the recordings omitted one word in two separate passages. Therefore, students heard those two stories at 149 CWPM.

5.4 IMPLICATIONS FOR PRACTITIONERS

Practitioners should continue to incorporate retelling into the instruction for students with Autism. It is important that retelling is part of a teaching practice and not used without instructions. Diehl, Bennetto, and Young (2006) found that when students listen to a story and are then asked to retell stories without a picture book, it is more difficult than if they can use the book during the retelling. Therefore, teaching students how to do a retelling with visuals is shown to improve retelling behavior. Visuals can be shown in many forms including pictures and words.

Roberts et al. (2005) notes that retelling can be "taught, modeled, and practiced more easily than cloze and question-response tasks" (p. 308). Since students with Autism may find it challenging to have stories as a series of meaningful events, they are in need of modeled instruction that builds this skill (Baron-Cohen, Leslie, & Frith, 1986). Retelling stories is one avenue to practice how to stay on topic and provide information about what was heard. However, other avenues to practice retelling should be explored. Gabig (2008) asked students to recall events that occurred during the school day.

To further promote effective listening comprehension through retells, practitioners should find stories for students that build on a common theme yet are still at their instructional level. A study of listening comprehension had middle school students with Autism retell stories they heard through writing and drawing (Colasent and Griffith, 1998). They found that student narratives improved when stories centered on a theme.

Students in this study were asked to reading passages to determine a fluency reading score. However, the results of the study did not show that reading fluency correlates to the number of correct words retold or the number of thought units. As with Alex who had the highest

fluency score of all five participants, his words correct per minute and thought units were the lowest among all participants and across all conditions. While Roger who had a 3rd grade reading fluency level spoke only in one-to-two-word phrases for the majority of the retells. Therefore, practitioners should seek to use measures of listening comprehension as the basis for the instructional level of stories when conducting retells.

Finally, practitioners should examine the various ways technology can be used to support listening comprehension. Technology has served as a critical aspect of instruction for students with Autism (Lucas, Thomas, & Norbury, 2017). Alison et al. (2017) found ways to incorporate technology into instruction so that students build independence in their instruction. Whether it is a computer or an ipad, there are numerous ways for students with Autism to access information.

5.5 DIRECTIONS FOR FUTURE RESEARCH

As future research in conducted for students with Autism, listening comprehension is something that should continue to be explored. This study consisted of five participants diagnosed with Autism and speech and language impairment, while two of the participants also had another secondary diagnosis of intellectual disability. Students with Autism having increasingly complex needs and therefore future research should include studies that have participants with two or more disabilities. This information will contribute to the literature and provide strategies for practitioners.

Retelling for students with Autism does not have a strong literature base yet it is important that further research is conducted. Many different methods to incorporate retells when examining listening comprehension exist. For example, additional prompts both verbal and

pictorial, may increase the quantity and quality of retelling. The use of prompting will allow students to receive instruction on how to complete a retell followed by feedback and various prompting procedures. The combination of the two (teaching and various prompts) may further inform the research on listening comprehension.

The presentation of the stories may also change as research evolves. Instead of pre-recorded audio, teachers can read the stories to the students varying inflection and pacing. Kim (2016) found that some students in kindergarten through second grade may benefit from stories be read by live audio. Additionally different measurement of retells may provide further insight. Words and thought units per minute provide one analysis, but others exist. Measures such as syntactic complexity (Israelsen & Gilliam, 2016) and idea units (Reed & Petscher, 2012) may provide a clearer picture of the effects of retells completed under different environmental conditions.

O'Connor and Klein (2004) used cloze passages for students with autism to look at the syntactic complexity of language. Future research should also seek to manipulate the presentation of visuals during retelling to determine the effects of these visuals on correct words per minute. During this study, students were shown visuals at 25, 75, and 125 minute-marks in the listen with pictures condition. Retell is a way to determine listening comprehension, but other methods should continue to be explored.

5.6 CONCLUSION

Listening comprehension is often overlooked as a measure to improve reading comprehension and social interactions for students with Autism. Research on listening

comprehension for students with Autism has been limited and this study aimed to contribute to the literature in this area. The presentation styles showed mixed results among participants, however the listen only condition yielded the lowest results among participants. Through the collection of correct words retold and thought units, a stronger analysis was able to be conducted on individual retells across participants and conditions. Based on the results of this study, students with Autism need continued instruction in listening comprehension to improve retelling behavior. Future research will include other methods of listening comprehension (cloze) as well as participants who are diagnosed with two or more disabilities.

APPENDIX A

TABLE OF REVIEWED ARTICLES WITHIN THE LITERATURE REVIEW

Article	Design	Dependent Variable	Independent Variable	Participants	Setting	Outcome
Alison, Root, Browder, & Wood (2017)	Single-case, Multiple probe across participants	# of independent pairings of "Wh" words with definitions and examples # of correct responses to comprehension questions	Technology-based Shared Story Reading "Wh" questions	-3 students w/ASD, ELL -8 to 10 years old	Self-contained classroom, suburban public elementary school	Pairings of "Wh" words with definitions and examples All participants increased in # of independent responses "Wh" Questions One student met mastery after 5 sessions, while two met mastery at sessions 10 and 11, respectively.
Kobari-Wright & Miguel (2014)	Non-concurrent multiple baseline design	# of listener responses from an array # of listener responses from an array w/visual sample # of tacts from a category	Listener training Listening condition Tact condition	-4 children w/ASD -4 to 5 years old	Separate room in school or student's home	Post-training -All 3 participants tacted and categorized all pictures -Students who had a naming repertoire were able to categorize -Listener training may produce speaker behavior and categorization
Lucas, Thomas, & Norbury (2017)	Multiple-baseline across participants	# of words correctly named	Linguistic Context to teach vocabulary using E-prime software	-35 children w/ASD -18 w/ structural language -17 w/LI -29 TD peers -8 to 13 years old	Specialist school for students with ASD	Picture naming task -Presentation mode did not influence phonological learning Recognizing new words -Higher accuracy scores were recorded Students with ASD are able to learn new vocabulary within a linguistic context
Mims, Hudson, & Browder (2012)	Multiple-baseline probe design across students	# of correct unprompted responses to text-dependent listening comprehension questions	Comprehension questions	-4 students w/ ASD -1 female -3 males -12 to 14 years old	Self-contained special education classroom-ASD	Comprehension Questions During Intervention, each student answered 165 comprehension questions: -Students answered between 77 and 124 answers correctly
Mucchetti (2013)	Multiple baseline with alternating treatment design within study	Correct vs. incorrect responses to questions	Shared reading (picture symbol/text response board)	4 students w/ASD -3 males -1 female -5 to 6 years old -Nonverbal	Private school	All four students showed higher story comprehension and task engagement in intervention and activity engagement compared to baseline.
Murdock & Hobbs (2011)	Multiple-baseline design	# of daily events reported -Coding of student responses	Visual Cueing System	-3 students w/ ASD -5 yrs. 1 month to 5 yrs. 4 months old	Preschool classrooms-private facility	One student maintained performance with partial cueing, one student provided more events than in cueing phase, and one reduced the number of events during partial cueing
Preis (2006)	Alternating Treatment design	# of commands presented # of commands achieved across intervention, generalization, and maintenance	Commands across treatment conditions *A*- picture support with verbal commands *B*- without picture symbols with verbal commands	-5 students w/ASD -3 females -2 males -5 to 7 years old	University speech and language pathology center	Use of visual supports (picture communication symbols) are effective got verbal directions. However, the visuals did not improve skill acquisition.
Spooner, Ahlgrim-Delzell, Kemp-Inman, & Wood (2014)	Single-case multiple probe across participants	# of correct responses for items in task analysis # of correct unprompted responses	Shared Stories with Ipad 2 with GoTalk Now	-4 students w/ASD -8 to 12 years old -Limited to no verbal ability	Self-contained special education classrooms in public school	Participants increased correct responses on task analysis from baseline. Three students increased correct responding in listening comprehension questions during intervention while one student decreased correct responding.
Whalon and Hanline (2008)	Single-subject multiple baseline design	# of student generated questions -related or unrelated -prompted or unprompted	Cooperative learning with reciprocal questioning (using SCORE)	-3 students w/ASD -2-ASD -1-PDD -9 TD peers -7.5 to 8.7 years old	Small room located outside of general and special education classrooms	Unprompted questions increased for all participants from baseline to intervention. Participants with ASD responded to questions generated by peers without prompting increased during intervention
Whalon et al. (2015)	Multiple-baseline across participants	# of unprompted correct responses to fact and inference-based questions # of Verbal initiations # of Nonverbal initiations	Shared reading intervention (RECALL) with prompting hierarchy	-4 students w/ASD -males -4 to 5 years old	Self-contained special education preschool	-All four participants decreased incorrect responding -Spontaneous responding to fact and inference-based questions -3 of 4 participants increased frequency of initiations

Note: ASD- Autism Spectrum Disorder; TD- Typically Developing, LI- Language Impairment

APPENDIX B

IRB APPROVAL LETTER

University of Pittsburgh
Institutional Review Board

3500 Fifth Avenue
Pittsburgh, PA 15213
(412) 383-1480
(412) 383-1508 (fax)
http://www.irb.pitt.edu

Memorandum

To: Katherine Schultz
From: IRB Office
Date: 11/6/2017
IRB#: PRO17070003
Subject: The Effects of Conditional Stimuli on the Retelling Behavior of Students with Autism

The above-referenced project has been reviewed by the Institutional Review Board. Based on the information provided, this project meets all the necessary criteria for an exemption, and is hereby designated as "exempt" under section

45 CFR 46.101(b)(1)

Please note the following information:

- Investigators should consult with the IRB whenever questions arise about whether planned changes to an exempt study might alter the exempt status. Use the "**Send Comments to IRB Staff**" link displayed on study workspace to request a review to ensure it continues to meet the exempt category.
- It is important to close your study when finished by using the "**Study Completed**" link displayed on the study workspace.
- Exempt studies will be archived after 3 years unless you choose to extend the study. If your study is archived, you can continue conducting research activities as the IRB has made the determination that your project met one of the required exempt categories. The only caveat is that no changes can be made to the application. If a change is needed, you will need to submit a NEW Exempt application.

Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.

APPENDIX C

PARENTAL CONSENT FORM

Consent Letter
Principal investigator: Katherine Schultz
Study title: The Effects of Conditional Stimuli on the Retelling Behavior of Students with Autism

Dear Parent/Guardian:

My name is Katherine Schultz and I am a Co-Supervisor of Autistic Support Programs at IU13 as well as a doctoral candidate at the University of Pittsburgh. I am preparing to write my dissertation about **The Effects of Conditional Stimuli on the Retelling Behavior of Students with Autism**. This is a study about listening comprehension. I am writing this letter to ask for consent for your child, if qualified, to participate in this study. I am also asking for permission to use the results of the study with teachers and researchers through presentations and publications. I believe that this study will assist your child in building skills that will benefit their comprehension. Additionally, the results will inform educational practices for educators who work with students with Autism.

Screening Information

- Your child will be assessed using the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) to gather information on their oral reading fluency level
- In order for a child to participate in the study, a reading level above kindergarten and an instructional reading level between 50-150 words correct per minute are needed

Study Information

- If your child qualifies based on the screening results, sessions will begin
- The study will take only 2 minutes per day over the course of 4-6 weeks and be in addition to the reading instruction your child is receiving
- Your child will be played a recording of a short, 150 word story each day
- During the story, they will be given one of three conditions (random) each day: listen only, listen plus text, and listen plus pictures
- After the story is over, the student will be asked to tell their teacher everything they remember about the story
- The classroom teacher will be conducting each of the sessions
- **Each two-minute session will be video recorded to guarantee accuracy of implementation. The videos will be reviewed by the researcher to review the story retell and record words correct per minute**

Information Gathered by Researcher

- Exceptionality category
- Grade level
- Classroom program
- School name
- Parent's name
- Address
- Telephone number
- Date of Birth

- Teacher's name
- IQ scores (if available)
- Academic achievement scores
- Full-face images (during video recordings)

There are minimal risks with your child's participation in the study. Your child may experience frustration with academic tasks similar to a typical classroom task. Since the sessions will be video recorded, the video will be uploaded to a secure database through the University of Pittsburgh. In addition:

- A pseudonym (false name) of your child will be used in the written dissertation submitted to the University of Pittsburgh
- Personally identifiable information (date of birth, address, phone number, parent name etc.) will only be accessed through the IEPwriter system already used by IU13
- Video recordings will be stored on a password protected computer and uploaded to a secure database
- The principal investigator, the co-investigator, and the classroom teacher will have access to all research data and documents which will include personal identifiers
- In order to share the results of the research, information of the results, including video recordings may be used to share at conferences and presentations within the Lancaster-Lebanon IU 13. Session information may also be used in the future for other research. However, no student names will be used.

Confidentiality

According to University of Pittsburgh policy, all research records must be maintained for at least 7 years following final reporting or publication of a project. For projects involving children, records must be maintained for 5 years past age of majority (age 23 per PA State law) after study participation ends.

There will be no data or scores added to your child's educational record. Research records will be stored indefinitely in locked files at the University of Pittsburgh. Identifiable records may be accessed by the University of Pittsburgh Research Conduct and Compliance Office (RCCO) for purposes of monitoring the conduct of the study and could be released in response to an order by a court of law.

If at any time, you decide that your child will not participate in the study, there will be no negative consequences. Even with your consent, your child must also choose to participate in the study. If you and your child both agree to participate, please understand that participation is voluntary and you or your child may withdraw from the study at any time. Immediately upon the request for withdraw, sessions will stop. If at any point you choose to withdraw your child from the study, please contact me, Katherine Schultz, at 717-875-5965 or at kns57@pitt.edu.

If you would like more information or if you have questions about any part of this letter, please call Katherine Schultz at **717-875-5965**. If you would like to verify this study is being conducted in your child's classroom, please contact your child's teacher at **717-838-1331.** If you have any questions about your rights as a research subject or wish to talk to someone other the research team, please

call the University of Pittsburgh Human Subjects Protection Advocate toll-free at 1-866-212-2668.

Please complete the attached consent form and return the forms to your child's teacher. Thank you for your support.

Katherine Schultz, M.Ed.

Doctoral Candidate

PARENTAL CONSENT

The study information has been explained to me and all of my current questions have been answered. I understand that I am encouraged to ask questions about any aspect of this research study during the course of this study, and that such future questions will be answered by a qualified individual or by the investigator(s) listed on the first page of this consent document at the telephone number(s) given. I understand that I may always request that my questions, concerns or complaints be addressed by a listed investigator.
I understand that I may contact the Human Subjects Protection Advocate of the IRB Office, University of Pittsburgh (1-866-212-2668) to discuss problems, concerns, and questions; obtain information; offer input; or discuss situations in the event that the research team is unavailable.
A copy of this consent form will be given to me/my child.

____ **YES**, I give permission for my child, _____,
(child's name)
to participate in this project. I understand that my child's participation is voluntary and that he/she may withdraw from the project at any time.

____ **NO**, I do not wish for my child to participate in this project.

_____ _____
Parent Name Date

_____
Parent Signature

2. If you would like a copy of your child's results, complete the following items:

My telephone number: _____

My U.S. mailing address: _____

_____

If you give permission to share video/audio recording of your child in professional presentations <u>outside</u> of the Lancaster-Lebanon IU 13, please indicate so below. This is NOT a requirement to participate in the study.

____ **YES**, I give permission for the video/audio recordings of my child, _____,
(child's name)
to be shared in professional presentations related to this study. I understand that providing this permission is voluntary and that I may change my mind at any time during or after the study.

____ **NO**, I do not wish for my child's video/audio recordings to be shared.

APPENDIX D

VERBAL ASSENT FORM

Verbal Assent Script for Students with Autism in Grades 6 and 9

(Read to student)

Hi. My name is Mrs. Schultz. I asked your parents if you could help me with a study I am working on. You would be asked to listen to stories and at the end of the stories you will be asked to retell everything you remember. Would you like to work with your teacher during each of the sessions?

You can stop at any time and would no longer have to participate.

Do you have any questions?

(If parents consented to use of video in presentations)

Would it be okay if I used your videos to show others what I learned? I asked your parents and they said they would be okay.

APPENDIX E

FRY READABILITY RESULTS

FRY READABILITY RESULTS – GRADE 1 PASSAGES

Grade 1 Readings	*# of sentences (per 100 words)*	*# of syllables (per 100 words)*	*Grade Level*
1	11.5	127	1
2	11.7	126	1
3	11.2	117	1
4	13.5	119.4	1
5	10.6	119	1
6	11.5	122	1
7	12	116	1
8	11	118	1
9	12.5	126	1
10	12.5	122.8	1
11	11.4	127	1
12	12.2	132	1
13	11.8	124	1
14	11	118	1
15	12.5	132	1
16	10.3	125	1
17	11.7	123	1
18	10.7	139	1
Average	11.6	124	1

FRY READABILITY RESULTS – GRADE 3 PASSAGES

Grade 3 Readings	*# of sentences (per 100 words)*	*# of syllables (per 100 words)*	*Grade Level*
1	8.3	139	3
2	8.4	126	3
3	7.9	131.7	3
4	8.3	134.9	3
5	7.6	139	3
6	7.8	129.5	3
7	8.4	135	3
8	7.8	127.9	3
9	7.7	130	3
10	7.6	134	3
11	7.8	140	3
12	7.7	135	3
13	7.5	133	3
14	7.7	137	3
15	8.8	131.5	3
16	8.1	132.2	3
17	8.3	121.7	3
18	7.8	134	3
Average	8	132.9	3

FRY READABILITY RESULTS – GRADE 5 PASSAGES

Grade 5 Readings	*# of sentences (per 100 words)*	*# of syllables (per 100 words)*	*Grade Level*
1	6	139	5
2	5.9	144	5
3	6.4	140	5
4	6.2	151	5
5	6.4	147	5
6	6.2	158	5
7	6.5	146	5
8	6	151	5
9	6.3	144	5
10	6.4	142	5
11	5.6	134	5
12	6.2	138	5
13	6.5	138	5
14	6.3	136	5
15	6	125	5
16	6.3	149	5
17	6.1	139	5
18	6.1	141	5
Average	6.2	142.3	5

APPENDIX F

WORD OVERLAP ANALYSIS FOR PASSAGES IN GRADES 1, 3, & 5

Word Overlap Analysis for Passages in Grade 1 (Ave. 23%; Range 12%-38%)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	-	26%	25%	22%	15%	24%	19%	14%	24%	29%	19%	20%	24%	22%	18%	18%	17%	20%
2		-	18%	25%	18%	25%	19%	22%	23%	25%	23%	24%	26%	24%	21%	29%	21%	24%
3			-	22%	25%	25%	22%	32%	21%	16%	29%	20%	21%	29%	15%	17%	18%	22%
4				-	16%	28%	22%	16%	22%	20%	22%	19%	22%	17%	22%	18%	18%	18%
5					-	24%	17%	20%	18%	12%	22%	20%	13%	18%	20%	14%	22%	18%
6						-	24%	20%	27%	26%	17%	27%	19%	19%	28%	27%	19%	18%
7							-	38%	33%	26%	20%	22%	15%	28%	22%	27%	24%	19%
8								-	22%	28%	23%	18%	25%	28%	15%	20%	19%	15%
9									-	38%	31%	30%	26%	35%	34%	34%	32%	31%
10										-	25%	32%	26%	22%	23%	26%	26%	29%
11											-	27%	20%	24%	17%	24%	17%	22%
12												-	21%	24%	22%	26%	22%	29%
13													-	27%	24%	24%	19%	31%
14														-	26%	36%	24%	28%
15															-	22%	25%	18%
16																-	28%	21%
17																	-	30%
18																		-

Word Overlap Analysis for Passages in Grade 3 (Ave. 23%; Range 14%-43%)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	-	22%	21%	29%	25%	29%	24%	23%	31%	22%	24%	22%	26%	21%	25%	25%	20%	20%
2		-	40%	41%	38%	43%	40%	38%	40%	35%	39%	38%	41%	39%	32%	38%	31%	23%
3			-	18%	20%	21%	19%	20%	22%	26%	20%	19%	16%	15%	22%	22%	22%	25%
4				-	26%	34%	14%	31%	21%	35%	23%	17%	25%	25%	21%	19%	19%	20%
5					-	21%	26%	21%	25%	24%	24%	24%	22%	19%	25%	22%	28%	26%
6						-	20%	27%	19%	25%	19%	22%	22%	30%	19%	19%	25%	22%
7							-	27%	23%	27%	31%	40%	27%	28%	29%	29%	26%	28%
8								-	26%	33%	25%	27%	26%	28%	27%	25%	28%	28%
9									-	36%	24%	23%	31%	33%	32%	30%	30%	27%
10										-	26%	24%	24%	31%	28%	24%	29%	24%
11											-	26%	17%	18%	24%	24%	23%	22%
12												-	22%	25%	28%	27%	25%	22%
13													-	22%	30%	25%	27%	24%
14														-	34%	31%	26%	24%
15															-	24%	20%	18%
16																-	26%	30%
17																	-	25%
18																		-

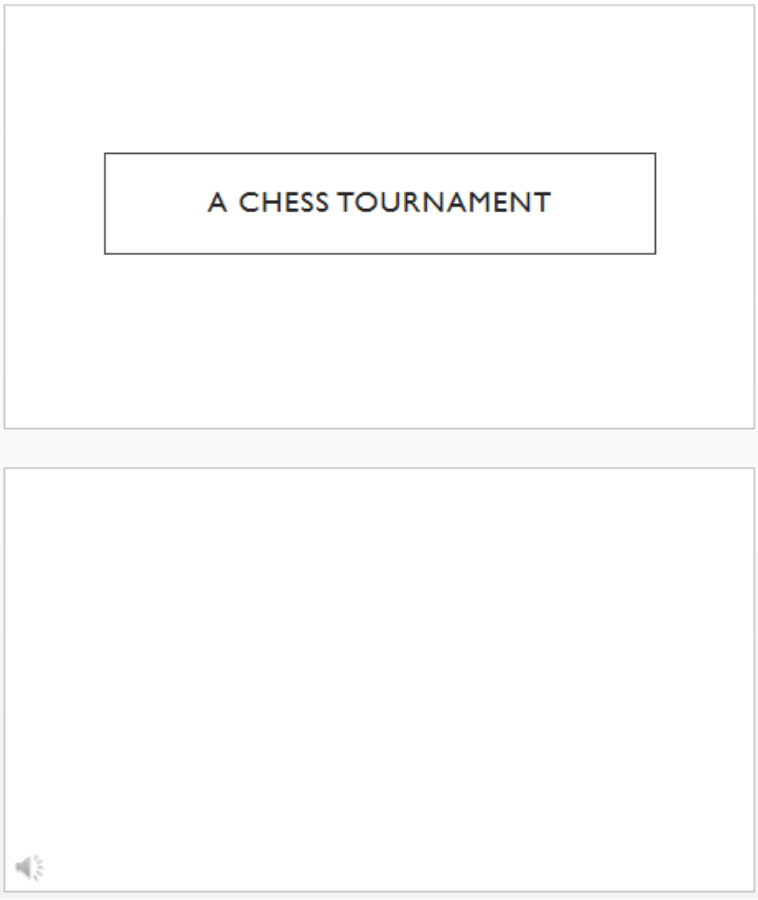
Word Overlap Analysis for Passages in Grade 5 (Ave. 18%; Range 10%-31%)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	-	15%	22%	22%	18%	18%	19%	20%	15%	13%	16%	20%	19%	15%	17%	21%	22%	22%
2		-	20%	23%	31%	21%	20%	19%	21%	26%	20%	29%	23%	23%	16%	25%	31%	23%
3			-	12%	15%	21%	16%	20%	14%	15%	17%	16%	19%	13%	14%	10%	10%	10%
4				-	21%	19%	22%	29%	23%	24%	19%	19%	18%	27%	13%	18%	15%	23%
5					-	28%	27%	21%	25%	26%	19%	24%	16%	18%	17%	20%	25%	25%
6						-	19%	20%	22%	21%	16%	19%	18%	28%	16%	20%	19%	17%
7							-	18%	23%	23%	19%	19%	19%	18%	19%	19%	18%	23%
8								-	23%	23%	25%	26%	22%	20%	18%	24%	23%	22%
9									-	21%	18%	15%	18%	16%	18%	17%	16%	15%
10										-	19%	22%	15%	22%	25%	15%	22%	18%
11											-	18%	15%	17%	17%	20%	16%	18%
12												-	17%	19%	15%	18%	16%	18%
13													-	15%	18%	14%	15%	16%
14														-	20%	19%	18%	18%
15															-	21%	16%	19%
16																-	20%	24%
17																	-	26%
18																		-

APPENDIX G

EXAMPLES OF LISTEN ONLY, LISTEN WITH PICTURES, AND LISTEN WITH WORDS CONDITIONS

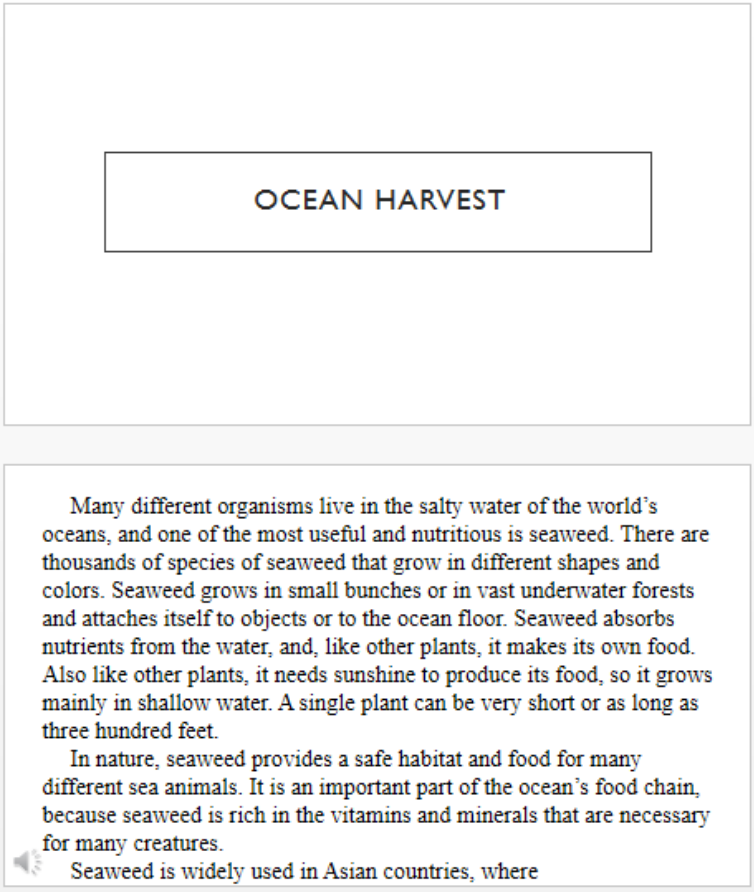
Listen Only



Listen with Pictures

GLASSMAKING

Listen with Words (Passage)



OCEAN HARVEST

Many different organisms live in the salty water of the world's oceans, and one of the most useful and nutritious is seaweed. There are thousands of species of seaweed that grow in different shapes and colors. Seaweed grows in small bunches or in vast underwater forests and attaches itself to objects or to the ocean floor. Seaweed absorbs nutrients from the water, and, like other plants, it makes its own food. Also like other plants, it needs sunshine to produce its food, so it grows mainly in shallow water. A single plant can be very short or as long as three hundred feet.

In nature, seaweed provides a safe habitat and food for many different sea animals. It is an important part of the ocean's food chain, because seaweed is rich in the vitamins and minerals that are necessary for many creatures.

Seaweed is widely used in Asian countries, where

APPENDIX H

TEACHER IMPLEMENTATION INTEGRITY CHECKLIST

Date: _____ Teacher Initials: _____ Training number: 1 2

Training: The experimenter will review how to use and submit video recordings, how to administer the three conditions and retell tests and how to respond to the student during experimental sessions.

	Yes	No	Not Applicable
Video Recordings			
1. Teacher is able to video record (set-up, start, stop)			
2. Teacher is able to submit a video using Pittbox			
Administering Conditions			
1. Teacher sets up camera so that teacher, student, and powerpoint are able to be recorded			
2. Teacher sits directly across from student			
3. Teacher places computer in designated spot on table			
4. Teacher opens powerpoint			
5. Teacher selects “slide show,” then “from beginning”			
6. Teacher states: ““You will listen to the story entitled <Teacher reads the title on the screen>. When the story is over, I am going to ask you to tell me everything you remember about the story. You can hit the space bar when you are ready for the story to start.”			
7. At the end of the story, teacher prompts student by saying “Please tell me everything you remember about the story.”			
8. Teacher starts timer for 60 seconds once the student starts to speak			
Responding during Retell			
1. If the students speaks for the entire 60 seconds, the teacher prompts “Stop. Thank you for participating.”			
2. If during the minute, the student goes silent for three seconds, the teacher asks one time, “Try to tell me everything you can.”			
3. If the student again goes silent for five seconds, the teacher immediately says, “Stop. Thank you for participating.”			
4. After the teacher says stop, the teacher stops the video camera and returns the student to their normal routine			
TOTALS			
Percentage of steps correct:			

APPENDIX I

TRANSCRIPTIONS OF RETELLINGS

Alex

Passage 1:

a new catcher in town [prompt] a new catcher in town [stop]

Passage 2:

go the camping [prompt] camping [stop]

Passage 3:

all about shoes have shoes [prompt] you all about shoes [stop]

Passage 4:

well it's called an ocean [prompt] hmm ah well I'm go to ocean too [stop]

Passage 5:

the land bridges [prompt] eh um cross them [stop]

Passage 6:

no tell story [prompt] there's no dirt here because there's no dirt here [stop]

Passage 7:

take a teacher [prompt] um i'm thinking [stop]

Passage 8:

victoria fall [prompt] hm found on a rock [stop]

Passage 9:

they call it sailing on land [prompt] hm, I can be captain [stop]

Passage 10:

help is on [prompt] help them [stop]

Passage 11:

he be in kindergarten I don't know so taco ice skate [prompt] huh ice skate [stop]

Passage 12:

over the rainbow [prompt] the color red, orange, green, yellow, blue or purple [stop]

Passage 13:

taking off [prompt] oh you go on airplane [stop]

Passage 14:

owl house [prompt] a big owl hoo hoo hoo hoo hoo [stop]

Passage 15:

what now [prompt] hm let's see let me think about [stop]

Passage 16:

sea of salt [prompt] you sail them [stop]

Passage 17:

the bear roar [prompt] i'm going to eat food t t t t t t t (makes sound of eating) i'm okay [stop]

Passage 18:

a whale [prompt] song [stop]

Brian

Passage 1:

Yes [prompt] story about pizza pepperoni cheese [stop]

Passage 2:

yeah oh bird nest he he he um um nest eggs to lay eggs and nest [prompt] alright the bird nest lay eggs in the nest and hide your eggs [stop]

Passage 3:

okay plays with uh a chess tournament principal library and chess ah boy and uh teacher and books students [prompt] a chess tournament librarian and go to [stop]

Passage 4:

um turtles live in the ocean and sea turtles live in in the water and turs babies eggs and turtles and dinosaurs lived in in dinosaurs live after at trees bushes and desert desert and dinosaurs lived in desert um yeah fish live in the water [prompt] um turtle live in the ocean um turtle in an arf an sand water [stop]

Passage 5:

ok be ok be will them space bar camping a fire marshmallows sleeping bags on the ground in forest on space rocket [prompt] space camp rocket spaceship and the ground camping ground on the moon astronaut rocket blast off [stop]

Passage 6:

so you ber dirt the plant and water's growing on an sun it's mm it it doht it's ones how how people sun the dirt soil water on growing grill grill grass dirt warm sun [prompt] okay the dirt on soil water grill grill dirts and plants [stop]

Passage 7:

uh glass water ice [prompt] uh glass water ice is drinking yep cup water ice [stop]

Passage 8:

eat dolphins hear in the water jump into high and swimming [prompt] oh dolphin do not away sw swimming an near shark and shark and whale and dolphin and the ocean and that's it [stop]

Passage 9:

alright owls help the bird to use a owl as baby birds and nest and owl and the night [prompt] uh owl and night and birds in the nest birds cage birds see their food bird water and drinking [stop]

Passage 10:

The clean plants clean are kaspouse taste good and plants and uh dirt and the water plants and grow on and out sun spring [prompt] plants an plants are clean fresh [stop]

Passage 11:

story about the can a girl who tried climb on the tree branches remember the story about what's a ss story about it's climb on tree picnic on side and house the house [prompt] try again I can see read it also I can see read it um [stop]

Passage 12:

cat the dog ran over house chasing pets animals [prompt] uh huh cat the dog grandmother and pet animals cat food dog food drink um two waters uh yeah and outside dog house cat house [stop]

Passage 13:

strawberry shortcake and strawberry cake tessa tell parents uh parade strawberry age dairy and grow up [prompt] strawberry strawberry pie or strawberry juice drinking or strawberry grow up friends [stop]

Passage 14:

green roots gardens and many schools in different many gardens at school and root gardens there is many also greenhouse green roots and many any ways [prompt] okay its green roots gardens and the flowers rest in the spring dirt and gardens in rooftop not house [stop]

Passage 15:

uh a camping camp camping on the fire camping marshmallows ground camping tent at outside at night sleep and bed and see house camping on the family [prompt] camping family on tree outside and making snores, chocolate marshmallows, graham crackers on sandwich [stop]

Passage 16:

a a football game player football game outside it's basketball tennis, sports and sports car and beach ball [prompt] a sports ball car in its ball beach ball volleyball tennis ball basketball boring game ball ball [stop]

Passage 17:

Danny's birthday is grandpa [prompt] okay Danny and Joe ride free right past the birthday Danny's birthday grandpa is coming say Danny Joe ride [stop]

Passage 18:

uh um skateboard is the school starts in boy and skate park jumping outside [prompt] uh that's okay skateboard jumping flipping and uh skateboard school starts and skateboard and jumping ramp off the build. You go skateboard [stop]

Roger

Passage 1:

about the story yeah [prompt] [stop]

Passage 2:

play store [prompt] slowly [stop]

Passage 3:

sound, sound, boy, play [prompt] [stop]

Passage 4:

nest chicken eggs play boy girl kid bye play [stop]

Passage 5:

pizza play food tomato cheese pepperoni sauce onions tomatoes cheese [stop]

Passage 6:

uh unpack school start play bored boy girl store board game rain [stop]

Passage 7:

empty full water boy girl play game full empty water girl play boy empty full play a game [stop]

Passage 8:

cake everyone this cake dog [stop]

Passage 9:

birds play girl kid boy girl play there that kid [prompt] [stop]

Passage 10:

garden plants seeds grow water stems flowers tree plant grass leaves roses summer flower [stop]

Passage 11:

football sport play about away was football sport very play about [stop]

Passage 12:

puppy, cat boy girl kid people playing game checkers leech bone cat food [stop]

Passage 13:

dolphins water race shark run go racing fast slow slow down slow down, fast, race [stop]

Passage 14:

glass color rainbow put mix know but away she kite grass [stop]

Passage 15:

dirt soil worm dew cold plant garden seed water soil worm ground shovel tree [stop]

Passage 16:

ocean swim because looking food open sea turtles babies the suh [stop]

Passage 17:

rocket night spaceship space suit table chair astronaut dark moon star grass [prompt] uh [stop]

Passage 18:

camp camp fire tent sleeping bag roast marshmallows wood outside night dark stars moon in the sky grass [prompt] [stop]

Carrie

Passage 1:

roof plants once a place for (unable to hear word) [prompt] um roof plants a flower a tree a leaf it's a leaf what else (unable to hear word) uh, a stem the stem goes down the tree [stop]

Passage 2:

what is this poker like like what is this stick thing like a lamp put it on the candy and stuff like what's that the green grass, the green grass think it's the green grass huh I think it's a green grass [prompt] the grandma uh take to the son

and to the grandma's and to glass studios and he told her that he had to put the stick on so he can and when he can take a look a window or we can roller coaster we can go roller coasters on we can go the swimming pool [stop]

Passage 3:

um I will trist um trace or no [prompt] um it's a principal who brings a memory with that means that she'll see the memory do to learn things so let me pick school cartoons it take it home or take it back to class or you could read a book about spongebob cat dog and voice goes high hum digilly and be a voice actor and means about rugrats keep book rugats dora and one shum shum [stop]

Passage 4:

the patch find the eggs finding a nest nest has the bird baby bird eggs inside to keep it warm the birds keep feeding the baby till warm and the baby feeds the cockroach uh the baby bird eats bugs and also eats sandwich and the bab the mom eats worms and he eats caterpillar eats butterfly and there eat everything and birds sometimes they walks around so they get a worm and a snake eats baby birds [stop]

Passage 5:

um the space the space can go rocket ship astronauts moon, and sun planets stars galaxy aliens an airplane can fly over ther and then I'm flying with jet a jet flying through space and the rocket is called jet I mean flying eh jet and [stop]

Passage 6:

um the garden uh worm helps plants worm have to what like this like this and they are going in the tree and they're under in the soil to keep it warm and people eats the worms from China worms can be itchy when they move like this uh and it can hurt and uh bird eats worms and birds also eats worms that feed the baby birds and [stop]

Passage 7:

uh Lan's first day Lans can learn at homework and it can learn a computer math or it can learn writing it can go learn that a math class it can learn a a wait you can learn at the smartboard number math you can learn the number math you can color you can color and eat snack lunch chair store plants lighter castle bites, and we going outside recess [stop]

Passage 8:

um a sandwich is history of pizza pizza made of tomato sauce and cheese and ja and the triangle and then and then there bacon they the bacon or cheese or stuff like that people many people eat like the pizza hut dominos or uh sa

even Hershey pizza sometimes when pizza many times a pizza has pepperoni pizza and pizza were going a place about the pizza hunt will find it at pizza hunt or little caesars little caesars you can find it on the pizza and find [stop]

Passage 9:

uh a story of of a space with the skateboard so skateboard if you are going park if you're going someone else in the place skateboard can take a walk by the car if you need it go into the park and go like this and they have a helmet they have a helmet and they wear it on their they wear the thing a knee throw on their hand hck or the thing anything he wants to go he has skateboard flip and the meanest skateboard flip if you're going to da and finally he walks around finally he walks around the skateboard jump [stop]

Passage 10:

a ball baseball can play game and a football can play game too or you can kick with the ball or you can hit with the ball to catch with the ball play on basketball station or football station or a baseball station you can go a basketball places to park or soccer ball goes to park or the other things it play dribble dribble the basketball throw it on the baskets a roll around the ball and catch it to friends and teachers then [stop]

Passage 11:

the owl's special can see the animals or ride it ride the roller coaster uh ride a roller coaster a special you can go to summer fall winter spring and the owl in spring summer it goes like hoo hoo hoo hoo hoo and kayla is going to a some fun special see the animals elephants lions penguins a big cats tiger (student name) if you keep speech there do not yell at giraffes [stop]

Passage 12:

dolphin has tails dolphins has tails because it helps him jump higher he has a fin on his head and he has the body can swim dolphin eats fish but dolphins say brr ah ah ah (dolphin noises) dolphin keeps going like doing song ah ah ah (dolphin noises) what else he eats like fish and snails does he eat snails ohhh, dolphin has teeth pretend to eat fish dolphin looks his eyes so he can look for food dolphin cries when he can doctor this is [stop]

Passage 13:

okay the story cake is either look at giant at the parade and you can eat it or you can see it the really big you can play with it or you can fly with it can we fly with it no as you show to the mom and dad you show them to the teachers or you can show Ms. Ariel it all you can show cat dog everywhere and and the balloons will fly through the strawberry shortcake and the strawberry shortcake lives in the circus the strawberry cake was keep live in his house and

strawberry shortcake lives in in outside of the house a neighborhood has people use the the uh strawberry shortcake [stop]

Passage 14:

horseback and look for treasure hunt go climbing climbing mountains ride a horse pool i'll go swim in the pool kids swim in the pool and and you go to the park and we can also go to the school wait what okay and we can also go to the mountain to climb go to the beach can go to the boat and find treasure hunt pirates drives the boat with you finds the treasure hunt and you smell something in the boat treasure hunt meh meh and [stop]

Passage 15:

camp family meets like in marshmallows tent you can go sleep in the tent sleeping bag going to go swimming pool at the beach and relaxing at the beach and why you put some some in the umbrella umbrella at the beach you have umbrella why okay so [prompt] family camp meets to get fire sing banjo and eat some breakfast and we eat sandwich we eat all foods in a day and tent is where you're going to sleep [stop]

Passage 16:

clean it's for cleaning the table clean the toys clean the wah floor clean a face up in the water clean with the sink taking a bath or you can clean anything on the planet and get licks faces can can clean dog licks his paws and hamsters loves to take a bath does hamster love bath oh so dog likes bath cats don't like waters and people clean the dogs in the bath and sometimes you clean arms up with hanitizer or you clean up blanket and make the bed pretty [stop]

Passage 17:

turtles eats jellyfishes turtle has baby turtles where you can keep it warm in laying sand turtle swims with the babies and turtles goes to have shells to keep it warm turtles have black and white turtles all have different colors turtles can goes swim up and down turtles swims down turtle swims up turtle eats fish turtle eats crabs turtle eats um ham a meat turtles walks on the beach [stop]

Passage 18:

cat was throwing dishes he was throwing those he brought the puppy with the wood in he he got a brand new puppy he takes the dog outside we take dogs to walk we take dogs to go to park and we takes dogs goes anywhere place or take in cars cats don't like waters cats is eats some cat food and cat stays outside when it's hot outside and the dogs stay outside too we can hold dogs we can hold cats oh you can pet them cat or dogs [stop]

Jacob

Passage 1:

Saturday a busy Saturday they have a banana there is there is story there there was a banana and there was and the a city [stop]

Passage 2:

yeah somewhere make dinner macaroni and cheese after eating you can you can go in to his room to play they have a sleepover they have a sleepover they can they can in the ocean [prompt] eh oo soo at yea they they have a play they have a spongebob square pants [stop]

Passage 3:

pancake breakfast breakfast pancake [prompt] breakfast a school [stop]

Passage 4:

a camp is a story they are eat hot dogs with marshmallows [prompt] yeah marshmallows they eat camping at home they they had a tent they swam in the ocean [stop]

Passage 5:

they clams they clams have a open they they clams open and close they eat shell they they eat on the floor [stop]

Passage 6:

the doctor and the checkup they can the doctor make you feels better make make a feels better [prompt] take a pills pills medicine [stop]

Passage 7:

eat ice cream on a bowl they have the ice cream on the bowl they can eat with a spoon they eat a they eat they eat they eat ice cream bowl they eat ice cream they eat hey eat ice cream bowl they eat eat ice cream they eat shells it is [stop]

Passage 8:

go to sleep on the bed on the bed you go to sleep they have a mattress they have library books they have they have goo doo gosh a good night movie [prompt] they have a they sleeping who did who knows bo de da mosh [stop]

Passage 9:

they have a lemonade stand they drink lemonade they play at school they buy stuff they get a water they it is it is it is water it is they play all day [prompt] they drink lemonade, yeah they drink lemonade ade they sell water they sell water they drink lemonade they can be alone eh ah da [stop]

Passage 10:

they have a e e e apples they have a apples problem they eat apples they eat yellow apples and green apples and red they have eat apples they have eat apple seeds they apple seeds they have a green apple on the tree they have a green apple they have a spoon they have a spoon they are a open up they have a a a a a they have a tree they have a tree [stop]

Passage 11:

on their head they on their head they they eh on their head from beginning on their head they they hats they eh uh they eh uh they they hats on their head eh sponge bob [prompt] doh he eh uh they they uh uh uh uh sponge bob hat they uh they eh eh they eh eh [stop]

Passage 12:

they eat they not eat rocks they eat they eat shells they they not eat rocks they can open paint it is fun stuff it is it is it is fun to the paint them they have eat rocks they have eat other problem [prompt] they not eat they they no no eat rocks [stop]

Passage 13:

a shape art is big a shape is triangle a shape is square and circle triangle shapes ssh shapes sh shapes [prompt] they have a they have a magic they have a [stop]

Passage 14:

my mommy is a artist my mommy is painter is brush and molds a a molds they have a mommy artist [prompt] they have a they have a e they don’t they have a oo mommy artist [stop]

Passage 15:

cat at the doctor they can take him they can give him water and aleve and aleve hm hm and and um um and water give him water they have a hm hm hm and and doctor they have a doctor they have they have him medicine we drive home [stop]

Passage 16:

it can have a big day they they high school football they had a e e e ao tie be e e e e [prompt] they had a football they had a big game they had a ow [stop]

Passage 17:

the block party we had presents and music and games they had they not eat playdough they had a game they had a block party they had a they eat they eat cake they eat [prompt] they eat birthday party a party [stop]

Passage 18:

they got a puzzle they oh no no no they have they not eh eh and then and then the puzzle and then to school and then then that is at the school they are things there are things at school in in and hm and and pencil they are wood [prompt] they have a not eat playdough [stop]

APPENDIX J

SEQUENCE OF CONDITIONS

Student: Alex Grade Level Stories: 5			Student: Brian Grade Level Stories: 3			Student: Roger Grade Level Stories: 3			Student: Carrie Grade Level Stories: 3			Student: Jacob Grade Level Stories: 1		
D1	B	A New Catcher in Town	D1	C	A Famous Food	D1	A	A Chess Tournament	D1	A	Rooftop Gardens	D1	A	A Busy Saturday
D2	C	A Big Imagination at Bighorn Canyon	D2	A	Finding a Nest	D2	C	Lan's First Day	D2	B	Glassmaking	D2	C	A Night at Grandma's House
D3	A	All About Shoes	D3	B	A Chess Tournament	D3	B	Horseback Treasure Hunt	D3	C	A Chess Tournament	D3	B	A Pancake Breakfast
D4	C	Ocean Harvest	D4	A	Save the Turtles	D4	C	Finding a Nest	D4	B	Finding a Nest	D4	A	Camping at Home
D5	B	The Land Bridge	D5	C	Space Camp	D5	B	A Famous Food	D5	A	Space Camp	D5	B	Clams
D6	A	No Dirt Required	D6	B	How Worms Help Gardens	D6 sent	A	Learning to Skateboard	D6	C	How Worms Help Gardens	D6	C	Having a Checkup
D7	C	A Genius at Work	D7	A	Glassmaking	D7	B	Keeping the Planet Clean	D7	B	Lan's First Day	D7	A	Ice Cream
D8	B	A Visit to Victoria Falls	D8	C	Amazing Dolphins	D8	C	Strawberry Festival Day	D8	A	A Famous Food	D8	B	Go to Sleep
D9	A	Sailing on Land	D9	B	Kayla's Special Owl	D9	A	Kayla's Special Owl	D9	C	Learning to Skateboard	D9 Sent	C	My Lemonade Stand
D10	B	Help is on the Way	D10	C	Keeping the Planet Clean	D10	B	Rooftop Gardens	D10	B	A New Ball Game	D10	A	Picking Apples
D11	A	My Little Pal	D11	A	Lan's First Day	D11	C	A New Ball Game	D11	C	Kayla's Special Owl	D11	B	Kinds of Hats
D12	C	Over the Rainbow	D12	B	Rachel's Box	D12	A	Rachel's Box	D12	A	Amazing Dolphins	D12	C	My Rock Collection
D13	A	Taking Off	D13	A	Strawberry Festival Day	D13	B	Amazing Dolphins	D13	B	Strawberry Festival Day	D13	A	Shape Art
D14	B	Owl Houses	D14	C	Rooftop Gardens	D14	C	Glassmaking	D14	A	Horseback Treasure Hunt	D14	B	My Mom is an Artist
D15	C	What Now	D15	B	Going to Family Camp	D15	A	How Worms Help Gardens	D15	C	Going to Family Camp	D15	C	Our Sick Kitty
D16	B	Sea of Salt	D16	A	A New Ball Game	D16	C	Save the Turtles	D16	A	Keeping the Planet Clean	D16	B	Star Pitcher
D17	C	The Food Tree	D17	C	Horseback Treasure Hunt	D17	B	Space Camp	D17	B	Save the Turtles	D17	A	The Block Party
D18	A	Whale Song	D18	B	Learning to Skateboard	D18	A	Going to Family Camp	D18	C	Rachel's Box	D18	C	Puzzles

APPENDIX K

SOCIAL VALIDITY QUESTIONNAIRE

Teacher Questionnaire

	Strongly Disagree	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
	1	2	3	4	5
The powerpoint presentation was easy to use					
Procedures for implementation were clear					
The time for each session was reasonable					
Students were interested in the sessions					
The results of this study will benefit other practitioners					
Listening to stories helped students retell.					
Seeing pictures helped students retell stories.					
Seeing text helped students retell stories.					

Student Questionnaire

	Strongly Disagree	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*
	1	2	3	4	5
I liked participating in each session.					
Each session was just the right amount of time.					
There were just enough sessions for me.					
Listening to stories helped me retell.					
I liked using pictures to help me retell.					
I liked using text to help me retell.					

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