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The Effect of Narrative Language Intervention on the Language Skills of Children with Hearing Loss

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The Effect of Narrative Language Intervention on the Language Skills of
Children with Hearing Loss

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Masters of Speech-Language Pathology
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ABSTRACT

Children with hearing loss have limited auditory access to their native language and struggle to develop appropriate language skills. These children consistently demonstrate less complex oral language output, smaller vocabulary inventories, and delays in overall communicative proficiency. With the extensive implications hearing loss has on language development, a child with hearing loss requires immediate access to appropriate and effective intervention to address deficits and curb long-term language delays. However, there is a paucity of research investigating the effects of various language intervention programs with children with hearing loss. Much of the existing research focuses on the consequences of a selected language modality or lacks the rigor needed to produce conclusive evidence. While it has not been extensively investigated with children with hearing loss, narrative language intervention has been effective at improving a number of language skills of children with a variety of disabilities and language needs. Therefore, the purpose of this study was to investigate the effect of narrative language intervention on the narrative retelling skills and vocabulary use of children with hearing loss. A multiple baseline research design and a repeated acquisition research design were implemented. Participants included two children ages 5 and 9 diagnosed with bilateral sensorineural hearing loss, fitted to an amplification device. Each child received weekly, individual narrative language intervention with a focus on use of target vocabulary words. Both participants demonstrated weekly increases in narrative retell scores and repeated pre-test to post-test gains in the use of targeted vocabulary. Results suggest narrative language intervention improved the narrative retell ability and vocabulary use of children with hearing loss.

INTRODUCTION

Immediate, accurate access to the sounds and the structure of one's language is essential to develop the linguistic skills and strategies needed to communicate in everyday life (Sininger, Grimes, & Christensen, 2011). Children who do not have appropriate access to language will fall behind on important milestones, fail to develop early linguistic skills, and struggle with higher level tasks imperative for academic success (Moller, 2000). Hearing loss is a risk factor that has the potential to hinder or completely inhibit a child's natural exposure to sound and typical development of language (Moller et al., 2010). Currently, every two to four children in one thousand are born with hearing loss, placing it among the most prevalent birth defects diagnosed in the United States (NIDCD, 2013). Degree and severity of the hearing loss, as well as the type and age of amplification largely determine the specific language characteristics exhibited by children in this population (P. Spencer & Marschark, 2010), but consistently, physical limitations to the auditory system result in an inability to recognize, identify, and process the language environment (Moller, 2000). Such deficits translate to less complex oral language output, smaller vocabulary inventories, and delays in overall communicative proficiency. Moreover, these language deficits will have long-term implications for reading, writing, academic, and social outcomes, particularly if they are not treated effectively (Nittrouer & Lowenstein, 2015).

Children with hearing loss are relatively deprived of language and experience less rich linguistic environments because of inconsistencies in the frequency, diversity, and complexity of language input (P. Spencer & Marschark, 2010). Even with an amplification device the language environment will continue to be distorted and sound unnatural (Moller et al., 2010). This is

detrimental to the development of language skills because it obstructs consistent, accurate language exposure. If a child's language exposure is reduced or degraded, or the child receives little input because of a hearing loss, communication delays are inevitable and the child's oral language will adopt atypical characteristics (Nittrouer & Lowenstein, 2015). Furthermore, because a child's auditory structures are formed by the eighth week of gestation typically hearing children benefit from in utero language stimulation while children with hearing loss do not (Lund, 2016). Consequently, a child with hearing loss is born behind and must immediately work to catch up with hearing peers, magnifying the challenge of interpreting his or her language environment and decreasing the likelihood of developing typical oral communication. More often than not, the game of catch up perpetuates as the child with hearing loss ages and language demands increase socially and academically (Lund, 2016; Trussell, Dunagan, Kane, & Cascioli, 2017). Initially, delays will be reflected through an inability to meet pre-linguistic milestones (e.g. babbling, cooing) and eventually oral language will be characterized by delays in age-appropriate word production and learning. A child with hearing loss will struggle to develop accurate phonological awareness and morphological skills limiting semantic and syntactic understanding. In turn, these weaknesses lead to poor letter-sound identification and decoding, an inability to produce letters and words intelligibly (Moeller et al., 2010), consistent use of the same, simple phrases, and overuse of common verbs and familiar nouns (P. Spencer & Marschark, 2010). Overall, if delays are not addressed a child with hearing loss will produce shorter sentences that lack the maturity and linguistic complexity of same aged hearing peers impacting long-term reading, writing, and academic success, as well as functional communication (Nittrouer & Lowenstein, 2015).

Another domain significantly impacted by language deprivation and subsequent deficit is vocabulary knowledge. Consistently, vocabulary size among children with hearing loss is found to be significantly smaller than hearing peers (P. Spencer & Marschark, 2010; Trussell, Dunagan, Kane, & Cascioli, 2017). Additionally, children with hearing loss struggle to understand the multifaceted meaning of many vocabulary words and how they can be used across situations. Research shows children with hearing loss hear words in fewer contexts leading to comprehension delays and an inability to understand the utility of words that make up the native language (P. Spencer & Marschark, 2010). Parents and other adults tend to use restricted vocabularies and general language during interactions with a child with hearing loss because of lowered expectations concerning the child's abilities; unfortunately, this leaves the child at a greater disadvantage (Lund, 2016). The same physical challenges that limit frequency and diversity of language exposure simultaneously contribute to superficial vocabulary development due to interconnectedness of the language domains (P. Spencer & Marschark, 2010; Lund, 2016). Insufficient exposure to a representative language environment coupled with a physical inability to benefit from surrounding conversations make it impossible for children with hearing loss to develop adequate vocabulary knowledge (P. Spencer & Marschark, 2010).

The impact of hearing loss on children's spoken language and vocabulary development, as well as the consequences of not providing early intervention services are well understood and clinicians must use evidence-based interventions to address the language needs of children with hearing loss. Unfortunately, the paucity of research in this area leaves clinicians without the evidence-based practices they need to properly serve this group of children. It is necessary to identify treatment strategies that result in the most functional communication for this population. Several auditory-oral programs and a number of strategies are thought to increase language skills

of children with hearing loss using hearing aids (P. Spencer & Marschark, 2010). Research for these programs, however, has primarily included cochlear implant users (P. Spencer & Marschark, 2010) or children who are profoundly deaf. Most of this work focuses on the consequences of a selected language modality (oral or signed), and consistently lacks the rigor needed to produce strong evidence of effectiveness (P. Spencer & Marschark, 2010). Additionally, few studies investigating the efficacy of various language intervention programs for this population are replicated (Trussell, Dunagan, Kane, & Cascioli, 2017).

Successful treatment for children with hearing loss begins with early identification and immediate access to rich language; if the child is expected to produce speech, identification must be paired with early intervention services (P. Spencer & Marschark, 2010). Auditory information is often accompanied by significant visual and tactile support through pictures, lip-reading cues, and facial expressions to highlight the receptive aspect of language and communication. Vocabulary, morphology, and syntax are typically a focus and taught using direct instruction, interactive conversation, modeling, and extensive practice (P. Spencer & Marschark, 2010; Lund 2016). Auditory-verbal therapy uses similar practices but was designed for preschool children with hearing aids or cochlear implants (P. Spencer & Marschark, 2010). The goal of auditory-verbal therapy is to ensure a child acquires spoken language skills appropriate for their age by the time they enter kindergarten; however very little evidenced-based research is available (P. Spencer & Marschark, 2010). Cued speech is another method aimed at addressing the phonological delays experienced by a child with hearing loss created to promote language and literacy skills (Cornett, 1967). Presently, cued speech is often used concomitantly with spoken language to supplement therapy (Cornett, 1994). Depending on age at which a child is identified and services are initiated, oral programs have shown some benefit for expressive vocabulary,

receptive syntax, and speech production as well as minor pragmatic advantage; importantly, success was highly dependent on parental support, background history, and cognitive abilities (P. Spencer & Marschark, 2010). Proponents of oral methods for language development note that while children with hearing loss show progress with verbal language and simple linguistic skills they fail to keep pace with hearing peers in vocabulary learning (Trussell, Dunagan, Kane, & Cascioli, 2017) and with complex linguistic forms required for academic language and interactive-conversational discourse (Zamani, Soleymani, Jalaie, & Zarandy, 2018).

One research-based approach to language intervention is narrative language intervention. Narratives consist of story structure (or the story level grammar; Stein & Glenn, 1979) and the sentence level structures that reflect literate language through the inclusion of modifiers, causal and temporal markers, and subordinate and relative clauses (Greenhalgh & Strong, 2001; Westby, 2005). Interventions that promote narrative language may have a lasting impact on academic achievement considering early narrative language predicts later academic achievement (Fazio, Naremore, & Connell, 1996; Bishop & Edmondson, 1987), specifically related to reading comprehension (Catts, Fey, Tomblin, & Zhang, 2002; Dickinson & McCabe, 2001). In primary grades, children are expected to demonstrate an understanding of narrative discourse-level tasks such as main ideas, story grammar, key details, and text comprehension, as well as understand and produce complex linguistic structures (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). These tasks are extremely challenging for children with hearing loss (Moller, 2010; Nittrouer & Lowenstein, 2015).

The research on narrative language intervention is vast and has included a variety of children with various types of language delays, consistently resulting in improved language skills. For example, children with language learning delay (LLD), children with language

impairment (SLI) showed increases in the content, structure, and complexity of self-generated narratives as well as increased understanding and use of language skills, like syntax, after narrative language intervention (Gillam & Gillam, 2016; Gillam et al., 2009). Related to narrative language intervention, children with expressive and receptive language delays and a co-morbid neurological impairment also showed gains in understanding and use of story structures (Petersen, Gillam, T. Spencer, & Gillam, 2010). Children with autism spectrum disorder (ASD) and children using alternative augmentative communication (AAC) devices benefited from linguistic and pragmatic components of narrative language instruction (Gilliam & Gilliam, 2016; Petersen et al., 2014; Soto, Rice, Caputo, 2009). Soto, Rice, and Caputo (2009) demonstrated how narrative intervention improved story retelling skills of children using AAC devices to positively impact social interactions. T. Spencer, Kajian, Petersen, and Bilyk (2013) used an individualized narrative language intervention to improve preschoolers' with disabilities language comprehension and production skills. With an aim to prevent long-term difficulties of culturally and linguistically diverse at-risk preschoolers, narrative language intervention has consistently produced positive effects on a range academic language skills (T. Spencer, & Slocum, 2010; T. Spencer, Petersen, Slocum, & Allen, 2014; T. Spencer, Petersen, & Adams, 2015; Weddle, T. Spencer, Kajian, & Petersen, 2016). Finally, Adlof, McLeod, and Leftwich (2014) showed that narrative language intervention improved vocabulary understanding, text comprehension, and use of complex grammatical structure measured by calculating the mean length of utterance and clausal density of retells. These studies exemplified how explicit teaching of narrative retelling and the language used to tell stories can improve language abilities.

While it has not been extensively studied as a method of intervention for children with hearing loss, narrative language intervention has the potential to be well suited for this

population. In a recent study conducted with Persian speaking children with hearing loss, authors described narrative language intervention as a bridge to connect cognitive, linguistic, and social skills for children with hearing loss (Zamani, Soleymani, Jalaie, & Zarandy, 2018). Compared to a conventional speech therapy condition, children with hearing loss who received 24 sessions of narrative language intervention in small group and individual arrangements showed significant improvements in the number of total words (NTW), the number of cohesive markers (NCM), and the number of total clauses (NTC) used for story retells. In another study involving three children with cochlear implants and specific language impairments, narrative language instruction improved narrative quality and syntactic understanding with some modification for acoustic highlighting (Justice, Swanson, & Velvet, 2008). Despite the emergence of narrative language interventions with the literature for children with hearing loss, the research is severely limited. The language difficulties children with hearing loss experience are similar to those exhibited by the children examined in previous research and narrative intervention can be used to promote many aspects of language. Hence, it is reasonable to expect that narrative language intervention can simultaneously address story retelling and vocabulary use has great potential to benefit young children with hearing loss. If this method of intervention effectively addresses these early linguistic skills, children's language can support the development of future reading and writing (Moeller et al., 2010). Additionally, strength in narrative skills would contribute to a child's social use of language and ability to develop relationships (Nittrouer & Lowenstein, 2015; Soto et al., 2009; Petersen & T. Spencer, 2016).

Given current evidence, the promotion of narrative language should improve the language abilities of children with hearing loss. The current study addressed the following research questions:

1. To what extent does a narrative language intervention improve the narrative retelling skills of young children with hearing loss?
2. To what extent does a narrative language intervention improve use of targeted vocabulary of young children with hearing loss?

Dependent Variables

Narrative Retelling Narrative retelling is a task that demands a number of language skills. To produce strong retells a child must be able to attend to and comprehend a story heard or read. They have to understand the general structure of stories and how elements of the story are organized and connected to create the framework of the text (Gillam et al., 2009). With language characterized by a general lack of diversity, decreased intelligibility, and reduced length of utterance (Moller, 2000; Moller et al., 2010), we know children with hearing loss have significant difficulties producing age-appropriate narrative retells. However, through narrative language instruction that involves consistent verbal models of complex sentences, explicit teaching of story structure, visual support, and practice retelling stories, it is hypothesized that children with hearing loss will include more story grammar components and complex linguistic elements in their stories.

Vocabulary Use Along with difficulties producing age-appropriate narratives, children with hearing loss struggle to compile age appropriate vocabulary inventories secondary to difficulties recognizing, identifying, and processing linguistic input and delays in early language skills (Moller, 2000). As they age, children with hearing loss continue to demonstrate smaller expressive and receptive vocabulary inventories (Lund, 2016). Consequently, we know learning the meaning of a variety of words and accurately transferring meanings across settings to appropriately use each word is extremely challenging for children in this population (P. Spencer

& Marschark, 2010). However, through narrative language instruction that involves direct prompting and ample support focused on word meaning and use, it is hypothesized that children with hearing loss will improve their use of taught words in untrained contexts.

METHOD

Setting and Participants

Research took place in individual treatment rooms at the University of South Florida (USF) Speech and Hearing Clinic. The same treatment room was used for both participants. The treatment room was equipped with one two-way, observation mirror, one large table with five child sized chairs, one dry erase board, a cabinet, and a sink.

To qualify participants needed to meet the following four inclusion criteria: 1) have at least a moderate level hearing loss (41 dB or greater) in one or both ears, 2) use a hearing aid or cochlear implant as their primary amplification device, 3) use English as his/her primary language, and 4) be currently enrolled in therapy for spoken language targeting speech-language delays. Recruitment flyers were posted in the University of South Florida Speech and Hearing Clinics and sent to speech-language pathologists (SLP) within the clinics. Caseloads were comprised of children with speech-language deficits receiving treatment in small group and/or individual arrangements; a number of young children with hearing loss are served on these caseloads. SLPs distributed flyers to the parents of clients who met the inclusion criteria. If a parent received a flyer and was interested in learning more about the study he or she contacted the first author by phone or email to set up an in-person meeting. All meetings were held in one of the individual treatment rooms. At the meetings, the study's purpose, procedures, and timeline were explained in more detail and a written parent permission form was distributed. Parents were encouraged to ask questions and had the option to sign the form during this encounter or take it with them to review and sign later. Once permission forms were returned, parents completed a

short demographic questionnaire. The questionnaire asked for more information about hearing status, date of diagnosis, date and type of amplification, and current intervention services.

Two participants were eligible for inclusion in this study. Ella was a five-year-old female diagnosed at birth with profound bilateral sensorineural hearing loss. Ella uses bilateral Nucleus 6 cochlear implants. She received once weekly speech-language therapy in the USF clinic before and during her participation in this study. Therapy goals target both receptive and expressive language tasks. She was also enrolled in a daily pre-school program for deaf and hard of hearing children. Given her age, Ella's reading and writing skills were just beginning to emerge; she did not read or write independently. She spoke English as her primary language.

Philip was a nine-year-old male diagnosed with moderate right sensorineural hearing loss and mild left sensorineural hearing loss. Audiological evaluation at age three showed evidence of borderline hearing loss but Philip was not officially diagnosed and fitted for hearing technology until 2015, at age five. Philip uses bilateral, behind the ear Phonak hearing aids. He received once weekly speech-language therapy in the USF clinics before and during his participation in this study, along with speech-language services provided by his local elementary school. Services targeted expressive and receptive language skills with short terms goals focused on a variety of associated skills (e.g. age-appropriate vocabulary understanding, utterance length and complexity, and reading comprehension). Philip was able to read and write on his own, however skills did not meet grade level expectations. He also spoke English as his primary language.

Dependent Measures

Narrative Language Measures (NLM): Listening To collect narrative retell language samples, the NLM Listening was used. The NLM Listening is a brief assessment tool for students in grades preK to third. The NLM Listening has been iteratively developed through 10

years of research (Petersen & T. Spencer, 2012, 2014, 2016) and is used by thousands of SLPs for screening and progress monitoring of language. There are 25 parallel stories per grade level that can be used for repeated sampling over time. To collect language samples using the NLM: Listening an examiner follows standardized procedures for administration using a simple script. Each sample takes approximately 2-3 minutes to collect. During assessment, the examiner displays five small illustrations depicting the main parts of the story and reads the story to the child. After listening to the story, the child retells the story. For the current study, to collect baseline retell data NLM: Listening Preschool Benchmark stories were used in order starting with story one. For retell assessment in the intervention and maintenance phases NLM: Listening Preschool Progress Monitoring stories were used in order starting with story one. Importantly all stories were unfamiliar to the participants and did not overlap with the stories used for intervention lessons. Even though assessment stories did not overlap with stories used for intervention instruction they were aligned in terms of content and structure. All retells were audio-recorded and transcribed for later scoring and reliability analysis. For each retell, story grammar components were scored for their completeness and clarity on a 0-2 scale while complex language features (e.g., *because*, *after*, *when*) were scored for their frequency with a maximum of three points each. Bonus points were awarded for the inclusion of multiple story grammar components necessary for a complete episode, and combined with the scores for story grammar and language complexity to create a total retell score (total = story grammar + language complexity + episode bonus).

Researcher- Designed Vocabulary Use Measure To collect data on the use of targeted vocabulary words, a researcher-designed measure was employed. The measure was based on theories of near and far knowledge transfer (Perkins & Salomon, 1992) and was developed as a

means of assessing deep learning and appropriate use of target vocabulary words across contexts (Hadley et al., 2016). Further, research suggests current vocabulary measures and corresponding interventions do not target deep level vocabulary knowledge or a child's ability to use learned vocabulary words appropriately in various settings (Hadley et al., 2016). Instead, many tools test definitional knowledge of target words using questions (e.g. *what does _____ mean?*), exhibiting memorization but not functional use (Hadley et al., 2016). As such, a researcher-designed measure was needed for this study. The vocabulary use assessment was designed to measure the extent to which children use the words targeted in intervention before and after they received instruction on those words. It was organized into two hierarchical levels. The first, and more challenging level, involved real-life photos depicting vocabulary concepts while the second, involved child-friendly drawings that were used during intervention sessions. At pretest, both contexts were unfamiliar to the children, but at posttest the second level would be familiar to the children. Therefore, it was considered easier.

Photos and pictures were printed on cardstock, laminated, and cut into 3 x 5 inch cards. To administer the assessment, an examiner completed the following steps. First, the examiner read an abbreviated story (two sentences) that had the target word embedded in it while the child looked at a photo related to the word. The story and photo were unfamiliar to the child at pre-test and post-test. The child was asked to retell the short story. If the target word was not used correctly, the examiner proceeded to the second step. In this step, the examiner read two sentences from one of the stories used in intervention while the child looked at one of the drawings used in intervention related to the word. This story and drawing were familiar to the children at post-test and follow-up assessments. Children's responses were scored on a scale of 0-5: 5 if the target word was used to retell the level one story; 4 if the target word was used in an

isolated phrase related to the level one story (e.g. “ball travel air”); 3 if the target word was used to retell the level two story; 2 if the target word was used in an isolated phrase related to the level two story; 1 if the child correctly used the target word in any sentence or phrase (i.e. says target word); and 0 if the target word was not used at all.

Research Design

To accomplish the aim of this project and answer the research questions, a multiple methods single case experimental design was implemented. Specifically, a multiple baseline across participants design was combined with a repeated acquisition design to address both research questions and examine the effects of the intervention on both dependent variables—narrative retelling and vocabulary use. These two single case designs were selected for a number of reasons. First, given the low incidence of young children with hearing loss served by this clinic, it was not possible to recruit a sufficient number of participants to conduct a rigorous group study. Likewise, delivering individual intervention with each child within a group study would have been cost prohibitive. Second, multiple baseline designs can appropriately control for most threats to internal validity ensuring the examination of a causal relation between the outcome and the intervention. Additionally, multiple baseline designs do not require the withdrawal of treatment and are appropriate, cost-effective, and straightforward mechanism for conducting research in clinical settings (Gast & Ledford, 2014; Haynes & Johnson, 2009). Lastly, by using this method and establishing a stable baseline for each child any change to the dependent variables during intervention could be confidently attributed to treatment and not another, uncontrolled variable (Kratochwill, et al., 2013).

A repeated acquisition design was added because it can provide an efficient and effective way to investigate the intervention’s impact on the use of targeted vocabulary words (Research

Question 2). Considering vocabulary use needed to be measured before and after instruction on the target words and it was not reasonable to repeatedly test children's knowledge of the entire set of target words, a multiple baseline design would not have been possible to answer the second research question. Additionally, repeated baseline testing would not have been necessary or appropriate due to the low likelihood that children would know target words prior to instruction (E. Spencer, et al., 2012). Finally, by implementing a repeated acquisition design, experimenter effect could be established through repeated demonstrations of learning of equivalent target behaviors (i.e., groups of target vocabulary words) from multiple weeks of pretest to posttest data, providing replication of a causal relation and evidence that the intervention was responsible for acquisition (i.e., vocabulary use) (E. Spencer, et al., 2012).

Procedures

The multiple baseline design was implemented across three conditions: baseline, intervention, and maintenance. The repeated acquisition design occurred only during the intervention condition of the multiple baseline design. Following multiple baseline design conventions (Kratochwill, et al., 2013), the NLM Listening was used to repeatedly collect narrative retells during baseline, intervention, and maintenance conditions. During intervention, consistent with the repeated acquisition design (Kratochwill, et al., 2013), weekly vocabulary targets were assessed at pretest (beginning of session) and posttest using the researcher-designed vocabulary use measure. Post-test assessment occurred at the end of each intervention session to assess immediate learning of that week's target words. Follow-up assessment was conducted at the beginning of the following week's session to assess retention of vocabulary knowledge. All assessments in all phases were audio recorded. Throughout the duration of this study each

participant continued to receive typical speech-language treatment consisting of individual therapy from the primary speech-language pathologist.

Baseline Procedures During baseline, a blinded research assistant collected two retells from each participant once a week. The baseline condition began with both participants at the same time, ensuring a rigorous, concurrent baseline design. However, each participant's baseline phase included a different number of retells allowing for staggered introduction of intervention. Participants needed to demonstrate stability of the target behavior (i.e. total retell score) during baseline before intervention was introduced. A blinded analyst determined when a sufficient level of stability had been achieved for each participant (Ferron & Jones, 2006). Ella entered intervention first demonstrating stability after six baseline retells. Once intervention was introduced with her, Philip completed three additional baseline retells and demonstrate stability before intervention was introduced. These procedures were informed by the What Works Clearinghouse standards for single case research designs (Kratochwil, et al., 2013).

Intervention Procedures Once a participant entered intervention, sessions occurred once a week for approximately 70 minutes. Each session in the intervention phase consisted of a 5 minute warm-up activity (e.g. coloring, playdough, games), 10 minutes of narrative retell assessment, 10 minutes of follow-up and pre-test vocabulary assessment, two 15 minute intervention lessons, two 5 minute breaks following initial assessment and lesson one, and 5 minutes for a final post-test vocabulary assessment. Before the first author began intervention steps (described below), a research assistant, blind to experimental conditions, conducted one narrative retell assessment using the NLM Listening, along with follow-up and pre-test vocabulary use data. Follow-up vocabulary use data was collected using the researcher- designed vocabulary measure and assessed use of the previous week's four target words in unfamiliar and

familiar contexts. Pre-test vocabulary data was also collected using the researcher- designed vocabulary use measure to determine knowledge of the current week's four target words prior to instruction. At the end of each intervention session, after vocabulary instruction and lesson stories were completed, post-test vocabulary data for that week's four target words was collected by the first author using the researcher- designed vocabulary use measure.

Intervention materials. Narrative intervention materials included 12 stories with appropriate themes (e.g., getting hurt, losing a game, dispute with a sibling) and a series of five drawn pictures for each story. Pictures corresponded to one of five major story elements (character, problem, feeling, action, and ending), but reflected specific content from the story. For example, one story was about a boy named John who was riding his bike, fell off and got hurt, was sad, went home to get help, and received help from his mom. Pictures and stories were printed on cardstock, laminated, and cut into 3 x 5 inch cards. Additionally, colored icons that represent the five major story grammar elements (1.5 x 1.5 inch) were printed on cardstock and laminated. Before the study's onset, the first author imbedded two target vocabulary words into each of the 12 intervention stories. Contextual clues were planted in intervention stories to support inference of their meanings (e.g. John *injured* his knee. He cut it on the ground).

Intervention steps. The intended framework for intervention was based on the procedures employed in T. Spencer, Kaijan, et al. (2013). Each session was semi-scripted but also involved general instructional principles to ensure flexible individualization. A different story was used for each lesson, for a total of 12 story lessons over the course of intervention. Stories were used in order from 1 to 12 and two stories were used per lesson. During intervention lessons, the first author facilitated complex language skills and vocabulary knowledge through oral story retelling activities using explicit instruction, repeated models, and systematic

scaffolding. Prior to independent retelling, each lesson story was sufficiently modeled for participants using spoken, visual, and written support as needed, and target vocabulary words and meanings were directly taught and repeatedly highlighted. Additional adjustments were made to instructional style for each participant to account for variations in distractibility, fatigue related frustration, and processing time.

Each intervention session consisted of two story lessons with four target vocabulary words, following the same five steps. *Step 1 (model story)*. The investigator modeled the story utilizing pictures and story grammar icons; as needed in this step the investigator named story grammar parts and encouraged the child to do the same. *Step 2 (comprehension questions)*. After reading the story, the first author asked five questions pertaining to the main elements of the story or the story grammar parts. For example, “Who was the story about” to prompt the child to identify the character or, “How did he/she feel about the problem” to prompt the child to identify the character’s main emotion. *Step 3 (retell one)*. To scaffold story retelling and fade support, the child told the story three times. In the first retell, the child retold the story with pictures and icons available. *Step 4 (retell two)*. In the next retell, pictures were removed and only icons were provided. *Step 5 (retell three)*. In the final retell, icons were removed and the child told the story without visual support.

Through the gradual removal of visual supports, each participant had the opportunity to produce more independent retells by the end of each story lesson. In steps 3 through 5, the first author helped the child retell as needed, ensuring he or she retold all five parts and used the target vocabulary words. The first author provided individualized and contingent support when story elements (e.g., problem, feeling, action) and complexity units (e.g. then, when, after, because) were omitted. Initially, this involved using two-step prompting, first asking a question

to facilitate a correct response (e.g., *What was his problem?*) and, if that was ineffective, modeling what the participant should say (e.g., *He injured his knee.*) and ensuring the child repeated the sentence. If these attempts did not elicit omitted story grammar elements or facilitate use of complexity units additional models, prompts, and cues were presented and individualized to each participant. Participants were encouraged to continue independent retellings with previously omitted information once it was stimulated and reviewed. Use of target vocabulary words was also reinforced during story retells and these supports were adapted for each participant's language needs. When either participant demonstrated difficulties learning target vocabulary words (i.e. could not repeat the word's short definition, could not produce the target word given the definition, consistently omitted target word from retells) and verbal prompts and models were unsuccessful, additional visual or written cues were implemented. Visual cues involved using a story images depicting the target vocabulary word to review the word's meaning and use related to the story. Written cues involved writing the challenging word(s) on a white board with brief definition(s). This was referenced throughout intervention steps when additional instruction was needed.

Maintenance Procedures In order to begin the maintenance phase, participants had to complete all 12 lessons and earn a score of 8 or greater on at least one assessment retell. This is the lowest developmentally appropriate retell score for young children (T. Spencer et al., 2014). Both participants received this score at least once during intervention and entered maintenance following their twelfth and final intervention session. No intervention sessions occur during the two-week maintenance period, but both participants continued attending typical speech and language therapy. Following the two-week maintenance period, the blinded research assistant collected two additional retells from the children using the NLM Listening.

Fidelity and Reliability

Trained research assistants observed approximately 30% of the intervention lessons and documented the number of steps completed correctly using an intervention procedural checklist. The research assistants put a check next to steps completed accurately. Fidelity was calculated for each lesson by adding the number of steps completed accurately, dividing this number by the total number of steps in the individual lesson, and multiplying this by 100. Fidelity results for each lesson were then combined to derive an average fidelity of intervention delivery. The mean fidelity score was 100%.

Approximately 30% of the retell and vocabulary use assessment audio files were reviewed by independent research assistants. To assess fidelity of assessment administration (across all phases), research assistants documented the number of procedural steps the examiner completed correctly while listening to audio files. Fidelity results were combined to get an average fidelity score for assessment administration. The mean fidelity of retell assessment was 98% (83%-100%). The mean fidelity of the vocabulary use assessment was 93% (80%-100%). To assess scoring agreement (across phases), approximately 30% of weekly retells and answers to vocabulary questions were rescored by an independent research assistant. Inter-rater reliability was calculated by dividing the number of exact scoring agreements by the number of agreements plus the number of disagreements, multiplied by 100. Inter-rater agreement for retell assessment was approximately 83%. Inter-rater agreement for answers to vocabulary questions was 100%.

RESULTS

Narrative Retells

Figure 1 displays the results of each participant's narrative retell performance. Narrative retells are represented by solid circles. All panels of each participant's multiple-baseline graph were examined for improvements in level, trend, variability, and percent of non-overlapping data. In addition, best gain scores were determined by calculating the difference between the highest retell score in baseline and intervention. Immediacy of the effect was derived by calculating the mean score of the last three data points in baseline and the mean score of the first three data points in intervention. Table 1 outlines phase means, phase change between baseline and intervention, phase change between baseline and maintenance, best gain scores, and immediacy of effect.

While not substantial, Ella's growth in retell scores from baseline to intervention was demonstrated through visual and statistical analysis. During baseline retell scores reached stability, but with a slight ascending trend. Baseline scores ranged from 9-14 and all retell scores in baseline exceeded the minimum score needed to exit intervention. An increase in scores following the final baseline retell occurred when intervention was introduced but scores did not exceed the baseline level until the third retell in the intervention condition. Retell data continued to ascend gradually across the intervention condition. Overall, a modest change in level and trend was evident. Scores in intervention ranged from 14 (after the first intervention session) to 20 (after the final intervention session). After a two-week break from narrative intervention, Ella maintained scores above baseline levels across two retells (a score of 19 and a score of 16).

For Philip baseline scores were low and stable with no increase in level or trend. During baseline Philip's retell scores ranged from 0-5. Visual and statistical analysis show an immediate change in level and trend from baseline to intervention. During baseline, scores were low and stable with no increases in level or trend. Once intervention was introduced change in scores was substantial and slope continued to increase over six weeks of intervention. Scores during intervention ranged from 6 (after the first intervention session) to 17 (after the final intervention session). All retell scores during intervention fell above the baseline level. Philip exceeded the minimum retell score by the second collection of retell data (score of 10) following the onset of intervention. After a two-week break Philip maintained scores above baseline across two retells (two scores of 15).

Vocabulary Use

Figure 2 displays participant vocabulary use scores during six weeks of narrative language intervention. Each week, four vocabulary words were targeted and assessed at pre-test, post-test, and follow-up. Post-test assessment occurred at the end of each intervention session to assess immediate learning and follow-up assessment was conducted at the beginning of the following week's session to assess retention of target word learning. Participants received a vocabulary use score for each vocabulary word at all three assessment points. These four scores were then averaged to derive a mean pre-test, post-test, and follow-up vocabulary use score each week. Each solid circle on the repeated-acquisition graph represents an average vocabulary use score. Solid lines in Figure 2 connect pre-test scores to post-test scores to show change in vocabulary use before and directly after vocabulary instruction each week. Dotted lines connect pre-test scores to follow-up scores to show change in scores before and one week after vocabulary instruction each week. If at least five of the six possible replications resulted in pre-

test to post-test gains and graphed lines showed an upward trend from pre-test to post-test a causal effect is said to be demonstrated (E. Spencer, et al., 2012; Kratochwill, et al., 2013).

Directly following vocabulary instruction both participants consistently demonstrated higher vocabulary use scores and showed improvement in their use of target vocabulary words in untrained contexts. Consequently, across six weeks of intervention an ascending trend from pre-test vocabulary use scores to post-test vocabulary use scores is evident for both participants. Additionally, Ella and Philip correctly used at least three of the four target vocabulary words across contexts without prompting directly after instruction each week and achieved an average vocabulary use scores of 4.25 or higher. Ella was able to maintain high vocabulary use scores from pre-test to follow-up across at least four weeks of intervention demonstrating retention of vocabulary use in untrained contexts. At weekly follow-up assessment Ella consistently used at least two of the four target words correctly in an untrained context. Philip showed less improvement in vocabulary use scores from pre-test to follow-up with a more drastic decrease in scores from post-test to follow-up.

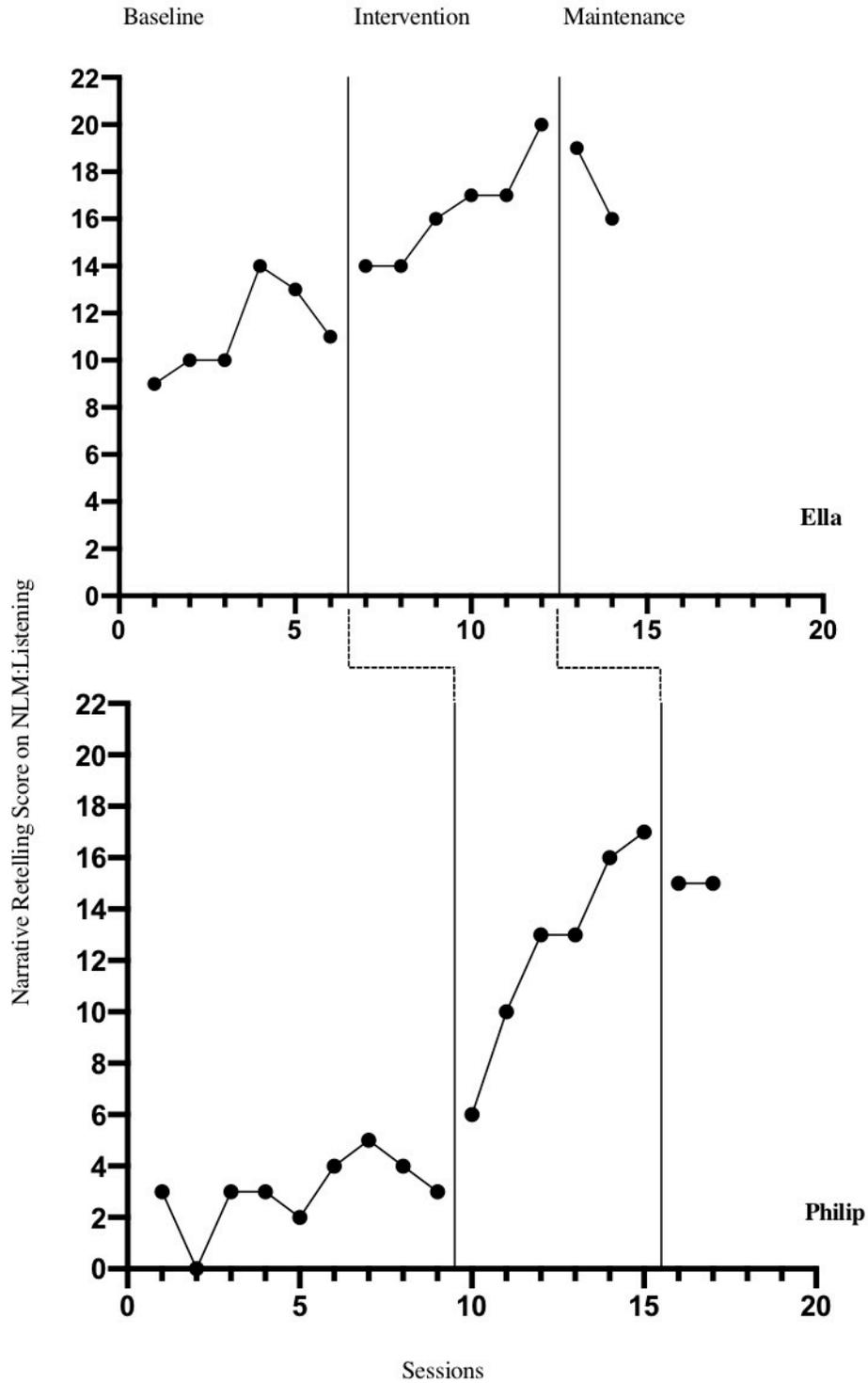


Figure 1. Participant Narrative Retell Scores Across Phases. This figure illustrates participant scores on the NLM:Listening measure in each session before intervention, during intervention, and following a two week break from intervention.

Table 1. Participant Narrative Retell Data Including Phase Means, Best Gain, and Effect

	Phase Means					Best Gain	Immediacy of Effect	Nonoverlapping data(%)
	Baseline	Intervention	Change	Maintenance	Change			
Participant One	11.6	16.3	4.7	17.5	5.9	6	2.0	6
Participant Two	3	12.5	9.5	15	12	12	5.7	100

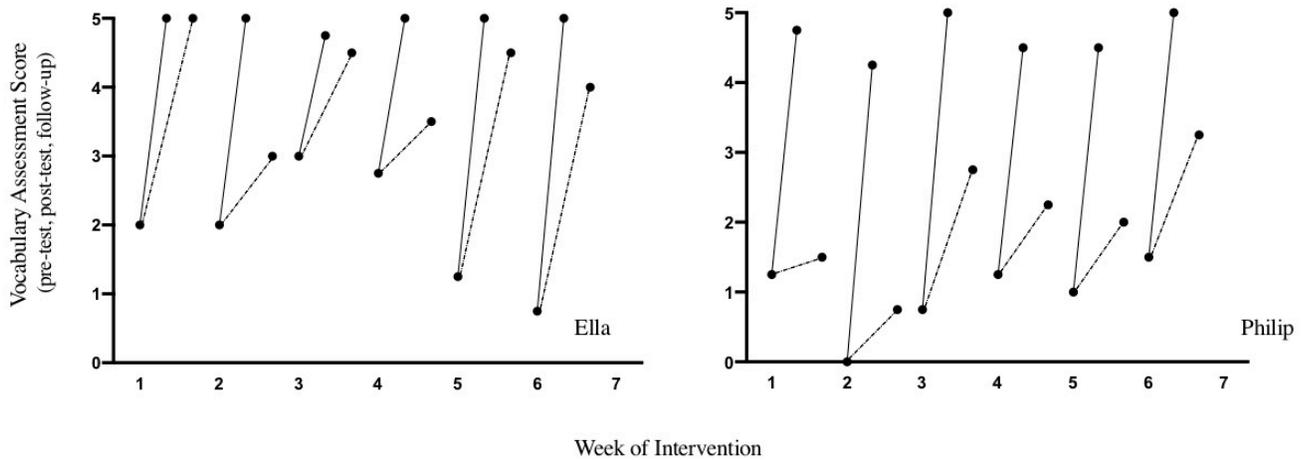


Figure 2. Weekly Vocabulary Use Scores Across Six Week Narrative Language Intervention. This figure shows Ella and Philip’s scores on the Experimenter Designed Vocabulary Use measure at pre-test, post-test, and follow-up across the six weeks of narrative language intervention.

DISCUSSION

The aim of this study was to determine if narrative language intervention with a focus on vocabulary improves narrative retell skills and vocabulary use of children with hearing loss. Children with hearing loss show overall deficits in spoken language content, structure, and complexity which often lead to permanent academic delays (Moller, 2000). With its ability to target a number of simple and complex language skills simultaneously and the success it has shown for improving the language skills of a variety of diverse populations of children (Gillam & Gillam, 2016; Gillam et al., 2009; Soto, Rice, Caputo, 2009; Petersen, et al. 2010; T. Spencer, & Slocum, 2010; T. Spencer, Petersen, Slocum, & Allen, 2014; Adlof, McLeod, & Leftwich, 2014; T. Spencer, Petersen, & Adams, 2015; Weddle, T. Spencer, Kajian, & Petersen, 2016), narrative language intervention may be a viable method for addressing the spoken language and vocabulary deficits of children with hearing loss. By adding vocabulary instruction to the narrative intervention, researchers may be able to target the multifaceted language needs of this population.

Narrative Retell

Initially, Ella included most of the primary story grammar elements, but they were not always in an appropriate sequence. Likewise, her sentences were often incomplete or disjointed. Ella struggled to use language complexity units (i.e. because, when, after) and produce complete sentences to form a cohesive narrative. In baseline, Ella consistently overused the temporal marker “then”. Given that she already produced a less sophisticated version of basic narratives,

intervention for Ella, focused on retelling the story elements in order and using complete sentences with developmentally appropriate linguistic complexity.

Once narrative language intervention began, Ella started using “then” appropriately while periodically using more complex markers that signal subordination such as “after” “when” and “because”. Following intervention Ella organized story grammar parts in the correct order and used longer sentence to describe and connect them which improved the quality and complexity of her retells. Even though improvement was evident in the NLM Listening scores, the area of greatest improvement (i.e., ordering of the story grammar elements and length and complexity of her sentences) were not captured by the NLM Listening. This is one reason that her improvement from baseline to intervention was not substantial. Another reason for this is that during baseline, her scores already exceeded the minimum retell score needed to exit intervention. Consequently, she was already performing at a developmentally appropriate level, reducing the effect intervention could have on her retell performance.

Philip demonstrated low and stable scores in baseline with less knowledge of the main story elements. Philip consistently performed below developmental expectations during baseline. He included very few story grammar elements and no complex sentence structures. In his baseline retells, Philip occasionally used the word “then” and between one and two story grammar parts such as the feeling or the setting. Consequently, there was enormous room for improvement related to the intervention, which was observed in the data patterns. Direct instruction on story grammar elements and practice connecting them in a cohesive narrative with a variety of complexity markers led to clear improvements in retell scores during the intervention condition. Fortunately, less background knowledge for storytelling and story elements did not appear to inhibit his progress. He increased on the number of story grammar elements he

routinely included in his retells and was consistently including subordinate clauses marked by “when” and “because”. His scores suggest how narrative language intervention, through specific and direct instruction on story grammar elements can improve the content and completeness of narrative retells despite less prior knowledge. Because Philip’s gains were focused on inclusion of story grammar parts and use of complex sentences, the NLM Listening scoring rubric was sufficiently sensitive to capture the gains he made.

The retell improvements Ella and Philip made corresponding with narrative language intervention suggest intervention had a positive impact for both the inclusion of story grammar and their complex arrangement within stories. While intervention format and delivery were the same for both participants, instruction and content were adjusted to meet their individual linguistic needs. For Ella it was important to include a number of verbal models to demonstrate how story grammar elements could be connected chronologically with longer, complex sentences. It was beneficial to probe her language using question prompts like, “Why did he feel sad?” or “Who did she ask for help?” and encourage her to produce independent retells that included more details and were more cohesive. During instruction, Ella was not easily distracted and attended well to each task. Compared to Philip she demonstrated less fatigue during story lessons and only a few moments of frustration. She required minimal positive reinforcement during independent retells and responded well to corrections and prompts when she omitted components from her retells.

Compared to Ella, Philip required more processing time when information was presented, was more easily distracted, and experienced greater fatigued frustration during intervention sessions. The examiners and the first author had to read stories at a slower pace and pause after each question or prompt. Implementing breaks in the session was particularly important for

Philip and he responded well when distractions were minimized (e.g. limit number of materials on the table). Because he had limited understanding of story grammar elements, the instruction consisted of several repetitions of models and prompts. Each of his story lessons began with review of the five parts of a story through prompting (e.g. “What five things should every story have?”, “What comes first in a story?”, “The person in our story is called...”). After this general overview the first author modeled the lesson story and pointed out each story elements. Following the initial model story grammar icons and story images were used to review story elements again before moving to intervention step 2: comprehension questions. Additional moments for story grammar teaching and review were not necessary during Ella’s lessons. Moreover, during independent retells, Philip benefitted from consistent reinforcement when story grammar parts were used correctly (e.g. “good! and how did he feel about that problem?”) to limit frustration. Similarly, when story elements were omitted and models were provided to correct him they were framed in a positive way (e.g. “You’re doing great! Let’s try it this way now.”). Comparing the strategies used during story lessons for each participant supports the adaptability of this intervention method and its efficacy for targeting the unique language needs and learning styles of two children with hearing loss.

Vocabulary Use

Both participants entered the study with deficits in vocabulary knowledge and use of vocabulary words across multiple situation; typical speech language therapy for both participants had long term and short term goals for vocabulary. Ella showed less drastic increases in retelling scores during intervention, however her improvements in vocabulary use following intervention were noteworthy. Both participants showed increases from pre-test to post-test but Ella was able to retain vocabulary knowledge week to week. A comparison of Ella and Philip’s weekly pre-test

to follow-up data showed greater disparity between Philip's vocabulary use scores directly after instruction (post-test) and one week post (follow-up). She showed more improvement from pre-test to follow-up compared to Philip. This suggests Philip had more difficulties retaining knowledge of how to use target vocabulary words across contexts from week to week.

Along with disparities in vocabulary performance across weeks, subtle differences between instruction and prompting for vocabulary use during intervention sessions with each participant should be noted. Each story lesson included two target vocabulary words along with context clues and embedded definitions. During intervention step 1: story model, target words were repeatedly highlighted within the story lesson and short definitions were provided verbally. Participants were asked to repeat the definitions. When participants could not remember a target word or repeat its definition, or consistently omitted a target word from independent retells additional cues were provided as needed (e.g. visual-story images depicting word meaning, or written-words with short definition on a white board). Given Philip's reading and writings skills prior to this study, it is not surprising that written cues were a successful approach for prompting him to define target words or to remember to use the target word during retelling. Since Ella was not reading and writing independently like Philip, she did not benefit from the written words and definitions as much. Even with variations in cueing style for each participant, Ella and Philip showed significant gains in vocabulary use following instruction each week. However, Ella had greater success maintaining vocabulary use performance at follow-up across weeks suggesting deeper understanding and retention of how to use target words across situations.

Considering the gain Ella made in vocabulary use following instruction and the idea of cognitive load or cognitive capacity, it is possible that the deep understanding required to retain and use vocabulary words across contexts from week to week was affected by all Philip had to

attend to. Ella possessed at least partial understanding of story grammar elements prior to intervention so she was able to focus more on vocabulary use during story retells. Philip needed direct instruction on story grammar parts, language complexity, and vocabulary use. It is well understood that the capacity of working memory is limited and when bombarded with extensive novel information, “primary” information is attended to more readily and moved to long term memory over secondary or ancillary information (Paas & Sweller, 2012). With an increased cognitive load and a heavy focus on story grammar elements during intervention, Philip’s working memory could have been overwhelmed to the point that less attention could be allocated to storing new and complex vocabulary words in his long term memory. This could offer a possible explanation for why Philip’s vocabulary use scores were less consistently maintained from pre-test to follow-up each week.

Philip consistently demonstrated improved knowledge of target vocabulary words directly after instruction but had difficulties using target words correctly at follow-up one week later. With this, and a higher cognitive demand during his story lessons it is possible that his vocabulary use would have benefited from additional support outside of intervention sessions. One option would have been a home component for weekly target words to reinforced intervention instruction and allow for repeated practice of word meaning and use. By providing weekly target words with short definitions Philip’s parents could have reviewed each word during the week between intervention sessions and highlighted word use across daily life situations. This would have allowed for additional exposure to target words and extended learning of target words beyond one story lesson. With additional opportunities to learn and use the week’s target words Philip may have had more success maintaining high post-test vocabulary use scores at follow-up across weeks.

Limitations and Future Research

While the results of this investigation seem positive and promising for the use of narrative language intervention's use with children with hearing loss, there are several limitations to address. First, identifying and recruiting young children with hearing loss who meet inclusion criteria is often challenging given the individual variability that exists within this population. Consequently, the small sample size of this study impacts the significance of findings. With only two participants it is difficult to establish a causal relation between the intervention and the children's narrative retell performance. For narrative retell, a third demonstration of the effect would be needed to be confident that the intervention produced the effect in children's retell scores. Given that the minimum number of repetitions was documented for the repeated acquisition design, those results are less influenced by the small number of participants. Nonetheless, it would be better to replicate these findings across at least one or two more participants with hearing loss. Further, these results cannot be generalized to the population of all children with hearing loss with only two participants with inconsistent patterns of responding. In the future, two additional children will be recruited and this study's procedures will be replicated to continue this investigation. Replicating current findings would confirm the implications of this study by better supporting the efficacy of narrative language intervention for improving the narrative retell skills of children with hearing loss.

Another potential limitation was the timing and length of sessions in intervention. Participants attended one session a week for one hour during the intervention condition. Both participants attended sessions during the week after school, and Philip attended regular speech therapy directly before. Often participants would arrive or become fatigued during assessment and intervention lessons which could have impacted session performance. Philip especially

demonstrated difficulties attending to tasks and lessons as the session progressed and fatigue increased. This limitation was addressed with warm-up activities (e.g. games/free play) at the beginning of each session selected by the participants that allowed them both time to transition to the new learning environment. Additionally, periodic breaks were implemented into each session after initial assessment and between the two intervention lessons so participants were not asked to attend to only intervention tasks for the entire duration of the session. In the future it would be beneficial for participant fatigue and performance to divide intervention sessions over two days for approximately 30 minutes. The first session of the week could focus on vocabulary pre-test and follow-up assessment with one lesson story and two target vocabulary words. While the second session of the week could involve one narrative retell assessment and the second story lesson with two additional target words. Not only would this reduce fatigue by decreasing the length of each session but it would also limit the amount of information participants had to attend to in each session, and possibly improve overall performance.

Young children with hearing loss also have difficulties with articulation of sounds and words which decreases overall speech intelligibility second to auditory system deficits and the act of processing language through an amplification device. Occasionally, examiners and the first author struggled to understand certain words spoken by the participants. Audio-recording all assessments and intervention sessions helped counteract this challenge and sessions were also conducted in a quiet room with limited distractions. Difficulties with unintelligibility were similar across all conditions and equally challenging for both participants. In the future it may be beneficial to video-record assessment and intervention session so moments of participant unintelligibility can be reviewed using audio and visual feedback to improve accuracy of understanding.

During the intervention phase of this study a researcher-designed vocabulary measure was used. This tool was created because many existing measures do not investigate deep knowledge of target vocabulary words. After this study, the researcher-designed vocabulary measure seems to be an effective means of assessing word knowledge and the use of taught words across unfamiliar and familiar contexts. The hierarchical levels of the measure allowed participants to demonstrate learning of each target word in familiar contexts along with their ability to transfer word learning to unfamiliar contexts, which appeared sensitive to changes from no knowledge to partial knowledge to deep knowledge of words. The measure was also efficient to administer with straightforward directions and scoring procedures. It is interesting to note that while Philip's vocabulary use performance throughout intervention was not as significant as Ella's he was informally observed to use synonyms of target vocabulary consistently during vocabulary assessment, none of which earned him points. Given this observation, in the future it would be beneficial to adjust the scoring of the new vocabulary measure to be more sensitive to variation in word choice when participants use synonymous words correctly. Moreover, research should specifically examine this new measurement tool's reliability and validity.

Conclusions and Contributions

Despite challenges and limitations, it is encouraging that both participants demonstrated retell gains far above what was anticipated and showed improvements in vocabulary use from pre-test to post-test across six weeks of intervention. Following six weeks of narrative language intervention, both children made improvements in retell skills and their use of target vocabulary across trained and untrained contexts. However, participants did not show the same trends in growth for retell skills or vocabulary use when compared to each other. It is possible that scoring procedures for narrative retell assessment were not able to account for all of the complex

language growth Ella made during intervention because scores were based only on story grammar elements and language complexity. Likewise, while it was an efficient means for assessing vocabulary learning and use of target words across contexts the researcher-designed vocabulary measure was likely less sensitive to Philips vocabulary gains compared to Ella because it did not account for synonym use. Even though results for each participant are inconsistent with one another, both participants demonstrated important gains in narrative retell and vocabulary use following narrative language instruction.

Along with intervention impact on narrative retell and vocabulary use, the benefit of being able to adapt intervention instruction to the unique needs and language level's of each participant cannot be discounted. Every child with hearing loss presents with different identification ages, different amplification devices, different language skills and strengths, and different concomitant diagnoses so an intervention's ability to account for these heterogenous factors is essential (P. Spencer & Marschark, 2010; Moller 2010; Nittrouer & Lowenstein, 2015). From this, it is conceivable that such differences between Ella and Philips age of identification, age of amplification, and timing of speech language intervention played a role in study findings. Both participants had at least moderate sensorineural hearing loss in one or both ears; however, Ella was diagnosed and amplified at birth, while Philip was suspected to have a hearing loss at age three and officially diagnosed and amplified at age five. Consequently, Ella began speech language intervention sooner and received support for acquisition of foundational language skills from an earlier age. These specific differences could also contribute to variations in entering narrative skill level and account for strength in different areas following intervention. Disparities in participant entering knowledge and strength then led to variations in cognitive demand during intervention sessions which could also have impacted study findings. However, despite

variations both participants were able to show overall improvements in retelling and vocabulary use, speaking to the efficacy and adaptability of narrative language intervention for children with hearing loss.

Findings from this study reflect previous findings of the benefits of using narrative language intervention with children with hearing loss. Similar to Justice, Swanson, and Velvet (2008) who suggested narrative language intervention improved narrative quality of young children with hearing loss, participants in this study demonstrated improvements in inclusion and organization of story grammar parts, use of complexity units, and use of target vocabulary words in retells. These findings also directly support the results of the more recent Zamani, Soleymani, Jalaie, and Zarandy (2018) study which showed how narrative language intervention improves the content and complexity of narratives produced by Persian children in this population. More generally, improvements in narrative retells and vocabulary use along with the demonstrated flexibility of narrative language intervention contribute to the growing evidence base of narrative language intervention as an effective means to support the multifaceted language needs of diverse children. While findings appear to suggest positive implications for narrative language intervention as a feasible means to address spoken language delays and vocabulary deficits in children with hearing loss, they also support the need for further investigation.

REFERENCES

- Arfe, B. (2015). Oral and written discourse skills in deaf and hard of hearing children. *Topics in Language Disorders, 35* (2), 180-197.
- Adlof, S., McLeod, A., & Leftwich, B. (2014). Structured narrative retell instruction for young children from low socioeconomic background: a preliminary study of feasibility. *Frontiers in Psychology, 5*, 391-402.
- Bishop, D., & Edmundson, A. (1987). Language impaired four year olds: distinguishing transient from persistent impairment. *Journal of Speech and Hearing Disorders, 52*, 156-173.
- Catts, H., Fey, M., Tomblin, J., & Zhang, X. (2002). Longitudinal investigation of reading outcomes in children with language impairment. *Speech, Language, and Hearing Research, 45*, 1142-1157.
- Dickinson, D., & McCabe, A. (2001). Bring it all together. *Learning Disabilities Research and Practice, 16*(4), 186-202.
- Faizo, B., Naremore, R., & Connell, P. (1996). Tracking children from poverty at risk for SLI. *Speech and Hearing Research, 39*, 611-624.
- Ferron, J., & Jones, P. (2006). *Journal of Experimental Education*. London, England: Routledge, Taylor and Francis Group.
- Gast, L. & Leford, J. (2013). *Applied research in education and behavioral sciences*. London, England: Routledge, Taylor and Francis Group.
- Gillam, S., Fargo, J., & Robertson, K. (2009). Comprehension of expository text: insight gained from think-aloud data. *American Journal of Speech-Language Pathology, 18*, 82-94.
- Gilliam, S., & Gilliam, R. (2016). Narrative discourse intervention for school-aged children with language impairment: supporting knowledge in language and literacy. *Top Language Disorders, 36*(1), 20-34.
- Greenhalgh, K., & Strong, C. (2001). Literate language features in spoken narratives of children with typical language and children with language impairment. *Language Speech and Hearing Services in School, 32*, 114-125.
- Hadley, E., et al. (2015). Examining the acquisition of vocabulary knowledge depth among preschool students. *Research Quarterly, 0*(0), 1-18.

- Haynes, W., & Johnson, C. (2009). *Understanding Research and Evidence Based Practice in Communication Disorders*. Auburn University: Pearson Publishing.
- Horner, R., Swaminathan, H., Sugai, G., & Smolkowski, K. (2012). Considerations for the systematic analysis and use of single case research. *Journal of Education and Treatment of Children, 35* (2), 269-290.
- Jones, A., et al. (2016). Narrative skills in deaf children who use spoken English. *Research in Developmental Disabilities, 59*, 268-283.
- Justice, E. C., Swanson, L. A., & Buehler, V. (2008). Use of narrative-based language intervention with children who have cochlear implants. *Topics in Language Disorders, 28*(2), 149-161.
- Kratochwil, T., et al. (2013). Single-Case intervention research design standards. *Remedial and Special Education, 34*(1), 26-38.
- Lane, J., & Gast, L. (2014) Visual analysis in single case experimental design studies: brief review and guidelines, *Neuropsychological Rehabilitation: An International Journal, 24*:3-4, 445-463.
- Lund, L. (2016). The effects of parent training on vocabulary scores of young children with hearing loss. *American Journal of Speech-Language Pathology, 27*, 765-777.
- Moller, M. (2000). Early intervention and language development in Children who are deaf and hard of hearing. *American Academy of Pediatrics, 106*(3), 1-9.
- Moller, P., et al. (2010). Longitudinal development of phonology and morphology in children with late-identified mild-moderate sensorineural hearing loss. *Journal of Ears and Hearing, 31*(5), 625-635.
- Nittrouer, S., & Lowenstein, H. (2015). Weighting of acoustic cues to a manner distinction by children with and without hearing loss. *Journal of Speech Language and Hearing, 58*(3), 1077-1092.
- Paas, F. & Sweller, J. (2012). An evolutionary upgrade of cognitive load theory: using the human motor system and collaboration to support the learning of complex cognitive tasks. *Educational Psychological Review, 24*, 27-45.
- Perkins, D., & Salomon, G. (1992). *Transfer of learning*. Oxford, England: Pergamon Press.
- Petersen, D., Gillam, S., Spencer, T., & Gillam, R. (2010). The effects of literate narrative intervention on children with neurologically based language impairment. *Journal of Speech Language and Hearing Research, 53*, 961-981.

- Petersen, D., & Spencer, T. (2016). Using narrative intervention to accelerate canonical story grammar complex language growth in culturally diverse preschoolers. *Top Language Disorders, 36*(1), 6-19.
- Sininger, Y., Grimes, A., & Christensen, E., (2010). Auditory development in early-amplified children: factors influencing auditory based communication outcomes in children with hearing loss. *Journal of Ear and Hearing, 31*(2), 166-185.
- Spencer, P. & Marschark, M. (2010). *Evidenced-based practice in educating deaf and hard of hearing students*. New York, New York: Oxford Press.
- Spencer, E., et al. (2013). Effects of an automated vocabulary and comprehension intervention. *Journal of Early Intervention.*
- Spencer, T., & Slocum, T. (2010). The effect of narrative intervention on story retelling and personal narrative generation skills of preschoolers with risk factors and narrative language delays. *Journal of Early intervention, 32, 178-201.*
- Spencer, T., & Kaijan, M., Petersen D., & Bilyk, N. (2014). Effects of an individualized narrative intervention on children's storytelling and comprehension skills. *Journal of Early Intervention, 2*(1), 1-27.
- Spencer, T., Peterson, D., Slocum, T., & Allen, M. (2014). Large group narrative intervention in Head Start preschools: implications for response to intervention. *Journal of Early Childhood Research, 13*(2), 196-217.
- Spencer, T., Petersen, D., & Adams, J. (2015). Tier 2 language intervention for diverse preschoolers: an early-stage random control group study following an analysis of response to intervention. *American Journal of Speech Language Pathology, 24, 619-636.*
- Soto, G., Solomon-Rice, P., & Caputo, M. (2009). Enhancing the personal narrative skills of elementary school-aged students who use AAC: the effectiveness of personal narrative intervention. *Journal of Communication Disorders, 42, 43-57.*
- Stein, N. & Glen, C. (1979). An analysis of story comprehension in elementary school children. *New Directions in Discourse Processing, 53-120.*
- Trussell, J., Dunagan, J., Kanen, J., & Cascioli, T. (2017). The effects of interactive storybook reading with preschoolers who are deaf and hard of hearing. *Topics in Early Childhood Special Education, 37*(3), 147-163.
- Weddle, S., Spencer, T., Kajian, M., & Petersen, D. (2016). An examination of multitiered systems of language support for culturally and linguistically diverse preschoolers: implications for early and accurate identification. *School Psychology Review, 45*(1), 109-132.

Westby, C. (2005). Assessing and remediating text comprehension problems. *Language and Reading Disabilities, 157-23.*

Zamani, P., Soleymani, Z., Jalaie, S., & Zarandy, M. (2018). The effects of narrative-based language intervention on spoken narrative structures in Persian-speaking cochlear implanted children: A prospective randomized control trail. *International Journal of Pediatric.*