To the Graduate Council:

I am submitting herewith a Master's Thesis written by Ellie Carol Justice entitled "The Effects of Narrative Based Language Intervention on Children with Cochlear Implants." I have examined the final paper copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Speech Language Pathology.

Lori A. Swanson

We have read this thesis
and recommend its acceptance:

Acceptance for the Council:

Vice Provost and Dean of the Graduate School

EFFECTS OF NARRATIVE BASED LANGUAGE INTERVENTION ON CHILDREN WITH COCHLEAR IMPLANTS

A Thesis
Presented for the
Master of Arts Degree
The University of Tennessee, Knoxville

Ellie C. Justice
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ABSTRACT

Objective: The purpose of the current study was to examine the effectiveness of Narrative Based Language Intervention (NBLI) with children who have cochlear implants (Cis). The researchers sought to determine in a preliminary study whether a 6-week production-based intervention approach focusing on production of grammatical structure, as well as narrative content and form, would produce similar results in children with Cis as previously shown in children with Specific Language Impairment (SLI).

Participants: Three girls, ages 5;4 – 8;0, participated in the study. Participants were recruited from Child Hearing Services (CHS) at the University of Tennessee, Knoxville (UTK). The children were all diagnosed with a severe-profound sensorineural hearing loss, had a minimum of two years cochlear implant experience, and scored at or below one standard deviation in relation to the mean on the Clinical Evaluation of Language Fundamentals – 4 (Semel, Wig, & Secord, 2004) and the Test of Narrative Language (Gillam & Pearson, 2004). The participants all scored within one standard deviation on either the Test of Nonverbal Intelligence (Brown, Sherbenou, & Johnson, 1997) or the Leiter International Performance Scale (Roid & Miller, 1997).

Method: Participants went through six weeks of NBLI. Data were gathered via two story retells and two story generations during each probe session. The "Quick Narrative Assessment" presented by Miller, Gillam, and Pena (2001) was implemented in calculating the narrative quality of both retells and generations. The percentage of grammatically correct utterances was calculated for each story. The use of syntactic targets in retells was monitored during and after intervention. Syntactic targets were

compared across conversational samples taken prior to intervention, immediately after, and at the three month follow-up.

Results: P1and P2 made noticeable gains in narrative quality. All three participants made gains regarding syntactic targets. P1 showed significant gains in her use of coordinating and subordinating conjunctions. P2 increased her use of coordinating and subordinating conjunctions as well as post modification of nouns. P3 made gains in subordinating conjunctions and post modification of nouns. The results of this study warrant further investigation regarding the use of NBLI with children who have hearing impairments.

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I. LITERATURE REVIEW

Positive Correlation Between Hearing Loss and Language Development

Research has shown a positive correlation between a severe to profound hearing loss and delayed language development in young children (e.g., Blamey et al., 2001; Geers, 2002; Geers, 2004; Geers & Moog, 1994; Geers, Nicholas, & Sedey, 2003). As a result of the advent and use of the technology leading to the cochlear implant, the linguistic gap separating children with severe to profound hearing loss from typically hearing peers appears to be narrowing.

Blamey and colleagues (2001) assessed speech perception, production, and language of eighty-seven school age children with hearing loss. The authors present that children who use cochlear implants, hearing aids, or both should be regularly monitored with measurements of speech perception and production as well as language in order to properly assess their communicative skills in a naturalistic way. Blamey and colleagues convey the importance of using open-set tests of speech perception as well as conversational samples in order to get the most realistic look at how the child functions in their everyday environment. In their study, the researchers found that the children with hearing loss who used either a cochlear implant or a hearing aid developed language at a steady rate; however, their language development was slower than that of children with normal hearing. Group trends indicated a language delay of four to five years when the children were ready to enter secondary school at approximately 12 years of age.

According to the regression model used by Blamey and colleagues (2001), speech perception scores are expected to significantly improve along with the improvement of

language. Geers and Moog (1994) compared a group of children using cochlear implants to a group of children using tactile aids and another group making use of hearing aids. The researchers (Geers & Moog, 1994) found the children with cochlear implants acquired all language and communication skills evaluated in the study (i.e. receptive and expressive vocabulary as well as receptive and expressive language) at a faster rate than children in the other two groups. Geers and Moog (1994) reported that the cochlear implant group in their study demonstrated the most linguistic improvement over time in their Developmental Sentence Scores; the children's sentences were noted to be growing in complexity. The researchers also noted that children in the cochlear implant group showed greater improvement in receptive and expressive language skills than is typical for their age matched peers with severe to profound hearing loss. The cochlear implant group made the expected gains for their age and advanced on to the 72nd percentile from rankings in the 50th percentile where they started (Geers & Moog, 1994).

Language impairment associated with hearing loss was also noted by Geers, Nicholas, and Sedey (2003) in their research which looked at the language skills exhibited by 181 children with early cochlear implantation and the factors which seemed to affect language development when cochlear implants were received prior to the age of five. Some participants used an oral only mode of communication and others used oral plus sign. In their study, Geers and colleagues (2003) used the CLAN programs to look at lexical diversity, bound morphemes, utterance length, and syntactic complexity in conversational samples with children who had hearing losses; in a narrative task, the children were asked to tell a story using an eight picture sequence. Geers et al. (2003) found that children with cochlear implants who used oral plus sign communication

produced more words per utterance and more different words per minute in an interview using sign in addition to speech than in an interview during which only speech was used. More than half of the cochlear implant users scored within normal limits in utterance length, lexical diversity, different words per minute, verbal reasoning, and narrative ability; fewer than half of the cochlear implant group scored within normal limits with regard to the use of bound morphemes and their language comprehension on the TACL (Geers et al., 2003). Geers and colleagues (2003) reported that children in the oral only group achieved higher narrative ability scores, produced significantly longer utterances regardless of interview type, used a greater variety of words, used more bound morphemes, and produced more syntactically correct structures than children who used speech and sign. Geers and colleagues (2003) concluded that children who have average intelligence and receive a cochlear implant at age five or younger can potentially achieve language skills equivalent to their hearing age mates.

Language Deficits in Children with Cochlear Implants

Recent research has explored the language deficits of children with cochlear implants (Geers, 2002; Kirk, Miyamoto, Ying, Perdew, & Zuganelis, 2002). Geers (2002) studied factors contributing to auditory, speech, and language skills in 180 eight to nine year old pre-lingually deaf children with four to six years of cochlear implant use. Child and family characteristics (especially nonverbal I.Q.) were responsible for approximately 20% of the variance in post-implant language, 24% of the outcome was related to characteristics of the implant, and 12% of the language outcome was related to educational factors such as communication mode. Geers, Nicholas, and Sedey (2003)

found important predictors for language ability were consistent across participants using Total Communication and those using an oral only form of communication; predictors included higher nonverbal intelligence, smaller family size, and higher socio-economic status as well as female gender.

Geers et al. (2003) report that the significant factors related to rehabilitation include the amount of time spent in the mainstream classroom and the amount of emphasis on speech and auditory skills within the curriculum. Similar to the finding by Blamey and colleagues (2001) which showed that speech reception could be expected to improve along with speech production, Geers et al. (2003) found that speech production abilities of their participants had a significant impact regarding the outcome of both oral and oral plus sign groups. Speech perception, which was meant to measure the benefit of the implant, was significant for those using oral only communication. The authors (Geers et al., 2003) explained that some factors were found significant to the outcome of individual participants but not to the sample as a whole; the number of therapy hours was a good predictor of spoken language competence when considered individually, but it was overshadowed by the effects of the type of classroom and communication mode when educational factors were considered all together. Geers and colleagues reported that the age at implantation does not affect language development. This finding contradicts the research by Kirk, Miyamoto, Ying, Perdew, and Zuganelis (2000), who explicitly state that the age at implantation does affect language acquisition. Kirk and colleagues (2000) report that expressive language skills of their participants increased with the use of their cochlear implant and that the age at implantation had a significant effect on the development of expressive language in their participants. Geers and

colleagues presented that, while the age at implantation does not seem to be a factor in language acquisition, their research does show that language development is more expeditious for children who wear cochlear implants than for those with hearing aids. The authors (Geers et al., 2003) explained that children who receive more auditory enhancement from their implant achieve language that is closer to that of typically developing children than those children who have speech perception abilities that are less acute. The strong correlation between the predictors nonverbal I.Q. and mode of communication with the outcome of language production found by Geers (2002) was reiterated by Geers et al. (2003). Geers (2002) reported that older children (i.e., nine year olds) and those who lost their hearing at a later age achieved the highest reading scores. Geers (2002) reported that increased skills in overall language performance related to smaller family size and more educated parents as well as child I.Q. These factors were once again found to be important in the Geers et al. (2003) study. In the Geers (2002) study, the age at onset was found to be an important predictor of language outcome; however, Geers et al. (2003) reported that the age at implantation did not affect the development of spoken language. Regarding the characteristics of the implant, loudness growth was the only factor that did not contribute to the outcome (Geers, 2002). Related to classroom characteristics, communication mode was the only factor shown to be a "consistently significant variable;" however, communication mode did not markedly affect the total language score (Geers, 2002). Geers (2002) reported that the number of hours spent in therapy and parent participation in therapy each correlated to higher skills in speech perception and production skills. Children who achieved the most intelligible speech were typically found in mainstreamed classes in private schools; these factors

were no longer significant when considered along with communication mode (Geers, 2002). Geers (2002) concluded that children who are implanted before the age of five have access to auditory speech stimuli at a time which is crucial for the development of speech and language; the extent to which this information is used by the child to gain competencies in speech, language, and reading are dependent upon a variety of factors including: what the child brings to the time of learning, what is provided by the characteristics of the implant, and what is provided by parents and professionals who are part of the rehabilitation program.

Grammatical Skills in Children with Cochlear Implants

Recent research has identified several syntactic deficits associated with children who have cochlear implants (Geers, 2004; Nikolopoulos, Dyar, Archibold, & O'Donoghue, 2004). Nikolopoulos et al. (2004) looked specifically at the grammatical competencies of children who use cochlear implants. Nikolopoulos and colleagues used the Test for Reception of Grammar of 82 prelingually deaf children who were under the age of seven and had been implanted up to five years. Before being implanted, only 2% of the children were above the first percentile when compared to their age matched peers; improvements were seen as 40% and 67% of children rose above the first percentile three and five years post-implantation respectively (Nikolopoulos et al.). The researchers reported that, five years after implantation, 20% of the participants were between the 25th and 75th percentiles. Nikolopoulos and colleagues pointed out that the children who were implanted before the age of four reached the 36th percentile and performed with skills that were more similar to their normal hearing peers than the children who received their

implants at later ages. The researchers presented that children who experience profound deafness, either congenitally or prelingually, are at risk for significant delays in all areas of oral language; those who develop language later than usual are likely to be at a disadvantage concerning the development of grammatical competence in particular. Nikolopoulos and colleagues point out that this is significant because delays in grammatical competence may cause further risks in the areas of reading and writing which are academically critical. Fortunately, the technology associated with cochlear implantation and the resulting speech enhancement has allowed children with severe to profound hearing loss to develop appropriate oral language for meaningful communication (Nikolopoulos et al.).

The extent of linguistic improvement seen after cochlear implantation is dependent upon several factors and varies from individual to individual. Geers (2004) conducted a study to determine if a child's speech, language, and literacy skills are affected by their chronological age at the time of implantation or length of time with an implant. As in the Geers et al. (2003) study, the age at implantation was not shown to significantly affect the language development of the participants; however, the age of the child at the time of the updated speech processor fitting was an important factor in the production of speech but no other area of language (Geers, 2004). Typical abilities in speech and language were exhibited by 80% of participants whose hearing loss was not congenital and who received implants within a year of the hearing loss.

Geers (2004) explains that, according to her findings, the speech production, speech perception, language, and reading abilities seen at the ages of eight and nine are not affected by the age at implantation. There were several reasons given for this lack of

correlation; two years is not young enough to show the benefits of early input, there may be benefits of early implantation that are no longer evident by the age of eight, or the strategies for coding speech available when the study was conducted failed to present adequate information. Geers summarizes that, even though no strong relationship between the age at implantation and outcome measures was found, more of the participants who received their implant at two years of age reached higher speech and language skills corresponding to their age matched peers than did children who were implanted at four years. The findings indicated that typical speech and language development can be expected from children whose deprivation of auditory stimuli lasts only a short time during the years important for learning language; a larger percentage of children who receive stimulation of the auditory system prior to a language delay (i.e., two years) will produce appropriate speech and language by the time they attend elementary school (Geers, 2004).

Narrative Skills in Children with Cochlear Implants

Recent research has shown deficits in the narratives produced by children with cochlear implants (i.e., Crosson & Geers, 2001; Luetke-Stahlman, Griffiths, & Montgomery, 1999). Luetke-Stahlman, Griffiths, and Montgomery (1999) explained that there is a need for the assessment of narrative abilities of children because there is little information in the literature to document the retelling of texts that can be used to monitor changes in language development. Making the connections between hearing loss and language impairment as well as between language impairment and narrative abilities, Crosson and Geers (2001) conducted a study which looked at the narrative abilities of children with cochlear implants. An eight picture sequence story was elicited from 87

eight and nine year olds who had been implanted for at least four years and 28 eight and nine year olds with normal hearing. The participants in the hearing impaired group experienced the onset of deafness before the age of 3;3, were implanted on or before their fifth birthday, demonstrated normal nonverbal intelligence, and resided in monolingual English speaking homes (Crosson & Geers, 2001). Crosson and Geers reported that the participants with hearing impairments had all worn Nucleus 22 channel cochlear implants for a period ranging from four to six years. Crosson and Geers reported that each participant who was deaf was seen on an individual basis by a teacher of the deaf using the child's preferred mode of communication; the participants with normal hearing were also seen individually. Those with typical hearing were seen by Dr. Crosson (Crosson & Geers, 2001).

Aside from narrative abilities, the reading abilities of the participants (in the Crosson and Geers (2001) study were measured by the Peabody Individualized Achievement Test-Revised, receptive language was measured by the Test of Auditory Comprehension of Language -Revised, and the speech perception abilities were assessed using the Word Intelligibility by Picture Identification Test. The authors (Crosson & Geers) explained that the picture sequence, rather than a verbal only prompt, was used when eliciting narratives because the pictures allowed the clinicians to keep more control over the content of a story. The narratives were transcribed, and a system for scoring the narratives was developed based upon the use of complete narrative structure, conjunctions, and referents used to differentiate and identify characters. Crosson and Geers explain that the narratives told by participants were broken into T-units which were described as discourse units that could serve as sentences. Each T-unit was scored with

regard to the type of narrative structure it represented; T-units were coded as orientations if they described the setting and characters or actions, complicated actions if they referred to chronological events, evaluations if they gave the character's reaction to the events, or resolutions if they followed the climax in the chronology of the story. A modified version of High Point Analysis was implemented when coding structural components of narratives, because High Point Analysis has been shown to differentiate developmental changes in both personal and fictional narratives. Crosson and Geers explained that the High Point Analysis takes into account events of the narrative as well as motivational and evaluative statements, but syntax and semantics are not included in the narrative assessment. The authors (Crosson & Geers) presented that narratives consist of four key elements including orientations which include clauses that give the setting and describe objects, characters, and actions. Complicating actions are narrative clauses that are restricted by time and indicate a time-ordered event. Evaluative statements present the narrator's attitudes concerning events and interpretation of the motives of the character as well as the character's reactions to events and the resolution of the story. Crosson and Geers used the use of conjunctions and referents in assessing the cohesion of the narratives produced by the participants. Crosson and Geers explained that scores reflecting the narrative abilities of the children with cochlear implants were evaluated in relation to their chronological age, IQ, speech perception, language, and reading skills; scores reflecting the narrative abilities of participants with normal hearing were compared to the scores of two groups. One group of cochlear implant users had scores in speech perception that were above average (i.e., above 48% on the Word Intelligibility by Picture Identification Speech Perception Test), and the other group of

children using cochlear implants were below average speech perceivers. A significant correlation was found among scores of narrative ability, speech perception, language syntax, and reading test scores; linguistic skills at the discourse and sentence levels were found to have independent effects on the narrative abilities of the participants. Crosson and Geers found that children with severe to profound hearing loss who scored above the mean in the area of speech perception with their cochlear implant produced narratives that had structures and referent use similar to those of their same age peers with normal hearing; however, the use of subordinate conjunctions by users of cochlear implants was less sophisticated than their age matched peers but more developed than the use of conjunctions of children with less benefit in their speech perception. Children who were noted to be below average perceivers demonstrated lower skills in the production of narrative structure and cohesive devices than typically developing children or users of cochlear implants with better speech perception. When Crosson and Geers examined the predictors of reading comprehension (i.e., age, I.Q., speech perception, language, and reading test scores), they found independent contributions of skills at the discourse and sentence levels as measured by narrative ability. Crosson and Geers reported that narratives of children with normal hearing followed the basic structure of a narrative and included a climax, a resolution, and at least one statement evaluating the character's planning and emotional reactions. The stories of participants with normal hearing also demonstrated the correct use of cohesive devices and references. Children who used cochlear implants and had above average speech perception produced narratives similar to those of typically hearing children in narrative structure and the use of referents. Significant group effects were found in all areas that were assessed; Crosson and Geers

reported that participants with better speech perception demonstrated stronger abilities in narrative ability, narrative structure, and narrative cohesion. Crosson and Geers presented three principal findings from their research. First, scores of overall narrative ability correlated to the global linguistic skills of the children and corresponded to scores of speech perception, receptive language, and reading comprehension. The second important finding was that children who experience prelingual deafness have impaired narrative skills, but the good auditory perception provided by a cochlear implant can help to lessen the narrative deficiencies. The third finding by Crosson and Geers is that their results reveal the importance of narrative skills for academic success by showing the correlation between narrative ability and scores in reading comprehension.

Crosson and Geers (2001) found that children who are implanted before the age of five and achieve high benefit in the area of speech perception produced narratives that were similar in structure and cohesion to those of their hearing age mates by eight to nine years of age. The authors presented that the availability of auditory information from cochlear implantation, particularly if acquired at an early age, may lesson the period of time needed in a special education classroom and expedite their entry into the mainstream classroom. Crosson and Geers (2001) explained that narrative assessment is crucial, because it can predict academic success in the mainstream classroom. The independent effect of narrative ability on reading comprehension was assessed; the researchers found that narrative ability had a significant effect on the various levels of reading comprehension among participants. Crosson and Geers explained that children with typical hearing are exposed to narratives and learn their form through "incidental teaching" as they hear people in their environment telling stories to one another; children

with severe to profound hearing losses do not benefit from hearing the stories being told around them. The introduction of the technology related to the cochlear implant provides the hope for improved perception of auditory speech which can potentially lead to the progression of the development of spoken language in children with severe to profound hearing impairments (Crosson & Geers, 2001).

Luetke-Stahlman and colleagues (1999) studied the narrative retellings of a girl whose chronological age was seven years and eight months; the subject presented with profound sensorineural hearing loss in both ears. The authors report that the young girl had not been exposed to reading before the age of four when she was adopted and brought to the United States where she received her cochlear implant soon after her arrival.

When she first came to America at the age of four, the little girl was without an education, speech, or language. Luetke-Stahlman and colleagues explained that, when the study began, the young girl could hear simple questions and statements only with her cochlear implant turned on; complex English was signed to the participant. She was judged to demonstrate 50% intelligibility with familiar listeners. Luetke-Stahlman and colleagues reported that the participant demonstrated a one year receptive language delay and a two year expressive delay on the Clinical Evaluation of Language Fundamentals (CELF), Assessing Semantic Skills Through Everyday Themes (ASSET) and the Test of Language Development (TOLD). In spite of the participant's difficult start in life, her abilities in English and reading were judged to be similar to those of two other deaf or hard of hearing subjects enrolled in the second grade (Luetke-Stahlman et al.).

Luetke-Stahlman and colleagues (1999) explained that the study involved an

initial intervention stage during which a teacher of the deaf mediated the participant's ability to retell a story by implementing a graphic organizer and discussing the components of the text. The teacher explained difficult concepts, vocabulary words, and syntax by acting them out. The second phase of the study involved the participant retelling two texts without any assistance while being video taped, the third stage brought more retellings with the assistance of the teacher of the deaf, and the last stage of the study included more retellings without mediation. Pre and post testing using the Gates-MacGinite Test of Reading showed an improvement of one full grade level in 12 months (Luetke-Stahlman et al.). The researchers reported that curriculum based assessments which took place at the end of the subject's second grade year showed that she was a "strong performer" on narrative reading but needed further focus on expository texts. Luetke-Stahlman and colleagues reported that, over the course of intervention, the participant evolved from a reader who had the need for more improvement to a "strong reader." Like the participants in the Crosson and Geers (2001) study, the young girl demonstrated a limited use of cohesive devices in her stories. Luetke-Stahlman and colleagues (1999) report that their participant steadily improved over the course of intervention. The participants of the Crosson and Geers study with poor speech perception had difficulty with the use of referential terms; similarly, the participant studied by Luetke-Stahlman and colleagues presented with insufficient pronoun use. The young girl used singular and plural devices incorrectly, used no referents, interchanged masculine and feminine pronouns, didn't use certain modals (i.e., would, should, won't), omitted various forms of "to be,"did not correctly use the past tense forms "was" and "were," showed inconsistent noun-verb agreement, never used a third person singular

verb, didn't correctly use versions of "to do," and inconsistently used plurals. Leutke-Stahlman and colleagues reported that these areas of weakness each improved from early to late intervention phases. The authors (Luetke-Stahlman et al.) reported both syntactic and semantic improvements across mediated and unmediated retelling conditions. The participant showed a full year's improvement on the Gates-MacGinite Test of Reading from pre to post testing. The authors conclude that the use of narrative retell tasks in mediated and non-mediated settings may be efficacious, and they recommend further use of the method.

II. Project Objectives

The purpose of the current study (N = 3 participants) was to examine the effectiveness of Narrative Based Language Intervention (NBLI) with children who have cochlear implants (Cis). The researchers sought to determine in a preliminary study whether a six-week production-based intervention approach focusing on production of grammatical structure as well as narrative content and form would produce similar results in children with Cis as previously shown in children with Specific Language Impairment (SLI).

The investigators worked to determine whether or not the same intervention approach produced gains in the production of oral narratives as measured by one aspect of narrative microstructure (targeted grammatical forms in story retell and sentence imitation tasks) and a general measure of narrative macrostructure (Quick Narrative Assessment), story grammar as measured by Miller, Gillam, and Pena (2001). Elements of narrative macrostructure which were assessed included setting, characters, temporal phrases, cause and effect relationships, grammatical complexity, dialogue, and creativity. Each skill was rated on a scale of zero to two.

III. Method

Description and Source of Research Participants

Children with cochlear implants for this study were recruited from Child Hearing Services (CHS) at the Hearing and Speech Center at UTK. Ms. Velvet Buehler, Director of CHS, distributed information packets that contained a letter to the parents and a fact sheet. If parents indicated a willingness to hear more about the study, the purpose of the project was clarified by phone or in person by the principal investigator (PI). If the parents continued to express interest, an initial pre-experimental session was scheduled.

Three children (CA = 5-8 years) with cochlear implants participated. They were from monolingual Standard American English-speaking homes in Knoxville, Tennessee. All children were enrolled in speech-language therapy in CHS. Each child had used her Ci with a minimum of 22 active electrodes for at least two years prior to entering the study. An audiological summary of the participants is presented in Table 1.

P1 used bilateral cochlear implants. She was first implanted with a Med-El Combi 40+ in the right ear in May 2002 at the age of one year and two months. The device did not provide P1 with the maximum auditory benefit possible. Although the device did not completely malfunction, it was seen as a soft failure and she was implanted for the second time within a month of when the first implant began to malfunction. The Nucleus Freedom implanted at her left ear was turned on in June 2005, approximately one year prior to her entrance into the study. She had four years and one month of total cochlear implant use prior to entering the NBLI project. An evaluation of the Med-El device in March 2006 revealed implant thresholds at reduced levels around 30 dB in the high frequencies from 2k to 8k Hz. Thresholds in the left ear were at normal levels.

Table 1 Audiological Summary of Participants 1-3

	P1	P2	P3
Hearing Loss	Bilateral, Profound SN Loss	Bilateral, Severe-Profound SN Loss	Bilateral, Severe-Profound SN Loss
Bilateral Implants?	Yes	Not during the study	No
Type of Implant	Med El Combi 40+ (R) & Nucleus Freedom (L)	Nucleus 24 with an ESPrint 3G processor (R)	Nucleus 24 Contour with an Esprint 3g BTE processor (L)
Age at First Implant	CA 1;2	CA 2;4	CA 6;2
Implant Experience	Four years/one month (total); one year with 2nd implant	Five years/one month	Two years
Hearing Status (Aided)	Reduced thresholds from 2k to 8k in the right ear & normal in left. Normal tymp.	Pure tone and speech reception thresholds within normal limits; Normal tymp.	Pure tone and speech reception thresholds within normal limits; Normal tymp.

Note: SN – Sensorineural; (R)-Right Eat; (L) – Left Ear; Tymp.-Tympanogram; CA-Chronological Age

P2 presented with a bilateral, severe to profound sensorineural loss. She used a cochlear implant at the right ear. P2 was implanted with a Nucleus-24 cochlear implant with ESPrint 3G ear level processor at the right ear in July 2001 at the age of two years and four months. P2 had approximately five years and one month of implant experience at the start of the study. P2's implant thresholds were within normal limits. During the three month follow-up testing, P2's mother reported that plans for a bilateral implant were being made.

P3 presented with bilateral severe to profound sensorineural hearing loss. She used a Nucleus 24 Contour cochlear implant with an ESPrint 3G BTE processor at the left ear. Her implant was activated when the subject was six years and two months old. two months old. She had approximately two years of cochlear implant experience at the start of the study. An audiological screening revealed pure tone thresholds within normal limits

P1 had been administered the CELF (Semel, Wiig, & Secord, 2004) and the TNL (Gillam & Pearson, 2004) during recent testing. She was administered the LEITER (Roid & Miller, 1997) before beginning intervention. P2 and P3 were given the CELF, TNL, and TONI. A summary of formal and informal assessments that were administered is found in Table 2.

P1 scored exactly one standard deviation below the mean in expressive language on the Clinical Evaluation of Language Fundamentals-4 (CELF-4). Her core language score was slightly below -1 SD. P2 and P3 both scored below -1.5 SDs in their expressive and core language scores on the CELF-4. All participants scored below 1.5 SDs on the Test of Narrative Language (Gillam & Pearson, 2004). P3 was unable to

Table 2 Informal and Formal Assessments for Participants 1-3

	P1	P2	P3
Chronological Age	5;4	7;6	8;0
Grade in School	Kindergarten	1st	1st
CELF-Core Lang.	82	46	40
CELF- Exp. Lang.	85	51	45
CELF – Rec. Lang.	98	65	82
TNL– Nar. Comprehension	6	3	Not Reported***
TNL – Nar. Production	4	5	Not Reported***
Nonverbal Intelligence	100*	83	108*
Oral Mechanism Functioning	WNL**	WNL**	WNL**

Note: Lang. - Language, Exp.-Expressive, Rec.- Receptive, Nar. - Narrative, CELF - Clinical Evaluation of Language Fundamentals (Semel, Wiig, & Secord, 2004), TNL- Test of Narrative Language (Gillam & Pearson, 2004), TONI - Test of Nonverbal Intelligence (Brown, Sherbenou, & Johnson, 1997), Leiter– Leiter International Performance Scale-Revised (Roid & Miller, 1997), MLU – Mean Length of Utterance, WNL-within normal limits

*Scores on the tests of nonverbal IQ were within 1 SD of the norm.

** See table 3 for details.

***Assessment could not be completed independently

complete the TNL independently, and valid scores could not be determined. The participants scored above -1 SD on Test of Nonverbal Intelligence Third Edition (TONI-3) (Brown, Sherbenou, & Johnson, 1997) or the Leiter (Roid & Miller, 1997).

All children passed an oral-mechanism screening. Facial symmetry was assessed as well as mandibular and lingual movements. Table 3 provides a summary of the participant's oral mechanism screening. No frank neurological or social emotional disorders were reported on the parental questionnaire.

All children had syntactic deficits based on Systematic Analysis of Language Transcripts (SALT) based on a 20-minute conversational language sample. The clinician-child conversational samples were taken as the child told the clinician about their experiences at school, their pets, vacations, or what he/she was making with available play-doh during the conversation. Grammatical forms occurring fewer than three times during the conversational sample were selected as syntactic targets.

Experimental Protocol

A single subject design (ABA) across participants was used in the present NBLI study. Finestack, Fey, Sokol, Ambrose, and Swanson (2007) explain that there are two major goals of NBLI, (1) to increase the quality of children's stories developing their use of story grammar components, and (2) to promote children's frequency, accuracy, and fluency of complex grammatical forms both in narrative and conversational contexts. The two variables used to monitor progress were narrative quality and the percentage of grammatically correct utterances. The three different probe types involved in the present study included baseline probes collected during three sessions which were conducted

Table 3 Oral Mechanism Exam

Oral Motor Exam	P1	P2	P3
Face is 5 eyes wide?	Yes	Yes	Yes
Upper face= Lower face?	Yes	Yes	Yes
Intercanthal width = alar base width?	Yes	Yes	Yes
Nasal ala are same size/shape?	Yes	Yes	Yes
Complete columella?	Yes	Yes	Yes
Philtrum defined?	Yes	Yes	Yes
Cupid's bow defined?	Yes	Yes	Yes
Auditory meatus is level with zygomatic arch?	Yes	Yes	Yes
Pinna complete?	Yes	Yes	Yes
Adequate lingual strength?	Yes	Yes	Yes
Adequate lingual mobility?	Yes	Yes	Yes
Can close eyelids lightly and tightly?	Yes	Yes	Yes
Can raise eyebrows?	Yes	Yes	Yes
Can shrug shoulders?	Yes	Yes	Yes
Adequate mandibular movement?	Yes	Yes	Yes

prior to intervention, intervention probes collected at the end of each intervention session, and maintenance probes collected during three sessions immediately following the termination of intervention as well as three months after intervention. Two story retells and two story generations were elicited during each probe session. The narratives used for retelling in recording probes were taken from the "Decodable Take Home Books@ from Open Court Reading (SRA/McGraw-Hill, 2002). The stories were on the first grade level. They were eight pages in length and consisted of approximately 150 words. During each recording of probe information, one Open Court story was from Level B Set 1, and the other was Level C Set 2. One story was more complex than the other in order to provide narratives with more tokens of complex sentences. Sequences of eight picture cards from the Thinking Corporation were used to elicit story generations. Single pictures containing several possible initiating events, which were available from previous work with NBLI (Swanson, Fey, Mills, & Hood, 2005), were used in the story generation task as well. The stories were analyzed for Narrative Quality using the AQuick Narrative Analysis@ presented by Miller, Gillam, and Pena (2001); percentage of grammatically correct utterances was also calculated. The probes for P1 were collected by the PI. Probes for P2 and P3 were obtained by Dr. Swanson. The data were analyzed within one week of collection and plotted on four graphs. Conversational samples were collected during baseline and maintenance sessions as a generalization probe.

Prior to initiating any data collection, parental informed consent was obtained. Parents were given the opportunity to ask questions and received satisfactory answers before their written consent was requested. Each child was informed about the project. She was given an age-appropriate explanation of the study by the clinician and her verbal

assent was obtained. Each child participated in two pre- experimental sessions scheduled within seven days. Pre-experimental sessions for subjects 1 and 3 were 1-1/2 hours in length and were conducted at UTK. The pre-experimental sessions for P2 were combined into one three hour session and conducted in a quiet room at the daycare where her mother worked. These sessions were scheduled after school hours or on days/times during the summer that accommodated the parents' schedules. The PI conducted the pre-experimental sessions. Throughout the two pre-experimental sessions, the eligibility criteria measures were administered. During the first session, an informal assessment of the participant=s oral mechanism was conducted as well as a hearing screening at 500, 1000, 2000, and 4000 Hz. If the child had not been through a audiological evaluation within the past six months, they were referred to an audiologist at UTK for a complete audiological evaluation including tympanometry; pure tone thresholds at 500, 1000, 2000, and 4000 Hz, as well as speech reception thresholds using spondee words as stimuli were determined. A hearing screening was conducted for P3 because she had recently been through a formal audiological assessment. She passed with thresholds for 500, 1000, 2000, and 4000 at 20dB. Audiological assessments for P1 and P2 revealed normal implant thresholds at 20dB.

The first pre-experimental session consisted of the administration of the CELF-4 (Semel, Wiig, & Secord, 2004) (administration time: 60 minutes) and a 20-minute (clinician-child) spontaneous conversational sample. In addition, the child=s hearing was evaluated with the LING Six Sound Test (administration time: 1 minute). During the second pre-experimental session, the Test of Narrative Langue (TNL) (Gillam & Pearson, 2004) (administration time: 20 minutes) as well as the TONI (Brown, Sherbenou, Johnson,1997)

(administration time: 20 minutes) were given. A twenty minute conversational sample was taken as the child played with play-doh and discussed their pets, experiences at school, trips they had been on, what they were making with the Play-Doh, etc. If indicated, the audiological evaluation previously described was conducted during the last 40 minutes of the second pre- experimental session. The PI transcribed the conversational sample using SALT (Miller & Chapman, 2001). Transcription was completed within seven days following the session. Samples were scored for mean length of utterance and structural stages. Three intermediate grammatical goals were selected based on the child's conversational and narrative samples analyzed with SALT as well as her narratives elicited as part of the TNL (Gillam & Pearson, 2004). Targets selected for P1 and P2 included coordinating conjunctions, subordinating conjunctions, and post modifications of nouns. The syntactic targets in the intervention with P3 included present progressive verbs, negative contractions, and coordinating conjunctions. One syntactic target was selected for each two weeks of the intervention program. Samples of goals were past tense, post-modification of nouns, pronouns as cohesive devices, and subordinating conjunctions. These goals were also chosen because they play an important role in narrative discourse. For each intermediate goal, specific targets were identified for each participant. At least three specific narrative production goals were also formulated for each child. Story components that received limited credit on the Test of Narrative Language (Gillam & Pearson, 2004) were identified and targeted. For example, children who failed to include a beginning (setting and characters) or ending were encouraged to use these components. Children who included these components but merely utilized information from the stimulus picture were encouraged to create additional information not perceptually available (e.g.,

character and location names, character's likes and dislikes, future changes in character behavior based on what they learned from story experiences). Similarly, children who did not produce complete problem-resolution pairs were encouraged to do so. Those who produced simple episodes were shown how to make them more interesting and complex by adding more and/ore embedding episodes. Although as few as three story component were specifically targeted, all story grammar components were addressed throughout each session for each child. The goals for each participant can be found in Tables 4A and 4B. During the pre-experimental sessions, the child was given verbal reinforcement (e.g., "You're working hard," AYou're finished with this. Good work!"). At the end of each session, the child was given a small prize. Praise was not contingent upon correct performance.

Stimuli

A maximum of 18 stories for the Story Retell-Imitation Task were used for each child. These stories contained a minimum of 10 examples of the child's weekly morphosyntactic or discourse-based target form. All stories contained each of the narrative components: setting, characters, problem, resolution, complication, and ending. Each story had three corresponding pictures. When children had identical morphosyntactic or discourse-level goals, the same stories were used across children. Syntactic goals were addressed for two weeks each, and every goal was modeled by the clinician in spontaneous conversation at least fifteen times in each session targeting the syntactic goal.

Intervention Schedule

As with the pre-experimental sessions, each child was seen individually in a sound treated room at UTK or a more convenient location for the child and family. P1 and

Table 4A Syntactic Targets

P1	P2	P3
Coordinating Conjunctions (and, but, or)	Coordinating Conjunctions (and, but, or)	Present Progressive Verbs (is/are –ing)
Subordinating Conjunctions (because, like, if, since)	Subordinating Conjunctions (because, like, if, since)	Negative Contractions (don't, won't, can't)
Post Modification of Nouns (i.e. "The man *who lived next door*)	Post Modification of Nouns (i.e. "The man *who lived next door"*)	Coordinating Conjunctions (and, but, or)

Note: Syntactic targets presented in consecutive order for each subject; each target was presented for two weeks

Table 4B Story Grammar Targets

P1	P2	P3
Setting/Characters (Time and place) (Character's name and attribute)	Setting/Characters (Time and place) (Character's name and attribute)	Setting/Characters (Time and place) (Character's name and attribute)
Initiating Event (The problem or "big event")	Initiating Event (The problem or "big event")	Initiating Event (The problem or "big event")
Moral of the Story/Ending (What did the character learn?)	Plan (How was the problem solved?)	Plan (How was the problem solved?)

Note: Story grammar targets presented in consecutive order for each subject; each target was presented for two weeks

P3 were seen at the Child Language Lab at UTK. P2 was seen in the quiet audio/visual room at her school. All sessions were conducted twice per week for 75 minutes (total intervention time = 15 hrs.). They were scheduled during the summer or after school hours on days/times that accommodated the parents. Two story retells and one story generation were elicited during the first session of each week and one retell and two story generations were done during the second session. Treatment for P1 was provided by Ms. Velvet Buehler. The PI collected baseline data. for P1 and provided treatment for P2 and P3. Dr. Swanson collected the baseline data for P2 and P3. One small prize was given at the end of each session, and the participants were given a storybook and cookie party at the end of the intervention period. Prizes were not contingent upon correct performance or overall progress.

Intervention Procedure

NBLI is a production–based, hybrid approach combining skills-based and naturalistic (interactive, meaning-based) activities. The modified NBLI protocol used in Swanson et al. (2005) and Fey, Finestack, Sokol, Ambrose, and Swanson (2007) was used in the present study. The activities included in each session are described below.

1.) The LING Six Sound Test was conducted at the beginning of each session with children who had not shown an ability to report a malfunctioning cochlear implant as an indicator that the participant=s cochlear implant was properly working.

2.) Warm-up Activity. The child retold the story from the Story Retell-Imitation Task (see below) from the previous session. The child's production was audio-recorded.

Because of previous exposures and practice, this story was very familiar to the child allowing for immediate success.

3.) Story Retell - Imitation Task. In this task, the child was asked to retell a story that contained multiple examples of the morphosyntactic or discourse level target form on a story component by component basis (Swanson et al., 2005). Prior to reading the story to the child, the clinician highlighted the story's main theme. The clinician then read the story using large inflectional modulations. The clinician read the story again, one story component at a time, and the child was asked to retell the story on a component-by-component basis (e.g., setting and/or characters, episode 1, episode 2, ending). While telling the story, the clinician acoustically highlighted the child's syntactic targets by saying the target with increased intensity and volume as well as inserting pauses before and after the target in the sentence. A Marantz digital audio recorder was used to audio-record the participant's story retells and generations each session. During the retelling of the story, the clinician and child enacted at least two of the events in each story (i.e., "Let's pretend we're being chased by a bear!"). If the child did not spontaneously imitate the action, the clinician said, "Can you act like you are being chased?" Enactments were attempted throughout each story retell task. The clinician then introduced a brief sentence imitation task. Sentences from the story used in the retell activity were used during the sentence imitation task. Sentences containing the syntactic target were broken down into two simple sentences and then combined to form a more complex sentence with the syntactic target. At least 10 sentences were imitated by the participant after each story retell activity.

As each story was retold on a component-by-component basis, corresponding colored pictures were displayed. After each child turn, the clinician requested clarification, more events (i.e., important details that were omitted), and/or more elaborate syntax as appropriate (as in Hoffman et al., 1990, pp. 104-105). If an "optional" target form was not produced, or produced incorrectly, the clinician modeled the sentence or recast the child's production. Fey et al. (2007) explain that recasting involves maintaining the meaning of the child's original utterance while adding syntactic information. The clinician then recapped the child's contributions, once again modeling the important semantic details and the targeted grammatical structures within a coherent story frame. Because of P3's lower language level, stories that were simpler than those used with the other two participants were presented. The stories used for P3 were from the study by Swanson et al. (2005). The upper level stories were rewritten with lower level morphosyntactic and discourse structures (Swanson et al., 2005). "Easier" stories were used with only the one participant.

4.) Story Generation Task. For this task, the clinician introduced a single picture to the child. The picture illustrated a scene without an obvious initiating event. First, the clinician described the setting and characters. The clinician then elicited an initiating event with a verbal prompt such as "Oh no! What do you think might happen in our story?" The child was encouraged to state a possible initiating event. The clinician highlighted the problem and then gave a verbal prompt to elicit a possible resolution. The child then stated a possible resolution. The clinician recapped the problem and resolution and then said to the child, "This is a great story! Let's tell this story again!" If the child failed to generate an initiating event, the clinician provided the child with

options to allow for story co-construction (Merritt, Culatta, & Trostle, 1998, pp. 320-321). The child selected which option to use for his/her story and then generated the complete story with the clinician's support. To elicit the story the second time, the clinician first asked, "Let's see, what do we have to say first?" Child said, "We have to say who the story is about." Clinician said, "That's right. We have to talk about the people/characters." If at any step the child failed to identify the next component to discuss, the clinician attempted to prompt a correct response (e.g., "We have to talk about where the story happened. That's called the _____."). If the child still failed to respond, the clinician simply labeled the next component and the child repeated it. During the story generation activity, the child was given another opportunity to enact at least two components from the story along with the clinician. The clinician encouraged the child to participate by saying things such as, "Let's pretend that we're camping and see a skunk!" Story grammar icons corresponding to each component of story grammar were presented as each part of the story was discussed. Construction and use of these icons followed the general approach of Story Grammar Marker (Moreau & Fidrych, 1998). As each part of the story was generated, the child was asked to name the icon. If the child was unable to label the story component, the clinician provided the name. Verbal prompts (e.g., "So, the boy decided to_____.") were used to trigger the child's description of each story grammar component. One prompt was used to elicit the initial "problem" and another the initial "resolution." Additional prompts were used to trigger a complication or another problem-resolution dyad. As the child described each story component, the clinician "recapped" and then prompted for clarification, more events, and/or more elaborate syntax as in the retelling task (Hoffman et al., 1990, pp. 104-105).

In story generation, the child's grammatical, phonological, and semantic errors were recast by the clinician. One of the child's target story components (e.g., complication) was given extra attention. Specifically, the clinician stated *how* the child's production of the target component contributes to the story plot. During the child's first attempt at generating the complete story, the clinician (or child when possible) recorded the child's utterances on a "foldout" storybook. The storybook contained the initial illustration and sketches (i.e., stick figures drawn by clinician and/or child) of all subsequent events (Ukrainetz, 1998).

5.) Repeated Retellings. At the end of the session, the child's parent was given a copy of the story and corresponding illustrations from the Story Retell-Imitation Task. The parent was also given the foldout storybook from the Story Generation Task. The parent was encouraged to read each story to the child once or twice per day and to have the child retell each story preferably to someone who has never heard it, such as another parent, friend, younger sibling, and/or grandparent at least once per day (Merritt et al., 1998, p. 316). Parents were asked to arrange authentic retelling situations (e.g., Grandpa said he would really like to hear your story). The technique of acoustic highlighting was explained to the parents of participants; the parents were asked to acoustically highlight their child's syntactic target(s) when reading the stories at home.

Collection of Probe Measures

At the end of each intervention session, intervention probes were collected. As previously described, the probes consisted of two story retells and two story generations. In addition to the intervention probes was the percentage of syntactic targets used by each participant. The first and last retell from the two week period targeting each of three

syntactic forms was selected and analyzed. The number of times the participant used the target was divided by the number of occurrences of the target in the original text presented to the participant. The percentage of usage of each target in the last retell with multiple embeddings of the given syntactic form was compared to the percentage of usage in the first retell emphasizing the given target. See Appendix for examples of stories used to collect baseline measures.

Follow-Up Testing

Follow-up testing was conducted and maintenance probes were collected during three sessions immediately following the termination of NBLI and again three months after the discontinuation of therapy. The probes presented included two story retell tasks to elicit syntactic targets as well as two story generation tasks with sequence cards and a single picture to assess story grammar components. During the three month post intervention follow-up, three stories used for retell activities during the intervention sessions were used to elicit retells with numerous opportunities for use of the syntactic target. Each of the three stories presented one of the three syntactic forms targeted during intervention. The retells were analyzed for the number of times the target was used by the participant as compared to the number of times it appeared in the original text. A twenty minute post-intervention conversational sample was collected; during the collection of the sample, the participant was expected to discuss the same topics and answer similar questions to those from the pre-intervention conversational sample.

Narrative Quality

Narrative quality was measured using the "Quick Narrative Assessment" presented by Miller, Gillam, and Pena (2001). This score was used to measure the

complexity of the narratives retold and generated by the participants. Narrative quality was based on seven criteria including setting, character information, temporal order of events, causal relationships, grammatical complexity, dialogue, and creativity. In each category, the participants were given a score of 0-2. For the setting, the child was given a 2 if they included the time and place, a score of 1 for including time or place, and a 0 if neither time or place were included. A score of 2 was given if the child included a character's name and information about the character, a 1 was awarded if the character's name was given and used consistently throughout the narrative, and a score of 0 was given if only pronouns were used as character references. If two or more temporal phrases were used, a score of 2 was given for the temporal order events, a 1 was given if one temporal phrase was used, and a 0 was given if no temporal phrases were used. A two was given for causal relationships if 2 or more causal phrases were used, a score of 1 was earned if one causal relationship was used in the narrative, and a 0 was given if no causal phrases were used. Grammatical complexity was given a 2 if two coordinating conjunctions were used, a 1 if one coordinating conjunction was used, and a 0 if no coordinating conjunctions were used. Dialogue was given a score of 2 if there was dialogue for two characters, a 1 if one character spoke, and a 0 if no character spoke. Creativity was rated from 0 to 2 based on the researcher's subjective opinion of the novelty, humor, suspense, and surprise in the story. The points earned in each of these seven categories were added together to yield a single score of the narrative quality of the baseline stories told by the participants. The maximum combined score for narrative quality possible was fourteen.

Syntax

The percentage of grammatically correct utterances was calculated from the narratives told by the participants during the collection of intervention probes at the end of each session. The number of grammatically correct sentences was divided by the total number of utterances in the narrative. Mazes, asides, false starts, and words used as fillers were not be included in the calculation of the percentage of grammatically correct utterances in each narrative. The use of syntactic forms targeted during intervention was assessed by calculating the percentage of usage (total targets in original text/number of targets heard in the retell) as previously discussed. Syntax was also measured via analysis of the pre-experimental and post- experimental conversational samples using Systematic Analysis of Language Transcripts (SALT).

Fidelity of Treatment (FOT) Results

The PI conducted a FOT check on two randomly chosen intervention sessions with each participant. With regards to each session, the PI judged whether or not the syntactic targets were modeled at least fifteen times by the clinician, if the clinician provided recasting of each incorrect or misused target during the participant's story retells, if the sentence imitation task was complete after each retell, and if each story grammar component was labeled and discussed during the story generation activity.

With participant 1, the clinician completed the sentence imitation task and addressed each story grammar component 100% of the time. In one sample, the syntactic targets were modeled the required fifteen times. In the second sample, which by chance was the first session, seven of the fifteen targets (47%) were modeled. In both sessions, the clinician drew the participant's attention to the incorrect or misused targets 100% of

the time; however, the story components were broken down and the task became sentence imitation instead of clinician recasts.

Both samples of P2's sessions showed that the syntactic targets were modeled at least fifteen times. In both sessions, the sentence imitation task was completed and each story grammar component was labeled and discussed. The clinician provided recasting of the targets during story retells 100% of the time.

Samples of P3's sessions showed a high FOT as well. The syntactic targets were modeled at least fifteen times. The sentence imitation task was completed, and the story grammar components were discussed in their entirety. The clinician consistently provided recasting of the targets during retells 100% of the time.

Reliability

Reliability was checked by a graduate assistant (G.A.) who signed a form of confidentiality before receiving training in data calculation. The G.A. was trained in the transcription of language samples, the segmentation of utterances and propositions, the calculation of the percentage of grammatically correct sentences, the identification and categorization of story grammar components, and the scoring of narrative quality using Miller, Gillam, and Pena's (2001) "Quick Narrative Assessment." The G.A. was also instructed in counting the total number of syntactic targets in the story retells and dividing the number of targets used by the participant by the total number in order to obtain a score indicating the percentage of appropriate times the target was used. Scoring sheets related to the percentage of grammatically correct sentences in each narrative recorded during baseline, as well as narrative quality, was developed and provided to the G.A. The G.A. randomly selected recordings of baseline information from 2 sessions (25% of the

intervention sessions) with each participant to transcribe and analyze. The G.A. transcribed the narratives told by the participant, gave them a narrative quality score and found the percentage of grammatically correct sentences in the stories. The G.A. reviewed each session to ensure that the syntactic targets were modeled in unstructured conversations and activities a minimum of 15 times during each session. The sessions were also reviewed to show that each syntactic target was recast by the clinician when used incorrectly by the participant an ample number of times. The G.A. was also given half of a conversational sample from each participant to transcribe. Regarding all measures of reliability, scores calculated by the G.A. were compared to those scores originally obtained by the principle investigator Acceptable reliability was considered that which was greater that 90% agreement. Discrepancies in scoring were addressed by the principle investigator and the G.A. who worked together to reach a consensus as to the correct scoring procedures.

The PI's transcriptions of conversational samples with the three subjects was compared to the G.A.'s on a word by word basis. Reliability between transcriptions from the PI and the G.A. was found to be very acceptable at 99%. The G.A. analyzed two baseline sessions by determining the narrative quality and percentage of grammatically correct utterances in each story retell and generation. Eighteen story retells and eighteen generations were analyzed by the G.A. In regards to the narrative quality scores, and G.A. and PI reached acceptable reliability of 92%. The reliability score for the percentage of grammatically correct utterances was 88%. Because this reliability did not meet the acceptable 90%, the PI and G.A. discussed scoring differences and arrived at 92% agreement.

IV. Results

During participation in the project, P1 had excellent family support. Attendance to the intervention sessions was consistent, and the subject's parents went through the stories with her at least once a day and created natural storytelling opportunities for her. Throughout the intervention, clinicians observed a significant increase in the subject's confidence in her own storytelling abilities.

Throughout P2's intervention sessions, she and her family were very cooperative. Her attendance was consistent. Only two sessions had to be rescheduled. While the subject attended sessions and participated, the stories presented were not reinforced at home and natural story-telling opportunities were not created for her. The clinicians noted that the patient had a confidence and desire to tell stories form the very beginning of data collection.

Throughout the intervention and collections of baseline measures, full cooperation was given by P3 and her family. They consistently attended intervention sessions, even throughout the holiday season. The stories presented were not carried over at home. Natural story telling situations were not created. At times, the participant's motivation was low and maximum reinforcement was needed from the clinician in order for her to fully participate. As did P1 and P2, P3 expressed an interest in attending the intervention sessions and participated in the tasks involved. When P3 arrived at her intervention session, she was often fatigued from school and her 30-45 minute commute. Her motivation was sometimes low, and extra enactments and games were used to keep her interested.

Narrative Quality for P1

Narrative quality (NQ) was assessed for two story retells and two story generations during each baseline session. Participant 1 demonstrated noticeable gains in the quality of her story retells and story generations from the start of the study to the three month follow-up session. During the intervention, P1's NQ retell scores went from 5.5 to as high as 8.0 before stabilizing around 6.5. During the three month follow-up, her retell scores went up as high as 9.0 before leveling off at 8.5. P1 showed noticeable improvement in the quality of both her story generations and her retells. Her story generation scores ranged from 4.0 to 7.5 with the gains she made being well sustained P1's performance was consistent during the post-intervention maintenance probes.

Narrative Quality for P2

As seen in Figure 2, P2 showed noticeable improvement in the narrative quality of her story retells. During intervention, these scores ranged from 2.5 to 5.5 before stabilizing at 3.5. During the post-intervention baseline collections, her scores rose to 6.0 and remained there for the last two sessions. P2's narrative quality of story generations remained at 3.0 for the first half of the intervention. At the end of intervention, her scores increased to 5.0. Performance in story generation increased to a NQ score of 6.0 before leveling off around 4.0 during post-intervention maintenance probes.

Narrative Quality for P3

P3 demonstrated unstable narrative quality scores in story retells. She showed minor gains during the post-intervention baseline and further gains at the

three-month follow-up. Her scores ranged between 1.5 and 2.5 during intervention and rose to 3.0 once during the post-intervention baseline. P3 demonstrated no gains in the NQ of her story generations until the post-baseline data collection. During intervention, her generation scores ranged between .5 and 1.5. They increased to 2.5 before returning to .5 during the post-intervention baseline collection. The most improvement in narrative quality was made by P1, and P3 made the least gains in narrative quality. The trend seen was for narrative quality scores to decrease during the maintenance probes collected immediately after intervention; lowered performance may be attributed to a fatigue effect as the participants grew tired of the activities and put less effort into their stories. Further gains in narrative quality were demonstrated at the three month follow-up. Narrative quality scores for Participants 1-3 are displayed in Figures 1-3.

Percentage of Grammatically Correct Utterances for P1

P1's percentage of grammatically correct sentences in her retells remained fairly consistent from the first pre-intervention baseline all the way through intervention, the post intervention baseline, and the three month follow-up. This information can be seen in Figure 4. During the three pre-intervention baseline sessions, she produced story retells with 71%, 75%, and 82% grammatically correct sentences respectively. During the first intervention baseline, P1's retells contained 73% grammatically correct phrases. Her performance peaked at 85.5% grammatically correct sentences during session 10, dipped to 67.5% during sessions eleven, and rose to 82% during the last intervention baseline. Regarding her story generations, P1 performed with 82.5%, 89%, 75% grammatically correct phrases

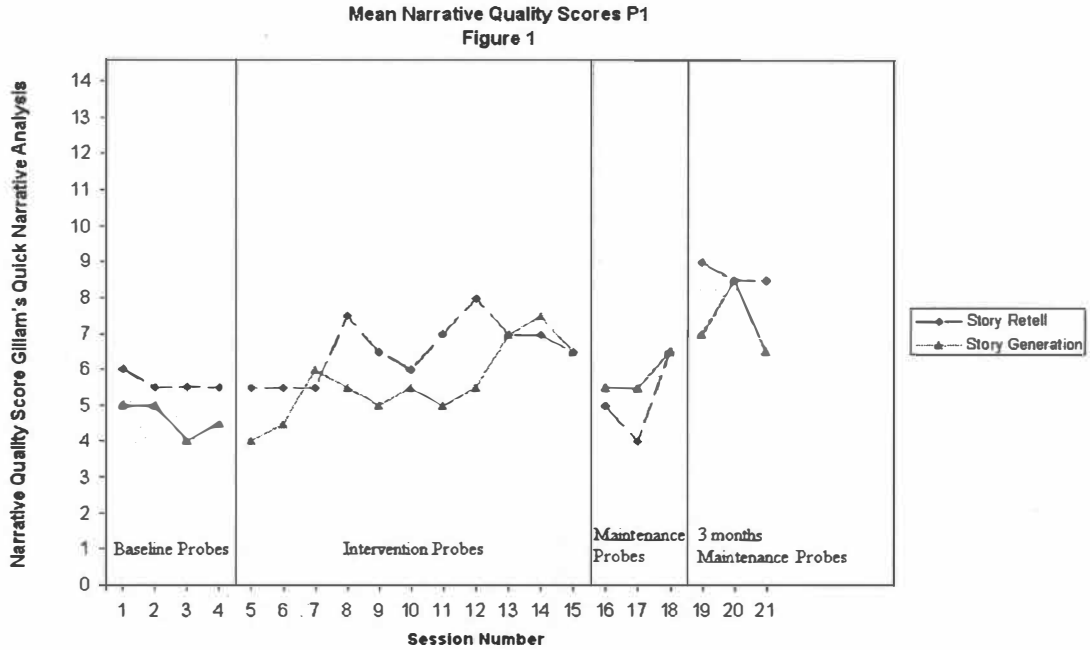

Figure 1 Note: The average narrative quality scores for P1 across baseline, intervention, and maintenance probes are displayed

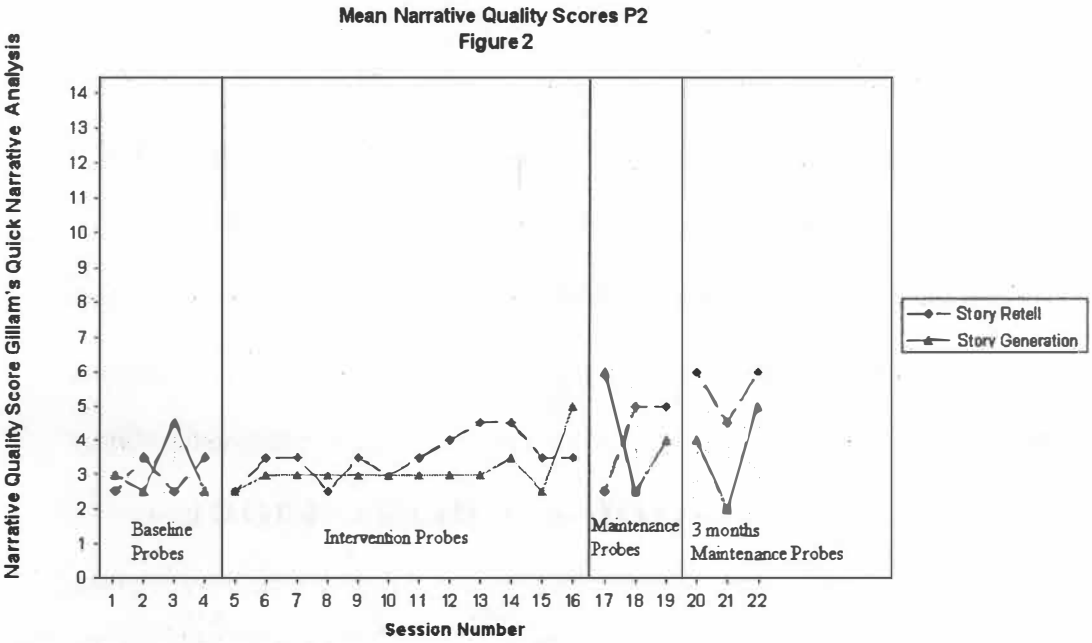

Figure 2 Note: The average narrative quality scores for P2 across baseline, intervention, and maintenance probes are displayed

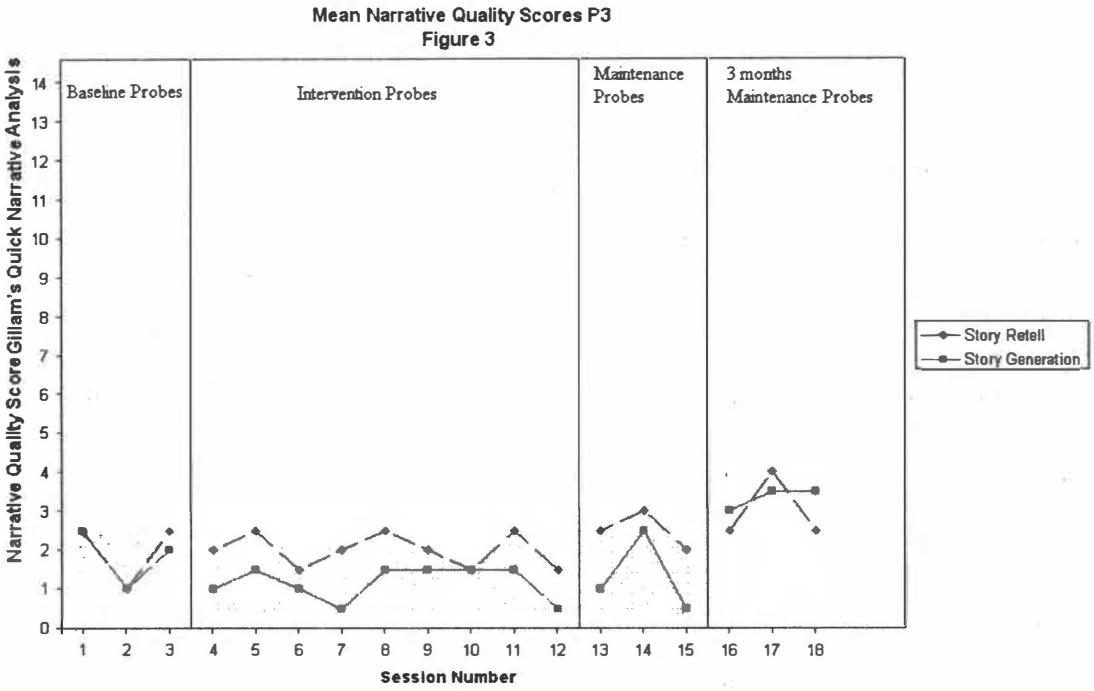

Figure 3 Note: The average narrative quality scores for P3 across baseline, intervention, and maintenance probes are displayed

during the three pre-intervention baselines respectively. Her story generations contained an average of 82.5% grammatically correct sentences during the first intervention baseline; P1's performance peaked early with 91.5% grammatically correct sentences during the second intervention baseline. The lowest percentage of grammatically correct sentences during intervention (71%) was produced during baseline collection for session nine. During the first post-intervention baseline, P1 produced relatively fewer grammatically correct phrases in retells and generations (59% and 38.5%, respectively). Performance in both tasks significantly improved over the last two post-intervention baseline sessions to 63% and 73% for retells and generations respectively. The percentage of grammatically correct phrases decreased over the three baselines taken during the three month follow-up. Three months after

intervention, the percentage of grammatically correct phrases decreased from 77.5% to 55% for story retells and from 65% to 42% for story generations.

Percentage of Grammatically Correct Utterances for P2

Figure 5 presents P2's percentages of grammatically correct utterances. The number of grammatically correct utterances in both story retells and story generations produced by P2 steadily increased over the first five sessions. The grammatical accuracy decreased to 62.5% and 41.5% in story retell and generation respectively. Over the next four sessions, grammatical accuracy in both story retell and generations showed a trend of increase. During session nine the grammatical accuracy in story generation tasks peaked at 90%. The scores for story retell peaked at 90% grammatically accuracy during session ten. Scores over the last two sessions decreased to 75% in story retells and 38.5% in story generations. During the post-intervention baseline, P2's scores in the percentage of grammatically correct utterances were significantly lower than those seen during intervention. Over the maintenance probe collection, her scores were 41.5%, 52%, and 29.5 % for probes one, two, and three, respectively. Her maintenance probes for story generation were 11%, 62.5%, and 63.5%, respectively. The scores for story retell peaked at 90% grammatically accuracy. Grammatically correct sentences were significantly lower than those seen during intervention. Over the post-intervention baseline collection, her scores were 41.5%, 52%, and 29.5% for baselines one, two, and three, respectively. Her post-intervention baseline scores for story generation were 11%, 62.5%, and 63.5%.

Percentage of Grammatically Correct Sentences for P3

As seen in Figure 6, P3's percentages of grammatically correct utterances in story retells were 85.5%, 80%, and 48.5% over sessions one, two, and three respectively. During the initial intervention baseline, P3 produced retells with an average of 34% grammatically accuracy and generations with 48.5% grammatical accuracy. Her performance peaked during session 6 with 78.3% grammatically correct phrases in story retells and 60% in story generations. By the last session, grammatical correctness stabilized around 53.5% for story retells and 61.5% for story generations. During the post-intervention baseline collections, P3's scores for the percentage of grammatically correct sentences gradually increased from 48.5% to 54.3% to 65% in story retells. Performance for story generations was less consistent with scores of 46.5%, 67.5%, and 46.5% for post-intervention baselines one, two, and three, respectively. The scores for story retell peaked at 90% grammatically accuracy. Grammatically correct sentences were significantly lower than those seen during intervention. Over the post-intervention baseline collection, her scores were 41.5%, 52%, and 29.5% for baselines one, two, and three, respectively. Her post-intervention baseline scores for story generation were 11%, 62.5%, and 63.5%. As P2's narratives grew longer, her percentage of grammatically correct utterances decreased. The percentages of grammatically correct utterances are displayed in Figures 4-6.

Specific Grammatical Targets

Two out of three participants (P1 & P2) demonstrated gains in their use of the syntactic targets during story retell activities. Regarding coordinating conjunctions

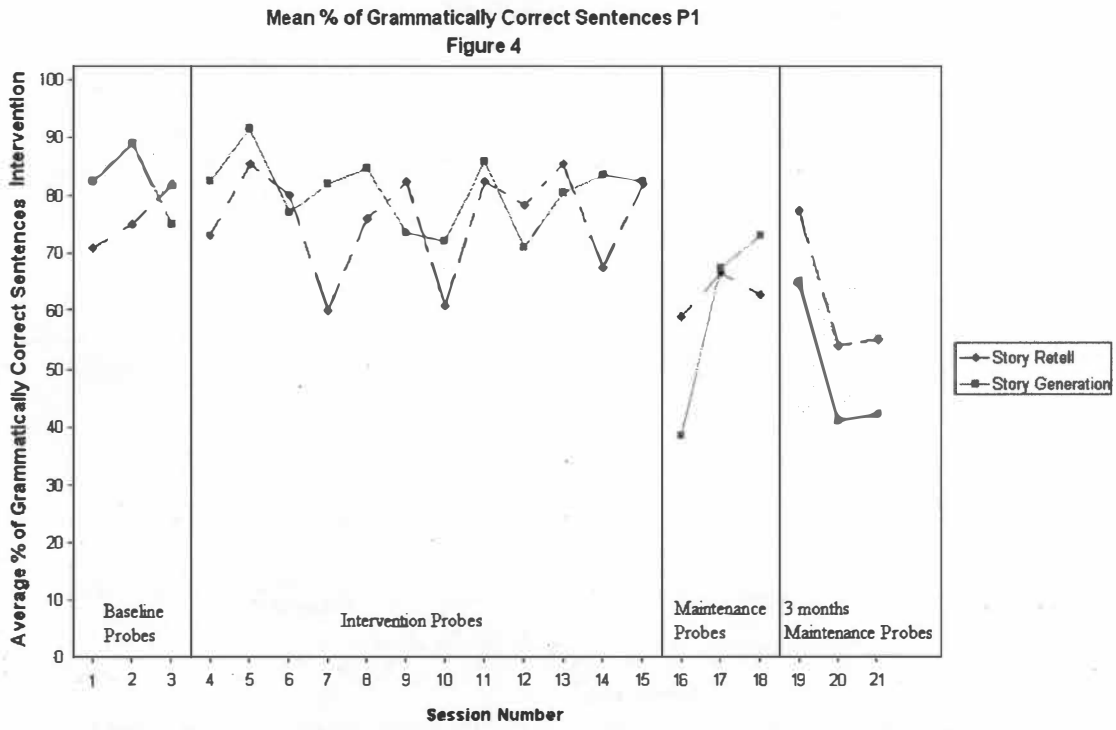

Figure 4 Note: The percentage of grammatically correct utterances for P1 is displayed

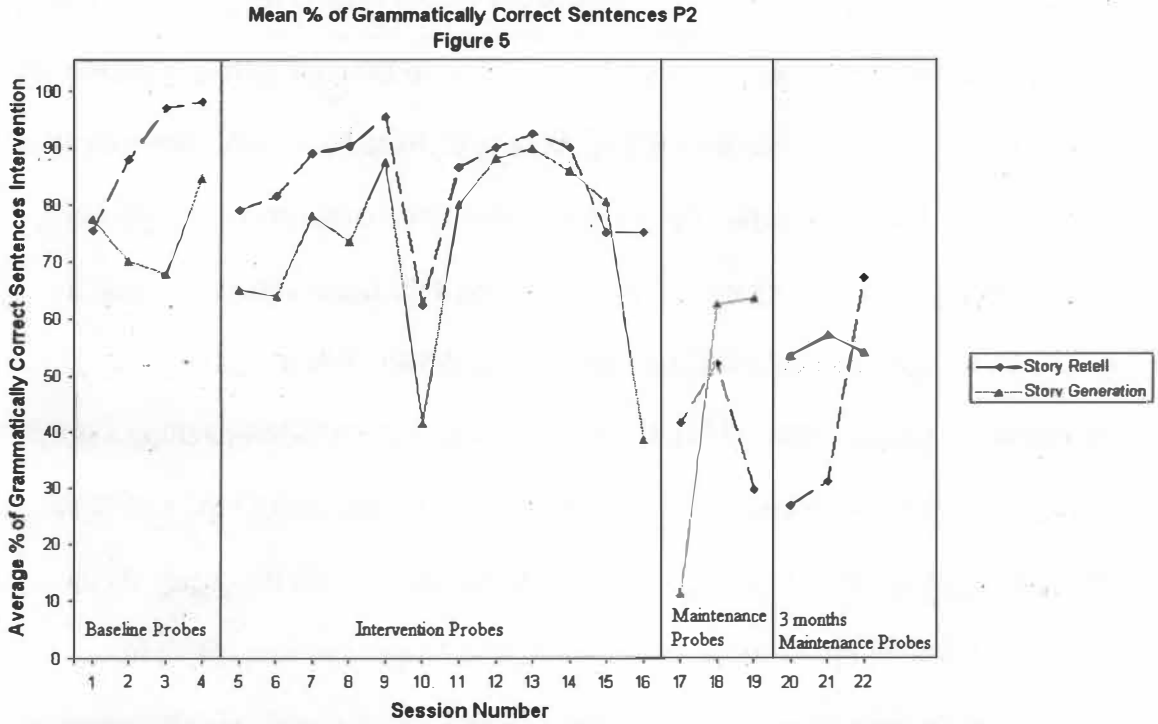

Figure 5 Note: Percentage of grammatically correct utterances for P2 is displayed

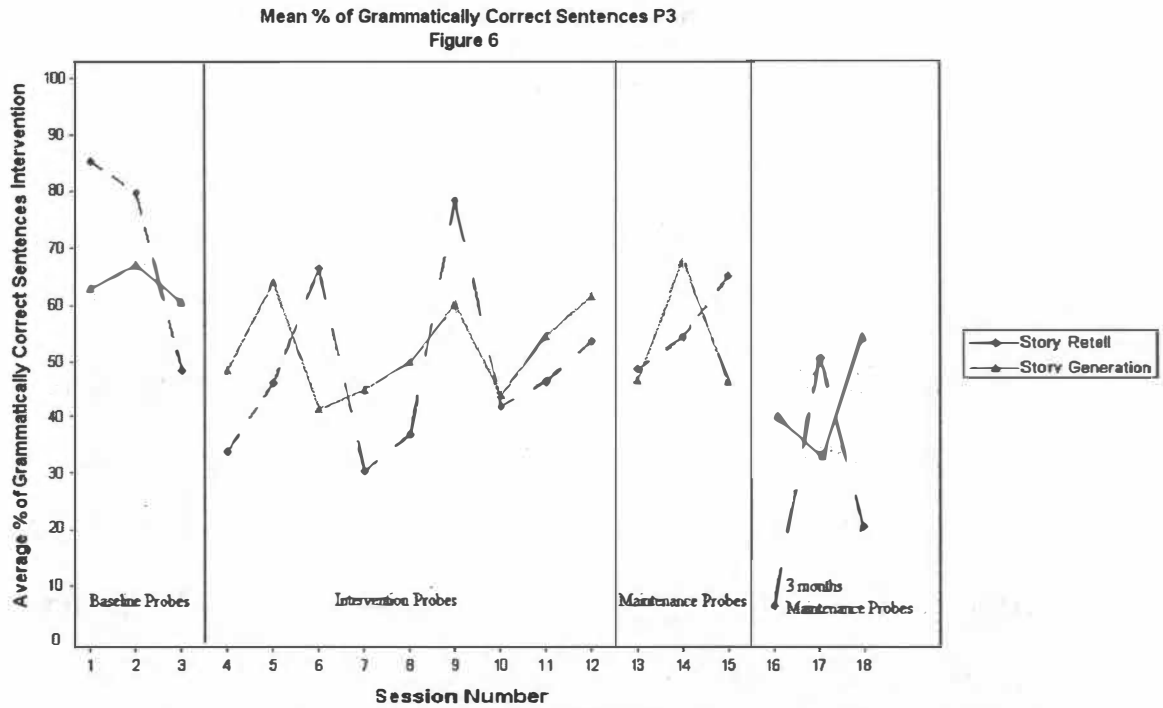

Figure 6 Note: The percentage of grammatically correct utterances for P3 is displayed

(CC's), P1 made marked gains using 9 targets (56%) in her retell during week one and 18 targets (113%) in her retell during week two. Recall that each grammatical target was the focus of separate two week periods of treatment. As can be seen in Table 5A, when read a story with 14 presentations of the target at the three month follow-up, P1 used the target 13 times in her retell (93%). When targeting subordinating conjunctions (SC's), P1 used five targets (45%) when retelling a story with 11 embeddings during the first week of the target. She used 13 SC's (95%) in her retell of a story with 14 examples during the second week of the target. At the three month follow-up, P1 heard a story with 14 SC's and used nine (64%) in her retell. P1 did not demonstrate the significant improvement with post modification of nouns (PMN's) that she did with CC's and SC's. The first week of the PMN target,

she used the same number of targets in her retell that was present in the original story; nine targets were present in the original story and the retell. Her use of PMN's declined to three (23%) after hearing a story with thirteen embeddings during the second week of the target. P1's use of PMN's remained at three (33%) in her retell of a story with nine example of the target at the three month follow-up.

As is shown in Table 5B, P2 demonstrated smaller increases in the use of the syntactic targets for story retells. When presented with CC's, she used four targets (31%) in her retell of a story with 13 targets embedded. During the second week of the target, she used five targets (36%) with 14 embedded. Her use of SC's rose from zero uses of the target in the retell of a story with 14 SC's embedded to three uses of the target (15%) in retelling a story with ten examples. P2's use of PMN's increased from zero in the retell of an originals story with 13 examples to three target forms in the retell of a story with ten (30%) over the two weeks of targeting the specific syntactic structure.

As shown in Table 5C, P3 did not demonstrate any syntactic gains during intervention. Her use of present progressive verbs (PP's) remained stable at two productions (20%) of the target in the retell of a story with ten targets during the two weeks of the target. P3's use of negative contractions decreased from one target (8%) in her retell of a story with 12 embedded targets to zero targets in her version of an original story with 14 targets embedded. P3's use of CC's decreased over the two weeks of targeting the syntactic forms decreased as well. During the first week, she produced one target form (10%) in her retell of a story with ten embeddings and zero targets forms after hearing a story with 14 examples of the target during the second

Table 5A Percentage of syntactic targets in story retells for P1 during intervention and three months following

Target	First Week as a Target	Second Week as a Target	Follow-Up as a Target
Coordinating Conjunctions	9/17 (56%)	18/16 (113%)	13/14 (93%)
Subordinating Conjunctions	5/11 (45%)	13/14 (93%)	9/14 (64%)
P.M.N.	9/9 (100%)	3/13 (23%)	3/9 (33%)

PMN = post modification of nouns

Table 5B Percentage of syntactic targets in story retells for P2 during intervention and three months following

Target	First Week as a Target	Second Week as a Target	Follow-Up as a Target
Coordinating Conjunctions	4/13 (31%)	5/14 (36%)	4/14 (29%)
Subordinating Conjunctions	0/14 (0%)	2/13 (15%)	1/14 (7%)
P.M.N.	0/13 (0%)	3/10 (30%)	0/16

PMN = post modification of nouns

Table 5C Percentage of use of syntactic stories in story retells for P3 during intervention and three months following

Target	First Week as a Target	Second Week as a Target	Follow-Up as a Target
Present Progressive	2/10 (20%)	2/10 (20%)	3/10 (30%)
Negative Contractions	1/12 (8%)	0/10 (0%)	2/12 (17%)
Coordinating Conjunctions	1/10 (10%)	0/14 (0%)	1/14 (7%)

week of targeting CCs. Please see Tables 5A-5C for information regarding target use in story retells.

Conversational Samples

Conversational language samples were recorded prior to intervention, during the post-intervention baseline collection, and at the three month follow-up. Samples were approximately twenty minutes in length; some were longer if the clinician did not feel that a sufficient number of child utterances had been collected in the initial twenty minutes. Because the clinician needed to engage the child by contributing more to the conversation in some samples, the samples varied in the number of child utterances collected. The number of child utterances in a sample ranged from 181-553 (average = 295). Each sample consisted of an average of 43% child utterances.

Each participant demonstrated increases in her use of at least some of the syntactic targets in conversation throughout the intervention and at the three month follow-up. See Tables 6A through 6C. P1 demonstrated marked gains in the use of syntactic targets during the collection of the conversational samples from pre-intervention to post-intervention and eventually the three-month follow-up. With regards to the coordinating conjunction "and," she used it 30 times during the pre-intervention sample, 19 times during the post-intervention sample, and 30 times at the three month follow-up. The coordinating conjunction, "but" increased from 6 appearances in the pre-intervention sample to 16 at the three-month follow-up. The coordinating conjunction "or" was not used across any of the conversational samples. Post modification of nouns (p.m.n.) was used by P1 one times in the sample prior to intervention, eleven times in the post-intervention sample, and then decreased to five

Table 6A The number of syntactic targets used by P1 across conversational samples

Target	Pre-Intervention 305 CU's (40% of total utterances)	Post-Intervention 553 CU's (66% of total utterances)	Three Month Follow-Up – 261 CU's (58% of total utterances)
C.C. "And"	30	19	30
C.C "But"	6	1	16
C.C. "Or"	0	0	0
P.M.N.	1	11	5
S.C.	4	3	14

Note: C.C.-coordinating conjunction, P.M.N.-post modification of nouns, S.C.-subordinating conjunctions, CU-number of child utterances

Table 6B The number of syntactic targets used by P2 across conversational samples

Target	Pre-Intervention 311 CU's (41% of total utterances)	Post-Intervention 181 CU's (32% of total utterances)	Three Month Follow-Up – 254 CU's (45% of total utterances)
C.C. "And"	19	11	39
C.C "But"	0	1	4
C.C. "Or"	0	0	0
P.M.N.	5	4	5
S.C.	2	5	6

Note: C.C.-coordinating conjunction, P.M.N.-post modification of nouns, S.C.-subordinating conjunctions, CU-number of child utterances

Table 6c The number of syntactic targets used by P3 across conversational samples

Target	Pre-Intervention 240 CU's (27% of total utterances)	Post-Intervention 217 CU's (38% of total utterances)	Three Month Follow-Up – 213 CU's (44% of total utterances)
P.P. ING	5	7	7
Cont. Auxiliaries	0	2	1
Neg. Cont.	41	15	12
C.C. "and"	2	0	9
C.C. "but"	0	0	0
C.C. "or"	0	0	0

Note: P.P. ING– present progressive -ing, Cont.- contactible, Neg. Cont. – negative contractions, C.C.– coordinating conjunction, CU- number of child utterances.

times at the three-month follow-up. The p.m.n. target is one that is perhaps used less frequently even in everyday adult conversations. Perhaps P1 acquired an understanding of its use, but the target was heard less frequently and generalized less than the others during the three months after intervention. Subordinating conjunctions (s.c.) were produced four times during the pre-intervention sample, three times during the post intervention conversation, and increased to fourteen times at the three-month follow-up.

P2 also demonstrated gains in her use of the syntactic targets during intervention; however, the gains were smaller. Her use of "and" decreased from nineteen during the pre-intervention sample to eleven during the post-intervention conversation. At the three month follow-up, P2's productions of "and" increased to thirty-nine. Her use of "but" remained infrequent throughout the baseline, post-intervention, and three month follow-up being used 0, 1, and 4 times, respectively. P2 did not use "or" prior to or after intervention. Her use of p.m.n. remained steady across conversational samples. It was used 5, 4, and 5 times during baseline, post-intervention, and the three month follow-up, respectively. P2's use of s.c. increased slightly from 2 production prior to intervention to five immediately following intervention. At the three month follow-up, P2 used six subordinating conjunctions.

P3 demonstrated some gains in her use of syntactic targets in conversation. The specific nature of P3's targets meant that targets could be attempted but not be correct. This was not the case for P2 and P3. Her use of present progressive –ing was 100% (5/5) of obligatory contexts prior to intervention, and remained at 100% (7/7) immediately following intervention and 100% (7/7) at the 3 month follow-up.

Most notably, P3's variety of verbs increased from two verbs at pre intervention when she used only "crying" and "doing" to six different verbs at the three month follow-up when she used "crying," "falling," "looking," "playing," "talking," "working". During the pre-intervention sample, P3 used contractible auxiliaries and copulas with 87.5% (11/81) accuracy in obligatory contexts. At the post-intervention and three month follow-up samples, she mastered these forms and used them with 94% (33/35) and 93% (27/29) accuracy, respectively. Although P3's use of the specific target form (contractible auxiliaries) was infrequently used across conversational samples. No contractible auxiliaries were produced during the pre-intervention sample. The target was produced with 67% accuracy (2/3) during the post-intervention sample and 33% (1/3) at the three month follow-up. P3's use of negative contractions decreased from 41 occurrences (i.e., 1 "can't" and 40 "don't") prior to intervention to 15 occurrences in the post-intervention sample. During the post conversational sample, P3 increased her variety of negative contractions by using "didn't" and "doesn't" in addition to "don't." At the three month follow-up, P3's negative contractions consisted of twelve uses of "don't." Her decreased number of negative contractions across conversational samples was viewed as a positive change since P3 had a tendency to use one stereotypical form "I don't know". She used "I don't know" numerous times in an apparent attempt to avoid conversing and focus on playing with the presented materials. It is believed that her impairment in expressive language made conversing during the collection of the samples more effortful for P3. Her use of coordinating conjunctions remained low across conversational samples. During the pre-intervention sample, "and" was used two times No coordinating

conjunctions were used immediately following intervention or at the three month follow-up. It should be noted, however, the size of the samples immediately following intervention and at follow up were smaller than her pre-intervention sample.

General Observations

Three females, ages five to eight, with severe to profound sensorineural hearing loss who had a minimum of two years cochlear implant experience participated in the present study. P1 was a five year and four month old female presenting with a bilateral profound hearing loss. She used bilateral cochlear implants. She was first implanted in the right ear in May 2002 at the age of one year and two months. She had four years and one month of cochlear implant experience prior to entering the NBLI project. Her left ear was initiated in June 2005, approximately one year prior to her entrance into the study. Regarding her performance on the CELF-4, P1 received a standard score of 82 in Core Language, 98 in Receptive Language, and 85 in Expressive Language. On the TNL, she received a standard score of 6 in Narrative Comprehension and 4 in Oral Narration. The CELF-4 and TNL had been given two months and three months prior to the subject's entrance into the project, and these scores were accepted as entrance criteria. The Leiter was given as a measure of nonverbal intelligence, and the participant preformed with a nonverbal IQ of 100. P1 received her intervention during summer 2006 (July-August). At that time, she was preparing to enter a mainstream kindergarten classroom. The subject resided with her parents and four siblings, one of which was her twin who did not present with a hearing loss.

P2 was a seven year and six month old female presenting with a bilateral, severe to profound sensorineural loss. She used a cochlear implant at the right ear. The participant was implanted on July 5, 2001 at the age of two years and four moths. P2 had approximately five years and one month of implant experience prior to the study. P2 was administered the CELF-4 as part of the entrance criteria. She received a standard score of 46 in Core Language, 65 in Receptive Language, and a 51 in Expressive Language. On the TNL, P2 received a combined standard score of 8 and an index of 64. Her quotient on the TONI was 83; even though this was slightly below 1.5 SD, the subject was entered into the study based on the researcher's observations and informal assessment of the child's cognitive abilities. P2 received intervention during fall 2006 (September-October). With the permission of the school district and principal of the subject's elementary school, sessions were conducted in a quiet room at her school. At the time of intervention, she was in the first grade in a self-contained classroom for children with hearing impairments. The subject resided with her parents and older sister of two years.

P3 was an eight year old female who presented with bilateral severe to profound sensorineural hearing loss. She used a cochlear implant at the left ear. Her implant was activated on December 22, 2004 when the subject was six years and two months old. She had approximately two years of cochlear implant use. This was the minimum amount of implant experience required to enter the study. P3 demonstrated the lowest language level at the time of her entrance into the study. On the CELF-4, she received a standard score of 40 in Core Language, 82 in Receptive Language, and 45 in Expressive Language. She was unable to complete the TNL independently;

therefore, a reliable score was not obtained. She received a quotient of 108 on the TONI. In general, the subject's receptive skills were significantly higher than her expressive abilities. P3 received intervention during the winter of 2006 (November-December). At the time of her participation, she was enrolled in a mainstream first grade classroom. P3 resided with her parents and twin sister who also had a severe to profound hearing loss

V. Discussion

Narrative Quality

Two of the three participants in the present investigation, P1 and P2, made noticeable gains in narrative quality. P1 demonstrated further gains during the maintenance probes at her three month follow-up. P2's narrative quality remained consistent throughout maintenance probes. Her narrative quality scores for story generations remained consistent until the last three intervention sessions during which she made significant gains. The quality of her retells improved at a more rapid pace than her story generations. The story retelling may have been easier because the clinician's model of the narrative was initially provided. P1 improved 2.5 points from her lowest to her highest scored retell. Her narrative quality in story generation increased two points from her lowest to highest score. P2 rose two points from her lowest score to her highest scores in both story retell and generation. The narrative quality of P1 and P2 peaked around sessions nine and ten and then stabilized during the last intervention sessions. P3 did not make noticeable gains in narrative quality; however, she did make gains in one aspect of her syntax as measured by the percentage of grammatically correct utterances within both her story retells and generations. Marton and Schwartz (2003) report that children who are specifically language impaired have difficulty with simultaneous processing and attention. It is suspected that P3 experienced this same difficulty. It may have been hard for her to process the story grammar components and narrative quality information along with the presentation of the three targeted syntactic forms.

Syntax

The participants' syntax was monitored by calculating the percentage of grammatically correct utterances in story retells and generations. In general, the percentage of grammatically correct utterances peaked earlier, around sessions five and six, than the scores for narrative quality. The gains in syntax were not consistently maintained by P1 or P2 during the maintenance probes. P3's performance remained fairly consistent. As suggested by Marton and Schwartz (2003), it is suspected that P3's cognitive energy was expended on her syntactic targets. This may be why her gains were maintained and the other two participants, who attempted to divide their attention between narrative and syntactic targets, demonstrated some apparent loss of syntactic improvements.

When the use of specific syntactic targets in story retellings was compared in stories presented the first week of the specific syntactic target and the second week, P1 and P2 were both shown to make noticeable gains. Both participants increased their use of Coordinating and Subordinating Conjunctions. P2 used more post modification of nouns the second week as well. P3's use of the syntactic targets did not increase from the first to the second week.

When pre- and post-intervention conversational samples were analyzed, P1 demonstrated notable generalization of syntactic targets into her conversational speech. P2's use of the coordinating conjunction "and" increased more than her other targets (post modification of nouns, subordinating conjunctions). The most important finding for P3 was a decrease in her use of the phrase "I don't know" during the conversational samples immediately following and 3 months post intervention.

During the pre-intervention sample, P3 had a strong tendency to use the stereotypical response "I don't know" when spoken to in conversational speech. Following intervention, P3 appeared much more willing to attempt conversation on a wide range of conversational topics. Compared to the pre-intervention conversational sample during which P3 used only "can't" and "don't," she produced a wider variety of negative contractions (didn't, don't, and doesn't) during the conversational sample immediately following intervention. At the three month follow-up, she used only the negative contraction "don't." P3's use of present progressive –ing increased across conversational samples. During the pre-intervention sample, she only produced the present progressive –ing once (crying). Subsequent samples included production of present progressive -ing with three to six verbs, respectively.

Acceptance of NBLI

P1 and P2 both had very positive reactions to NBLI. They enjoyed enacting various parts of the stories. P1 learned to take great pride in her stories. She produced very long narratives that, at times, included much tangential language. P1 attempted to make her stories long because she enjoyed the experience and the feedback she received both from the clinician and her parents after each session. P1 and P2 were both curious and entered the intervention sessions asking about what stories they would be telling. P3 frequently told the clinician that she was tired and appeared fatigued. Extra story enactments were necessary to maintain her interest. Unlike the other two participants, P3 enjoyed listening to stories more than telling them. She had a tendency to take more of a passive role as opposed to the active roles taken by P1 and P2 during intervention. All three children were very motivated

by the story generation activities in which they had an opportunity to illustrate their stores. They were attracted to the story grammar marker (Moreau et al., 1998) and enjoyed touching each icon as the corresponding story grammar component was addressed. The participants all came to expect their small prize at the end of each intervention session and asked about it before the session ended.

Child and Family Factors

The present study was conducted as an investigation into the efficacy of NBLI, an effective intervention for children with Specific Language Impairment (Swanson et al., 2005), with children who have hearing impairments. Current findings suggest that NBLI is an effective technique for improving the quality of narratives and syntax produced by children with severe to profound hearing loss who are five to eight years of age and have used a cochlear implant for at least two years. The gains made by each child will vary on an individual basis. In the present study, more implant experience and higher level language skills seemed to correlate with greater improvement in narrative quality and syntax. Being that longer implant use allows for more language growth and the development of higher language skills, these factors are very closely related. P1 was implanted at the youngest age of the participants. She had one year less of implant experience than P2, but P1 had the advantage of bilateral implantation although the input from the first implant was of questionable quality. P2 had the most implant experience of the participants. Although she didn't make gains as noticeable as those made by P1, she made noticeably more gains than P3. P3 had the least amount of implant use of the participants. She was implanted the latest and demonstrated the lowest language

level. The fact that she made the smallest gains may be attributed to these facts.

Family involvement leading to the carryover of stories from intervention into the home may have played an important role in promoting gains throughout the intervention. In contrast to the finding of Geers et al. (2003) that showed larger families correlated to smaller gains in narrative skills, the participant with the largest family made the most gains. P1 had significantly more family involvement than either P2 or P3. P1 had a much larger family than the other two participants, and her parents consistently gave her natural story-telling opportunities at home. Her parents and siblings would gather to hear the stories she learned during treatment. Her mother routinely read the stories to the subject and modeled the syntactic targets before asking the subject to retell the story. Storytelling became a very pleasurable experience for P1. Her significant gains are attributed, in part, to the unique experiences with which she was provided at home.

Based on anecdotal report, P2 and P3 were not provided with the opportunities to tell their narratives at home. Part of the lack of opportunity may be due to the fact that neither participant expressed a desire to tell their stories at home, and their parents did not instruct them to do so. P3 did show an inconsistent interest in telling the stories she generated to her parents immediately after the intervention sessions.

Another factor that seemed to affect the gains made by each participant was subject attitude and motivation. P1 quickly developed a genuine interest in story-telling and enjoyed the activities so much that she chose to practice the narratives in her free time. Her parents praised her specifically for telling good stories and remembering to include details. P2 did not necessarily develop a sincere appreciation

of telling narratives, but she appeared to be motivated and had a great desire to please the clinician. P2 arrived at the intervention sessions ready to work. P3 appeared to have the least amount of motivation. She expressed fatigue after school and needed games as well as extra story re-enactments for motivation. Neither P2 nor P3 were praised by their parents for telling high quality stories; these participants received parental praise for participating and being well-behaved during the intervention sessions. Perhaps the specific praise given to P1 had a part in motivating her and instilling in her an appreciation for narratives as well as a desire to tell stories of good quality. When the researcher initially attempted to collect baseline probes from P1, she was very soft spoken and would only tell stories to her mother or father. After extra baseline sessions, she became comfortable with the researcher and began telling narratives with less hesitation.

The factors that appeared to be associated with the greatest gains in narrative quality and syntax are independent but closely related. Implant experience and language level are highly correlated. Positive attitude and motivation appeared to be associated with the amount of family involvement. The more of these variables that were present in each subject's situation, the more likely they were to show gains during and after intervention. The possibility of a variety of combinations of these variables affected the individual outcomes of each participant.

Narrative Quality on the TNL and in the Present Study

The "Quick and Easy Narrative Assessment" used to determine the narrative quality of story retells and generations in the present study is used by Gillam and Pearson (2004) on the Test of Narrative Language (TNL) to calculate a score for the

"Alien Story." Just as the researchers in the current study presented a single picture in order to elicit a story generation, examiners giving the TNL (Gillam & Pearson) show one picture portraying aliens and their spaceship along with a family in the park. Gillam and Pearson present the same scoring protocol as was used in the current research. In both cases, each component of the narrative assessed was given a score of zero to two. Scores reflecting the inclusion of each component were added to obtain a narrative quality score. In the present study, the directions from the alien story were presented to the participants when eliciting a story generation from a single picture.

When the participants in the present study were administered the TNL (Gillam & Pearson, 2004), all presented with significant impairments in regard to story generation. P1 and P3 each received a score of two out of thirty-four on this portion of the assessment. P2 received an eight out of a possible thirty-four. Because the scoring protocol used on the TNL (Gillam & Pearson, 2004) was used in the current study, the PI was able to compare the participants' performances in single picture story generation on the TNL (Gillam & Pearson, 2004) and during NBLI. The narrative quality scores of P1 and P2 significantly increased during NBLI. P1's narrative quality scores for story generation increased to as high as 8.5, and P2's story generations were given scores as high as six. The scoring protocol used proved to be a reliable measure of narrative quality. P3 did not make significant gains in narrative quality but performed at a consistent level, and she produced stories that were scored very similarly to her "Alien Story." Her "Alien Story" on the TNL (Gillam & Pearson) received a score of two, and her narrative quality for story generations

generally received the same score peaking at a very similar score of 2.5 during NBLI.

According to the TNL Manual (Gillam & Pearson, 2004), a typically developing child is expected to increase their oral narrative score by four to six points within one year. The oral narrative score is comprised of the "Alien Story" as well as the generation from a picture sequence portraying a boy getting up late to school. Unlike the "Alien Story," the story from the picture sequence is not scored exactly as the narratives in the present NBLI project. When the combined oral narrative score on the TNL is compared to the narrative quality scores of the participants who gained an average of two to three points in narrative quality, it is shown that the participants in the present NBLI study made gains which were equivalent to what would be expected to be gained in half a year on the TNL (Gillam & Pearson, 2004).

Current Findings Versus Previous Studies

The success that Luetke-Stahlman and colleagues (1999) had with story retell activities in increasing the narrative ability of their subject was also supported by the use of story retells and the improvements seen in the present study. The improvements in syntax in the current study support the findings from Luetke-Stahlman et al. (1999) of the improved syntax that their participant demonstrated across mediated and unmediated conditions. For example, participants in both studies showed gains in their use of coordinating conjunctions, subordinating conjunctions, and present progressive verbs.

The participants in the present study all had cochlear implants that allowed for good speech perception; their progress in narrative ability and syntax supports the

finding from Crosson and Geers (2001) that good speech perception is crucial in the improvement of narrative ability and syntax.

Geers, Nicholas, and Sedey (2003) reported that higher nonverbal intelligence, smaller family size, higher socio-economic status, and female gender were all predictors for language impairment. The participant who made the greatest gains in narrative quality, P1, did not present with all of these risk factors. She had the largest family of the three participants, and this may have worked in her favor.

Schneider, Haywood, and Dube (2006) support the use of stories in intervention. The authors explained that stories provide a more holistic view of a child's speech and language skills because they require the children to combine words and sentences for a specific purpose. Schneider et al. (2006) presented that stories provide information concerning how well children use discrete language skills to communicate. Stories are important because they play a vital role in everyday interactions and educational settings as well as recreational activities (Schneider et al., 2006).

It appears to be crucial to intervene with children at the young ages of the participants in the present study because, as Marilyn Nippold (2007) explained, narrative skills continue to develop as children grow and mature. Their stories grow in length, detail, and organization. The number of episodes in their narratives increases. As children get older, their episodes are more likely to be complete and to be embedded within larger episodes. The narratives of maturing children increase in cohesion via the use of syntactic devices such as coordinating conjunctions. Children begin to say more about their character's thoughts, emotions, and plans. They also

may expend greater effort in order to entertain and appeal to their listener (Nippold, 2007). Research from Justice, Bowels, Kaderavek, Ukrainetz, Eisenburg, and Gillam (2006) showed that children improve in the productivity and complexity of their narrative microstructure from ages five to ten. Justice and colleagues report that narrative microstructure tends to peak around age ten. Older children show a decreased interest in producing elaborated narratives, and the quality of their narrative microstructure tends to decrease to that of an eight or nine year old (Justice et al.). According to this research, NBLI may be more appropriate for five to ten year olds who have more of an interest and desire to produce high quality narratives than older children

Kaderavek, Gillam, Ukrainetz, Justice, and Eisenburg (2004) reported that older children have an advantage over younger ones in that they are able to accurately self-evaluate their narratives. Regarding the very youngest participants in the study conducted by Kaderavek et al. all poor narrators rated themselves as "good" or "very good." Self assessment of narratives seems to be a developmental skill, and developmental norms are important because of the growing trend in speech-language programs to incorporate narrative intervention into therapy with preschool and school aged children Kaderavek and colleagues present that narrative intervention can promote early literacy skills and classroom success. Because young children are not usually good self-evaluators, it may be important for SLPs to implement intense adult scaffolding and other metacognitive strategies such as story maps and pictograms (Kaderavek et al.). The story grammar marker used in NBLI could be helpful in promoting metacognitive skills as well.

Bridge Between Oral and Written Language

Schneider et al. (2006) reported, "Oral stories are considered to be a form of literate language and to serve as a bridge between oral and written language styles" (p. 224). Several studies have found that children's stories have more features and characteristics of written language (i.e., longer utterances and more complex syntax) than daily conversation. Oral language is more similar to written language, because it is more formal than conversational interactions. Marilyn Nippold (2007) explained, "Narration is thought to be a more challenging and sophisticated discourse genre than conversation" (p. 294). MacLachlan and Chapman (1988) presented that narration necessitates the use of more complex syntax, offers less support, and leads to more difficulty with organization than conversation. Despite the high language level of narratives, young school children have knowledge regarding narration and can produce many different types in their own conversations (Nippold, 2007).

Unfortunately, children with hearing impairments have more difficulty acquiring narrative skills than their typically developing peers. These children do not have the advantage of "incidental learning" that other children do. Children without hearing loss are able to overhear more people, conversations, and narratives than those with hearing impairments. Typically developing children are unintentionally exposed to more language than children with hearing impairments. Children with hearing impairments do not bring the exposure to, or experiences with, higher level language skills into intervention sessions. It is difficult to scaffold concepts such as narrative skills due to the lack of experience most hearing impaired children have with narratives. For this reason, children with hearing impairments may need to be

explicitly taught higher level language skills through interventions such as NBLI.

Narrative and written language are more structured than conversational language. Heefner and Shaw (1994) reported that students with profound to severe hearing loss often have difficulty writing in English. This is significant because writing skills are critical in today's society for daily interactions, survival in educational settings, and gaining employment. It is essential to develop the skills in the formal language that oral narratives and written language share early in a child's development. Using narratives in intervention with children and adolescents is a wonderful way to bridge the gap between oral and written language. There is evidence that narrative skills aid in reading as well as writing. Research from Klecan-Aker and Caraway (1997) showed that the ability to tell original narratives is related to higher skills in reading comprehension.

The language skills involved in reading, writing, and narrative development are all essential to success in the classroom. Mukari, Ling, and Ghani (2006) reported that their participants with cochlear implants demonstrated a trend for performing poorly in language subjects and better in mathematics. This suggests that a language deficit may continue to present a challenge for children in the population to perform well academically. Mukari and colleagues reported that, although a majority of their participants were in mainstream classrooms, a significant percentage performed at or below average despite a normal nonverbal IQ. This suggests that the poor academic performance of children who have severe-profound hearing loss and use a cochlear implant may be attributed to their inability to access classroom instructions when presented orally (Mukari et al., 2006). The skills that each child has are often

affected by their auditory experiences and how long they have used the implant. Mukari and colleagues reported that, in the case of pre-lingual deafness, early implantation helps to optimize the critical language learning period. A sufficient amount of time is needed to acquire the oral language skills necessary for effective learning in an oral environment (Mukari et al.).

Nicholas and Geers (2006) reported that pre-implant aided hearing thresholds and the amount of implant experience account for a majority of the individual variance in spoken language skills. The authors reported that the age at implantation did not significantly affect the language outcomes of the children in their study (Nicholas & Geers). The amount of implant use affected the language outcome more than the age at implantation. Nicholas and Geers report that this advantage of longer implant use became more evident as the children got older.

Clinical Implications

The results of the current study indicate that NBLI can be an effective intervention for five to eight year old children with severe to profound hearing impairment who have at least two years of cochlear implant use. The children with hearing impairments greatly benefited from the visual aid of corresponding pictures to the story retells. The enactments of various story components assisted the children in their learning as well. The story grammar marker (Moreau & Fidrych, 1998) provided tangible and visible information to the participants as each story grammar component was addressed. These are some of the strengths of NBLI that make it appropriate to implement with children presenting with hearing impairments. When working with children, especially those with severe to profound hearing impairments,

it is imperative to provide information in as many modalities as possible (i.e. visual, tactile, auditory). The story retells and sentence imitation tasks were easily adaptable to the participants who were profoundly to severely hearing impaired by producing the syntactic targets with acoustic highlighting. Observations from the present study also support the importance of family involvement in the intervention process. P1 had the most involved family which allowed for the most story telling situations, and she made the most progress. Her mother or father observed each session. P2's mother was not able to observe the intervention sessions due to her schedule, and P3's mother observed initial intervention sessions inconsistently. The parents of P3 were dividing their time between P3 and her sibling who was in therapy in a different room at the same time.

Current and Future Research on NBLI

Further research regarding the use of NBLI with children who have severe to profound hearing impairments is needed. It will be necessary to include a greater number of participants in further studies. In subsequent research, it will be advisable to control for the language level of the participants. In the present study, the participant with the lowest language level had the most difficult time with the material and made the least gains. The entrance criteria stated that the participants should score below 1.5 standard deviations from the mean for expressive language. Future studies will need to include in their criteria a more specified language level for accepted participants and determine the lowest as well as the highest language level they will include in the study. Another drawback to the recent study was the fact that the most recent pictures developed to elicit story retells and generations were not

available for the present study. Finestack et al. (2007) reported that, compared to the original pictures, these new ones are intended to be more relevant to children today and are more likely to engage them and hold their interest as they produce their narratives.

Finestack and colleagues (2007) are currently conducting research in which they are investigating the efficacy of the most recent protocol for NBLI in isolation and when it either precedes or follows *Fast ForWord – Language* (FFW; Scientific Learning Corporation, 1998). Finestack et al. (2007) explained that, since FFW is intended to improve children's perception and processing of language, the program should help the participants get more out of NBLI. Children who have gone through the FFW program and learned to perceive and process language more efficiently should be better able to process the "implicit" language models and recasts offered in NBLI. They should also be able to recognize and remember the story grammar components more accurately (Finestack et al., 2007).

Research into the efficacy of NBLI is continuing. Larger samples in more diverse settings are needed. The results seen thus far are promising and warrant further investigation. As further research is completed, clinicians will find evidence to support either using or not using NBLI or adapting it to meet the needs of individual clients.

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Appendices

APPENDIX A
CONTACT LETTER

Dear Parents or Guardian:

Students with cochlear implants receiving services in Child Hearing Services at University of Tennessee Hearing and Speech Center have the opportunity to participate in a research project, entitled *Effects of Narrative-Based Language Intervention With Children Who Have Cochlear Implants,* conducted by the University of Tennessee, Knoxville (UTK).

During this study, your child would be invited to participate in a narrative-based treatment procedure for six weeks. Each week, your child would be given three individual 50-minute sessions or two sessions for 75 minutes. During these sessions, your child would participate in tasks designed to improve his/her grammatical and story-telling skills. As a result, your child might improve in his/her ability to produce complex sentences and embellished narratives.

Therapy sessions would be conducted in a sound treated room in Child Hearing Services at UTK or in a quiet room at your child=s school or church. All sessions would be held during the summer or after school hours. During this program, your child would continue to receive his/her regular school (and private practice) speech-language services.

If you are interested in your child participating in the study or have any questions, please call Dr. Lori Swanson or Ellie Justice at 974-1794 or Ms. Velvet Buehler at 974-1798. A fact sheet about the study also has been attached for more detailed information.

Sincerely,

_____
Dr. Lori A. Swanson

_____
Ms. Velvet Buehler, MA

_____
Ellie Justice (Graduate Clinician)

APPENDIX B

FACT SHEET ABOUT
Effects of Narrative-Based Language Intervention With Children Who Have Cochlear Implants

CONDUCTED BY ELLIE JUSTICE, LORI SWANSON, AND VELVET BUEHLER

Who will be involved? Six children with cochlear implants (age 5-10 yrs.).

What will they receive? Your child will have the opportunity to participate in a proven language intervention procedure in order to increase the complexity of their sentences and the quality of their narratives. Narrative Based Language Intervention (NBLI) will be the treatment technique used.

Amount of therapy? Three times per week (50 min. per session) or two times per week for 75 minutes for six weeks (total amount: approx. 15 hrs.).

Location of study? A sound treated room in Child Hearing Services at UT or in a quiet room at your child's school or church.

When will study be held? May 2006 through May 2007.

Nature of therapy activities? Your child will be asked to retell stories embedded with specific syntactic targets and participate in a sentence imitation task with sentences containing the syntactic targets as well as other syntactic targets that are not being taught. He or she will also be asked to generate novel narratives, and the presence of basic story grammar components will be assessed.

Nature of pre- and post-testing? Your child will be asked to participate in two (1-1/2 hrs.) testing sessions (total amount: approx. 3 hrs.) before beginning the study. Prior to beginning NBLI, three sessions will be conducted in order to collect baseline information. Three months after the termination of NBLI, your child will be asked to return to UTK for three sessions during which purely baseline information will be collected in order to determine how well the gains made during intervention are sustained.

Nature of the Probes? Pre and post baseline measures as well as probes presented at the

end of each session will include syntactic targets in story retell and sentence imitation tasks as well as an assessment of the use of story grammar components.

There will be two 1-1/2 sessions of pre-testing. Who will conduct therapy sessions? Dr. Swanson, Ms. Velvet Buehler, or Ellie Justice, graduate student in Speech-Language Pathology

Who has approved this study? The University of Tennessee, Knoxville (UTK)

What are the benefits? 1) Opportunity for your child to participate in a conventional, language intervention procedure that has been proven effective, 2) Assessment results shared with your child=s therapist (upon receipt of permission to release from you), and 3) Information gained related to effectiveness of this new therapy approach with children who have CI=s .

Thanks! Whether you decide to allow your child to participate of not, we want to thank you for considering this invitation to participate in this pilot study.

For Additional Information Contact:

Dr. Lori Swanson
(865) 974-1794

Ellie Justice (Graduate Clinician)
(865) 974-1794

Ms. Velvet Buehler
(865) 974-1798

APPENDIX C
INFORMED CONSENT-PARENTAL FORM

Parental Informed Consent

Effects of Narrative-Based Language Intervention With Children Who Have Cochlear Implants.

Dr. Lori A. Swanson, The University of Tennessee, Knoxville
Ms. Velvet Buehler, Child Hearing Services, The University of Tennessee, Knoxville
Ellie Justice, BA Graduate Student, University of Tennessee, Knoxville

INTRODUCTION

I understand that my child is being invited to participate in a study being conducted at The University of Tennessee, Knoxville. I have been informed that, throughout the six weeks of intervention, the treatment my child will receive as part of the project will replace the intervention that he/she would typically be receiving at Child Hearing Services (CHS). This Narrative Based Language Intervention (NBLI) study is designed to determine whether children (CA = 5-10 years) with cochlear implants benefit from a proven production-based, language intervention procedure. Children with cochlear implants are known to have difficulty producing grammatical structures at an age-appropriate level. They also have difficulty creating stories and retelling events. Therapy involving the retelling of special stories with certain grammatical forms embedded has been shown to improve children=s grammatical skills. Therapy involving story generation with an emphasis on including all of the parts of a story has been shown to improve children=s language skills. NBLI includes both of these treatment techniques in order to target children=s grammatical and storytelling skills. NBLI has been proven effective with specifically language impaired children, and this study will help to determine if the therapy is as effective with children who have received and use a cochlear implant.

PURPOSE

The project is designed to assess the narrative and syntactic abilities of children with cochlear implants and use NBLI, a therapy technique which has been proven effective, to improve each participant=s particular deficits.

PROCEDURE

In our proven intervention program, therapy will involve activities with stories that have been written to improve children=s grammatical and narrative production skills. Children will retell stories in an event-by-event fashion. They also will create stories to go along with pictures. At the end of each session, the child will be given a copy of the story and corresponding pictures from the story-retelling task. The child will be asked to tell this story to family members. The child also will be given a foldout storybook he/she has created. The child will be instructed to practice reading this book at home. Each session will also include a story retelling task in which children will be asked to imitate sentences containing their specific syntactic targets as well as other, non-targeted, syntactic forms.

Prior to therapy, each child will participate in two pre-experimental sessions (1- 2 hrs. each) in a sound treated room at UTK or in a quiet room in the child=s school or church. During the first session, the entrance criteria measures will be administered. The CELF-4 (Semel, Wig, & Secord, 2004) and the TONI (Brown, Sherbenou, & Johnson, 1997) will be given. A 20 minute clinician-child conversational sample will be taken. In addition, the child=s hearing and oral-motor skills will be screened. Parents will complete a case history form. For children who qualify, a second pre-experimental session will be scheduled to obtain pre-treatment measures. During this session, a 20-minute narrative language sample will be collected as part of the TNL (Gillam & Pearson, 2004). Next, the child will create short stories that are each based on three pictures. Finally, a nonsense word repetition task and a sentence imitation subtest will be administered.

Therapy sessions will be held 3 times per week for fifty minutes or two times a week for 75 minutes for 6 weeks in a sound treated room at UTK or in a quiet room in your child=s school or church. All sessions (testing and therapy) will be audio recorded. If possible, family members will be invited to observe the sessions on a video monitor. A certified speech-language pathologist or graduate student in speech pathology (Ellie Justice) will provide all treatment as described above. Three months following the therapy program, the same measures collected during the pre-experimental session will be repeated during three consecutive sessions in order to obtain post baseline measures. All assessment and intervention sessions will occur after school hours or during the summer at days/times that accommodate the parents. The total amount of test time and intervention time is approximately 3 hours and 15 hours, respectively.

RISKS

There are no known risks associated with this research. I have been assured that testing and intervention sessions will be stopped immediately, if there are any indications that my child is distressed. In these cases, data collected prior to termination will be

destroyed.

ANTICIPATED BENEFITS

I understand that there may be benefits to my child and that others also may benefit from the results of this research. The therapy strategies used in the study have been shown to improve children's language development. Thus, while there can be no guarantees, my child may benefit from the therapy provided.

PAYMENT TO SUBJECTS

Subjects will not receive payment for their participation in this project.

COSTS

Participants will continue to be charged the same amount they were paying for individual therapy at CHS before the beginning of the study.

ALTERNATIVES

I understand that there are alternatives to the therapies my child will receive by participating in this study. I know that my child could get either or both of the therapies provided in this study without needing to participate in this study. I am aware that I should inform the investigators if my child is currently enrolled (or becomes enrolled) in some additional therapy. I may seek additional services as I desire without penalty of any kind. Participation in other therapy programs (e.g., at the UT Hearing & Speech Center, my child's school, or a private practice) will not affect my participation in this research project.

CONFIDENTIALITY

I understand the investigators will keep secret all research-related records and information from this study. I know the experimental data gathered will be maintained in confidential files in a locked file cabinet in the lab of the project director at UTK and will be identified by code number on all cds and test forms. I understand further that the investigators will not reveal my own or my child=s identity if they present or publish the results of this study. All cds will be stored in a locked closet in the private office of Dr. Swanson (Rm. 431 South Stadium Hall) and stored for a maximum of three years following the end of the project. Dr. Lori Swanson, Ms. Velvet Buehler, the graduate clinician (Ellie Justice), and the research assistant involved in reliability checks will have access to these tapes. After three years, these original recordings will be destroyed.

QUESTIONS

I have read the information in this form carefully, and the investigators have answered my questions to my satisfaction. I know that if I have any more questions after signing this form, I may contact Dr. Lori Swanson (865) 974-1794, Ms. Velvet Buehler (865) 974-1798, or Ellie Justice at Dr. Swanson=s number. If I have any questions about my rights or the rights of my child, I may call (865) 974-3466 or write the Human Subjects Committee, University of Tennessee, Knoxville, 404 Andy Holt Tower, Knoxville, TN 37996.

CONSENT

The investigators gave me information about what will be provided for my child as part of this research. They informed me about what my child will be required to do for the study and about how long the research will take. I know that prior to data collection, my child will be given an age-appropriate explanation of the study and his/her written and verbal assent will be collected. I understand that if at any time my child expresses the desire to terminate a session, it will be discontinued immediately. Data collected to that point would be destroyed. The investigators also told me about any inconvenience, discomfort, or risks my child might experience by participating in the study. I agree to allow my child to participate. I am aware that I may withdraw my child from the study at any time. I understand that quitting or refusing any part of the study will have no effect upon the medical care or treatment my child or I will receive at UTK in the future. The investigator will give me a copy of this form to keep for my records.

_____

Print Child=s Name (Subject)

_____

Print Parent=s or Legal Guardian=s Name

_____

Parent or Legal Guardian=s Signature **Date**

Address:_____

Phone number:_____

WITNESS (to parent/guardian=s signature of document)

_____

Print Witness Name

_____ _____

Witness Signature **Date**

RESPONSIBLE INVESTIGATOR

_____

Print Investigator=s Name and Telephone Number

_____ _____

Investigator=s Signature **Date**

APPENDIX D
INFORMED ASSENT-CHILD FORM

Child Assent Form

Effects of Narrative-Based Language Intervention With Children Who Have Cochlear Implants.

Dr. Lori A. Swanson, The University of Tennessee, Knoxville

and

Ms. Velvet Beuhler, The University of Tennessee, Knoxville

and

Ellie Justice, The University of Tennessee, Knoxville

This is a project about how children tell stories. You will be asked to retell stories that the speech teacher or speech clinician reads to you. You also will be asked to make up stories to go along with pictures. You and the clinician will talk about the different parts of a story such as the characters and setting. You also will discuss certain words and sentences that make stories more interesting to others. Some of the other stories will be made into storybooks. You will take these books home and read them to your family.

Before you begin working on the story project, the clinician will test how well you listen and say words and sentences. This testing will take place over two sessions. Then you will start on the story project. For this project, you will meet with the clinician two times a week for seventy-five minutes or three times a week for fifty minutes. At the end of the project, the clinician will ask you to retake certain tests during one session.

Sessions for this project will be held in a sound treated room in CHS at The University of Tennessee, Knoxville or in a quiet room at your school or church. All of the sessions will be audio recorded. If possible, your family members will observe you on a video monitor. The audio recordings of your stories will not be played to anyone but the researchers, speech clinician, and people working for the researchers on the project. When talking or writing about this story project to others, your name will not be used.

It is your choice to help with this project. You can say Yes, I=d like to help, or No, I don=t want to help. If you say yes, you can decide to stop at any time. You would simply say, I want to stop. The clinician would stop the session immediately.

The activities involved in this story project were described to me. I had a chance to ask questions about the project and they were answered. I understand the project and want to be involved. I know that I don=t have to help with this project. No one has told me that I must play a part. I also know that I can stop being involved at any time. My teachers, speech-language clinician, and the people in charge of this project would not be upset if I decided to quit.

Child=s Name_____

Signature_____

Date_____

Witness_____

Address_____

Phone Number_____

APPENDIX E
ASSENT PROTOCOL FOR CHILD

Effects of Narrative-Based Language Intervention With Children Who Have Cochlear Implants.

Dr. Lori A. Swanson, The University of Tennessee, Knoxville
and
Ms. Velvet Beuhler, The University of Tennessee, Knoxville
and

Ellie Justice, Graduate student, The University of Tennessee, Knoxville

PRIOR TO PRE-EXP SESSION 1: (FOR ENTRANCE CRITERIA)
Hello, my name is ____. Did your (mom, dad, teacher) tell you why you=re here? I=m a speech clinician like the one at your school. I=m working on a special project with children your age. Today I=d like you to talk with me while we play with these toys. I have a (names of toys). Would you talk with me while we play with these things? Good. I=d also like you to do some other things as well. I have a few tests that check the way you listen and how you say words and sentences. The tests are a lot like games. If you do not want to be part of this project that is okay, all you have to do is tell me. Would you like to help me today with my project?

Great! Are you ready to look at these toys? Good. I think this (name of toy) looks interesting. How bout you?

PRIOR TO PRE-EXP SESSION 2: (FOR PRE-MEASURES AND PARTICIPATION)

Hi (child=s name)! I=m glad you came back today. Do you remember my name? I=m _____. Today we are going to do some different things. You=ll have a chance to listen to stories and answer questions and create stories of your own that go with pictures that I show you. There is no right or wrong kind of story. Would you be willing to do that? Good! These things will not take very long. If you do not want to do any of these things that is okay, all you have to do is tell me. Are you willing to help me today? Thanks. Your help really means a lot to me.

APPENDIX F

Example Story for Retelling Task

Friend Found

By Ashley Little and Marc Fey

Katie lived with her mom and dad in a big house. The house had a huge back yard, and Katie felt so small and lonely in it. Katie wanted a dog to play with, but her mom and dad always said no. One day, when she was playing outside, Katie heard a strange sound. It was coming from a bush by her house, and at first, it scared her a little bit. But Katie was curious and wanted to know what was making that sound. She leaned into the bush and listened again. Then, she bent over and reached right into the bush. Ahhh, Katie screamed as something jumped right at her. But it wasn=t a monster, and it wasn=t a wild beast. It was the cutest puppy Katie had ever seen, and she wanted it for her very own. So, she picked it up and carried it inside. Katie showed the puppy to her mom and smiled. Can I have him, mom? Please, Katie begged! Well, we=ll call the pound and see if they=re looking for this little guy, her mom said.

Katie was very nervous as she waited to find out about the puppy. Finally, she learned that the dog was a stray. You mean I can keep him, Katie asked? Yes, said her mom. He=s all yours, but you have to take good care of him. And that=s just what Katie did. She fed him and brushed him every day. They played and laughed in that big yard. And Katie was never lonely again.

The End.

Examples of Sentence Stimuli for Imitation Task

Intermediate Goal: Coordinating Conjunctions

Specific target forms (and, but, or)

Let=s think of some of the things that happened in the story. You say just what I say.

The house had a huge back yard. Katie felt so small and lonely in it.
The house had a huge back yard, **and** Katie felt so small and lonely in it.
Question: Do you have a yard where you live?

Katie wanted a dog to play with. Her mom and dad always said no.
Katie wanted a dog to play with, **but** her mom and dad always said no.
Question: Have you ever wanted a dog?

APPENDIX G

Example of a Conversational Sample

C I can.
C I can.
C Is it.
C Is.
C Is.
C Whose name is it?
E Abigail.
E I said your name.
C Oh.
E I said your name so I would know this is your voice.
C Okay.
E Pretty cool.
E Huh?
C XXXX
E What do we need to do with the playdoh?
C Get it out.
E We do need to get it out.
E What=s wrong with it?
C That=s why you need to squeeze and [c.c.and] get it out.
E: You need to what?
C Squeeze and [c.c.and] get it out.
E Squeeze and get it out.
E It=s stuck!
C (Can you) can you squeeze and [c.c.and] unstuck it?
E You try to get it out.
E Do you have it?
E No?
E Let me help.
C Squeeze it.
E Here it comes a little bit.
E It=s sticky.
E Can you help.
E Whoa!
E Good job you got it all.
E How did you do that?
C I did it (like) like this and [c.c.and] pulled it.
E You what?
C I did it like this like this.
C And [c.c.and] then I pulled it.
E Wow.
E You pulled it really hard huh.
C Yea.

E You are so strong!
C XXXX.
E What did you say?
C XXXX.
E Aniarchy?
E That=s a silly word.
C Yea, but I can do like this.
E Wow!
E You can?
C Yea.
E That is neat.
C Let me.
E What are we going to make with our playdoh?
E Oh.
E Oh.
E Don=t bother it okay?
E Leave it alone don=t touch.
C Um I=m gonna make a snowman.
E Whoa you know how to make a snowman out of playdoh?
E I have to see it to believe it.
C After this.
E After this?
C After I make (my s) my snake.
E Oh you=re making a snake first?
E And then what?
C I=m making snow balls.
E Whao!
E That is cool.
C(I=m gonna make sn) I=m gonna make a snowball.
C I=m gonna make a snake, snow balls, and snow man.
E You are?
E Whoa!
E You can make all of that?
E You are so good!
E Do you have a pet snake at home?
C I don=t like snakes.
E You don=t?
E Why not?
C Because some snakes are bad and [c.c.and] some snakes are bad.
E Oh!
C And they=re very very bad.
C They say Assss@.
C And [c.c.and] they can bite you like.
C They=re mean to you.
E They are?

E What do they look like?
C Ssss tiger t(iger) XX like tugers
C XX like tigers.
E Like tigers?
E I don=t like snakes.
C Me either.
E No.
E I=m scared of snakes.
C Me too.
E How do snakes make you feel?
C It makes me very scared like Aaaaaaaaaaaaaaaaaa!
C And [c.c.and] I run full fast with no shoes and no socks [p.m.n].
E When you see a snake you run?
C Yea.
C (And I and I) And I step in the mud and [c.c.and] I got feet dirty.
E Oh no!
C And then I washed it.
E Good.
C And it was clean.
E They were clean?
E: I=m glad you got all that dirt off your feet.
E You had to run really fast to be faster than a snake.
C Yea.
C But [c.c.but] snakes always go fast like this.
C Sssssssssssss.
C That=s how it goes.
E Oh it is.
E Do they walk?
E Can they run after you?
C Yea.
E Snakes can?
C (Can=t) Snakes can=t walk.
E Oh!
E Well can they jump?
C No.
C They can run.
E They can run.
C Like this.
E Oh wow!
E Well.
E Do you have any pets at home?
C I have kittens.
E You do?
C And cats.
C And Ping Man.

C Ping Man have boo boo.
E Oh no!
E Is that one of your kittens?
C No.
C Ping Man=s just a big cat.

VITA

Ellie Carol Justice was born in Pikeville, KY on September 5, 1981. She graduated with the Speech and Drama award from Pikeville High School in June 2000. Ellie went on to receive her B.A. in Communication Arts/Drama along with a Spanish minor from Carson Newman College in Jefferson City, Tennessee. While at Carson Newman, she was Vice President of Alpha Chi National Honor Society and gave presentations in the dramatic arts at both state and national conventions. Ellie graduated from Carson Newman with Magna Cum Laude honors and the Outstanding Graduate Award in Communication Arts.

Ellie developed an interest in Speech-Language Pathology after volunteering at a language camp for children with Autism in Morristown, TN. She entered the Department of Audiology and Speech Pathology at the University of Tennessee (UT) in August 2004. While at UT, Ellie served on a literacy grant focusing on children with hearing impairment and completed the Aural Rehabilitation Concentration. After defending her master's thesis, Ellie received a Master of Arts degree in Speech-Language Pathology in May 2007.