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The Type and Frequency of Morphosyntax Errors  
in Children's Narratives

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A thesis  
presented to  
the faculty of the Department of Communicative Disorders  
East Tennessee State University

In partial fulfillment  
of the requirements for the degree  
Master's of Science in Speech-Language Pathology

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by  
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May 2004

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Mrs. Kerry Proctor-Williams  
Dr. Steven Gross

Keywords: grammar, morphology, narratives,  
persistence, school-aged children

## ABSTRACT

### The Type and Frequency of Morphosyntax Errors in Children's Narratives

by

Jennifer Lynn Lockhart

A subsample of 478 children who originally participated in a larger study (Tomblin et al., 1997) was examined for type and frequency of morphological noun and verb errors in oral and written narratives in 2<sup>nd</sup> and 4<sup>th</sup> grade. Each child represented one of four groups: Typical Language, Specific Language Impairment, Nonspecific Language Impairment, or Low Nonverbal IQ. Three MANOVA's and post-hoc comparisons were used to test three predictions: (1) children will have more difficulty with verb than noun morphology; (2) children will make more errors in the written than the spoken narrative; and (3) children whose language impairments persist will produce more morphological errors than children whose language problems appear to resolve. Analyses supported the first two predictions but not the third. Results are discussed in relation to levels of morphological mastery, language development, and processing demands. Clinical implications of the study are presented.

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## CHAPTER 1

### INTRODUCTION

Children who are developing language in a typical fashion go through a period during which grammatical production is variable. There have been many studies focusing on grammatical morphological errors in spoken language that young children with language impairments produce (Bedore & Leonard, 1998; Leonard, McGregor, & Allen, 1992; Leonard, Miller, & Gerber, 1999; Oetting & Horohov, 1997; Oetting & Rice, 1993; Rice, Wexler, & Hershberger, 1998; Windsor, Scott, & Street, 2000). There have been fewer studies concerning the long-term effects of these errors on children with language impairment (Bishop, Price, Dale, & Plomin, 2003; Rice et al., 1998; Rice, Wexler, Marquis, & Hershberger, 2000). There have also been few studies regarding type and frequency of errors in written language (Gillam & Johnston, 1992; Windsor et al.).

The study by Windsor et al. (2000) examined the type and frequency of noun and verb morphological errors in both spoken and written language samples. They studied production of verb morphology, including past tense -ed, third person singular present tense 3s, and copula and auxiliary BE and noun morphology including articles a, an, the, plurals and possessives. They demonstrated that in contrast to typically developing 7 – 12 year olds, school-age children with a language learning disability (LLD) had difficulty marking verb finiteness in both the spoken and written components of language. Moreover, the Windsor et al. (2000) study found that children with LLD had the most difficulty with the regular past tense –ed, and, unexpectedly, they also found that children

with LLD also omitted the regular plural morpheme in 12% of the obligatory contexts. They also demonstrated that more errors occurred in a written narrative than in a spoken narrative. The present study will closely replicate the analyses of the aforementioned study, looking at noun and verb morphological errors in both spoken and written narratives. Although similar to the Windsor et al. study, the present study differs in three distinct ways. First, the number of participants in the present sample is larger than the number of participants in the Windsor et al. study. The Windsor et al. study focused on 60 participants. Each child produced two narrative samples, one spoken and one written, and two expository samples, one spoken and one written. This protocol yielded 240 samples. The present study will look at the spoken and written narratives that 478 children produced in second and fourth grade, for 1,912 samples.

Secondly, in the Windsor et al. (2000) study, of the 60 participants, 20 were classified as LLD and the remaining 40 had typical language development. Of these, 20 were chronologically age-matched peers; and the remaining 20 were language-matched peers, ranging from seven to 10 years of age. In the present study, as in the larger study by Tomblin et al. (1997), from which this data is drawn, the children were all similar in chronological age and were categorized into four groups: (1) typically developing (TL), (2) language impaired with normal cognition (SLI), (3) language and cognitively impaired (NLI), and (4) cognitively impaired with normal language (LNIQ).

The third distinction is the manner in which the oral and written narratives were elicited. In the Windsor et al. (2000) study, the children watched a videotape by themselves and were then asked to either tell a story or write a story about what they watched. For the present study, four sets of pictures were used, with each set containing

three pictures, in order to elicit stories from the 2<sup>nd</sup> and 4<sup>th</sup> grade children (Fey, Catts, Proctor-Williams, Tomblin, & Zhang, submitted). The children looked at two individual sets of pictures, one for the spoken narrative and one for the written narrative.

Finally, the current study will extend the work of Windsor et al. (2000) by examining whether or not kindergarteners with language impairments that persist into second grade have greater problems with morphological production as viewed in either their 2<sup>nd</sup> or 4<sup>th</sup> grade spoken or written language than children whose problems appear to resolve.

In summary, the overall purpose of this study is to examine production of noun and verb morphology in school-age children. The research project has four main goals. The first goal is to determine the type and frequency of noun and verb morphological errors in school-age children. I will examine which type of noun or verb errors occur more frequently. The second goal is to identify differences between spoken and written narratives and determine if more errors are produced in one context than the other. A third goal is to determine whether there is a relationship between group affiliation and production of noun and verb morphology in oral and written modalities. The fourth goal is to examine children's spoken and written narratives in both second and fourth grade to determine whether children whose language difficulties persist from kindergarten into second grade continue to produce noun and verb morphological errors at greater rates in 2<sup>nd</sup> and 4<sup>th</sup> grades than children whose problems resolve.

The remainder of this introduction will address the literature pertinent to the purpose of this research study. Because the data to be examined was collected in narrative samples, the methodological advantages will be discussed first. The first goal is

to examine type and frequency of both noun and verb morphological errors. The second goal is to determine whether more errors occur in spoken discourse or written narratives. For the purpose of these two goals, the literature on production of noun and verb morphology will be discussed. Following the production of noun and verb morphology will be relevant literature concerning my third goal, which focuses on group affiliation. For my fourth goal, I will address the literature pertaining to the persistence of language impairment (LI) over time. Finally, I will briefly address literature based on the OI, IRD, and SA accounts.

### Narratives

Children's narratives, as elicited in the present study, not only provide a rich source of morphological production but also are ecologically valid and have other methodological advantages. Westby (1991) states that narratives function as the "transition between oral and literate language styles both in cultures as a whole and for individual children (p 340)." Westby further notes that narratives are the first form of language that require a speaker to produce an extended monologue rather than interactive communication with others. A narrative can be elicited in many ways, and a child can tell or write a narrative about many things. Because a child can create a narrative in so many different ways, it provides an important and valid way of measuring a child's communication skills. A child's narrative can also provide much information about speech and language development for that child. McCabe & Rollins (1994) note that a significant methodological advantage of using narratives is that highly similar procedures can be used to elicit both spoken and written narratives. Botting (2002) discusses three

reasons for using narratives as an assessment tool. First, she suggests that narratives can be used to compare populations with each other and over time. Second, the ability to tell narratives is associated with literacy ability. Finally, the ability to tell a narrative involves pragmatic skills while at the same time being more formal than a conversation.

This is of particular interest in differentiating between children with linguistic difficulties (children with SLI), children with pragmatic language difficulties, and children with both linguistic and pragmatic difficulties (children with autism) (Botting, 2002). Children with LI often have more difficulty with both spoken and written narratives. They tend to tell stories with fewer story grammar components (Paul, Hernandez, Taylor, & Johnson, 1996) and reduced sentence complexity (Gillam & Johnston, 1992). Studies have also indicated that children with LI will produce more grammatical errors (Gillam & Johnston; Liles, Duffy, Merritt, & Purcell, 1995) and a poorer story quality (McFadden & Gillam, 1996; Paul et al., 1996).

Other researchers have studied narratives as a clinical tool. In their article, McCabe and Rollins (1994) reported that children begin to tell longer and more complex narratives between the ages of three and five. Although these researchers stated that preschool children often produce more complex narratives when creating a narrative about a past event, this may be awkward for the child to do so around people they do not know very well or with whom they are not comfortable (McCabe & Rollins, 1994). To resolve this difficulty, these researchers suggested using story prompts, such as a picture, to guide a children's narrative, as was used in the current study.

## Production of Noun and Verb Morphology

Recall that the first goal of this study is to examine the accuracy of production of noun and verb morphology. The second goal is to identify differences between spoken and written narratives, and furthermore determine if more errors are produced in one context than the other. The literature pertinent to these goals is discussed in the following sections.

### Oral Modality

In this study, I will begin by examining each child's morphological production in spoken and written narratives. According to Paul (2001), early lexical use in children with SLI is very similar to that of children with typical language but is acquired at a slower pace. For example, children with typical language should have more than 200 words by the age of two, whereas children with SLI will often have about 20 words. Children with SLI have difficulty with syntax as well. For example, children with SLI will often fail to combine words between the ages of 18 and 24 months when children with typical language are beginning to do so (Paul). Paul also states that children with SLI have particular difficulty with grammatical morphology. These morphemes include plural -s, possessive 's, third person singular, regular past tense -ed, copula and auxiliary BE verbs, and articles a, an, the. In Brown's Stages of Morphological Development, regular plural -s should be acquired first, followed by regular past -ed, possessive 's, uncontractible copula, articles, regular third-person, uncontractible auxiliary, contractible copula, and contractible auxiliary (Owens, 2001). Therefore, correct production of noun morphology will precede verb morphology in children who are developing language in a typical manner. Children with SLI develop these morphological markers in roughly the

same manner as children with typical language; however, according to Leonard (1991), children with SLI may have a delay of about six months in one set of features, and then a year or a year and a half delay on another set of features. For this reason, children with SLI do not appear to be developing language in a typical fashion.

Previous studies have found that, when compared to children with a specific language impairment ranging in age from 3 years 7 months to 5 years 9 months, younger typically developing children, ages 2 years 5 months to 3 years 3 months, with a similar mean length of utterance (MLU) have a higher accuracy rate when using grammatical morphemes in obligatory sentence contexts (Leonard, Eyer, Bedore, & Grela, 1997). Studies have also shown that children with SLI have lower accuracy rates for regular plural markers and copula BE in spontaneous spoken language than younger MLU matched peers (Leonard et al., 1997). In a study by Leonard, Bortolini, Caselli, McGregor, and Sabbadini (1992), it was found that children with SLI made more errors with regular plural –s , third person singular, regular past tense –ed, and copula BE than younger MLU matched peers in spontaneous spoken language. The same study found that the SLI and MLU groups had about the same accuracy rate for both articles and irregular past tense forms (Leonard et al., 1992). In contrast, a study by Oetting and Rice (1993) found that four to five year olds with SLI had about the same level of accuracy as MLU peers when using regular plural. They also found that word frequency made a difference for children with SLI. They were less likely to correctly add plurals to nouns that did not occur frequently. In a 1997 study by Oetting and Horohov, their results demonstrated that six-year olds with SLI had more difficulty with regular past tense than

their MLU matched peers. These findings indicate that children with SLI are likely to make both noun and verb morphological errors in spoken language.

### Written Modality

While children with SLI are more likely to produce errors in spoken narratives, including a writing component in the narrative task adds an extra modality that may increase error rate in school-age children. Written language demands different cognitive, linguistic, and mechanical constraints than are required for spoken language (Gillam & Johnston, 1992). For instance, Gillam and Johnston (1992) state that conceptually, writers must create communicative context, provide information, and reflect intended meaning. Linguistically, a writer must convey meaning and mood. While writing, a person must also be able to incorporate the mechanical aspects by using correct spelling and appropriate punctuation and capitalization (Gillam & Johnston). Gillam and Johnston state that the writing process is difficult and that children make important discoveries about these three aspects of written language later in development. Because of these factors, these researchers state that children with a language learning impairment may have an especially hard time using morphology correctly in their writing. In the Gillam and Johnston study, spoken and written narratives of both typically developing children and language learning disabled children between the ages of 9 and 12 were analyzed. This study found that there were more errors in the writing sample for both groups of children. Gillam and Johnston found that they used fewer morphemes and propositions per utterances in the writing sample as opposed to the spoken sample. It was also noted in this study that children with LLD made more errors than those who were

typically developing. Scott and Windsor (2000) and Windsor et al. (2000) supported these findings.

Scott and Windsor (2000) analyzed spoken and written language samples of 10 to 12 year old children with and without LLD. This study revealed that all of the participants produced more written errors than spoken errors. However, the group of children with LLD made significantly more errors in the written narratives than the younger language-age (LA) peers and the chronological age-matched (CA) peers. In the LLD group, 40% of the utterances contained errors, whereas in the LA group, 17% of the utterances contained were errors, and the CA group made errors on only 14% of the utterances. In the written narratives, children with LLD had most difficulty with regular past tense –ed and to a lesser extent regular plural –s. The performance of each child was examined if there were a minimum of three obligatory contexts available for each noun or verb morphological marker. Windsor et al. (2000) found that 7 out of 19 children in the LLD group produced regular past tense -ed errors in the spoken narratives, while 11 out of 17 children in the same group produced errors during the written narratives. As with regular past tense –ed, children with LLD produced more plural –s errors during the written narrative as opposed to the spoken narrative. While 5 out of 20 children in the LLD group produced regular plural –s errors during the spoken discourse, 13 out of 20 children in the same group produced errors during the written narrative. All errors produced for these two morphological markers during the written narratives were errors of omission (Windsor et al.). It is also important to note that in the Windsor et al.study, children with LLD also had difficulty using irregular past tense verb forms appropriately. Six out of 19 children produced irregular past tense errors during spoken discourse, while

11 out of 20 children produced errors during the written narratives. Research indicates that all children are more susceptible to producing errors in the written language (e.g., Gillam & Johnston, 1992; Scott & Windsor, 2000). This research furthermore indicates that SLI or LLD children are even more vulnerable to producing errors in narratives and will produce more errors in written narratives than spoken narratives.

### Group Affiliation

The third goal of this study is to examine whether or not group affiliation is related to the types and frequency of morphosyntactic errors in these narratives. In the Windsor et al. (2000) study, it was found that children with LLD had a higher rate of morphological errors in both the spoken and written narratives than typically developing children. The proposed study will further refine this examination by designating four groups of children. These groups include children with specific language impairment (SLI), non-specific language impairment (NLI), low non-verbal cognition (LNIQ), and age-matched typical language development (TL). The participants in this study are a subsample of children from a larger epidemiological study of language impairments in kindergarten children (Tomblin et al., 1997).

Catts, Fey, Tomblin, and Zhang, 2002, who also examined this sample, defined each of these categories. For a child to be identified as SLI, the child must have below normal language skills (e.g., SS <85) and normal nonverbal abilities (e.g., SS >85). In order for a child to qualify as having NLI, that child must have both verbal and nonverbal skills that are below normal. In addition to the SLI and NLI groups, children were also identified as LNIQ with language skills within normal limits but nonverbal skills that are below average. The

children in the TL group did not meet the criteria for either a language impairment or a nonverbal cognitive deficit. These children were within normal limits for both language and nonverbal IQ.

When Catts et al. (2002) examined these groups of children for reading outcomes, they found that the children with language impairments had a higher incidence of reading difficulties than either the low non-verbal cognition, or typically developing age-matched control group. Within the LI groups, the children with NLI were at higher risk for reading disabilities than those with SLI.

#### Persistence of Language Impairment

The fourth goal of this study is to determine whether children with SLI whose language problems persist from kindergarten to 2<sup>nd</sup> grade produce more morphological errors in 2<sup>nd</sup> and 4<sup>th</sup> grade than children whose problems appear to resolve. The study by Catts et al. (2002) showed that the kindergarten children with LI whose language difficulties persisted into the 2<sup>nd</sup> grade were more likely to have difficulty reading in the 2<sup>nd</sup> and 4<sup>th</sup> grade. They concluded that if a child's language abilities improved from kindergarten to 2<sup>nd</sup> grade, then the reading skills of that child would improve for the 2<sup>nd</sup> and 4<sup>th</sup> grades as well. These children that seemed to improve on their language skills from kindergarten to 2<sup>nd</sup> grade are referred to as recovered LI (RLI). Those children who were classified as having a language impairment in kindergarten that continued to have language problems in the 2<sup>nd</sup> grade are referred to as persistent LI (PLI). In the same study, the children recovering from LI (RLI)<sup>1</sup> in the 2<sup>nd</sup> grade produced stories with more

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<sup>1</sup> Recovered Language Impairment (RLI) will be called Indeterminate Language Impairment (ILI) later in this paper. See Methodology for an explanation.

grammatical errors and poorer story quality in their stories than in the stories of the children with TL. However, the RLI group differed only in relatively small ways from children with TL in the 2<sup>nd</sup> grade, and the performance of the RLI group was much better than those children with persistent LI (PLI). By 4<sup>th</sup> grade, however, the children with RLI differed on more variables and by wider margins from the TL group, and there were fewer differences between the RLI group and the PLI group. Therefore, the children who showed signs of recovering from LI in the 2<sup>nd</sup> grade tended to still produce stories that were shorter in length with less grammatical accuracy. The researchers from the Fey et al. study concluded that children with early LI should not be expected to have fully recovered from their language impairment.

Paul (2001) states that children with SLI often outgrow many of the linguistic aspects of SLI by the time they begin school. However, children with SLI still have problems with complex language skills such as metalinguistic and narrative tasks. Paul also states that children who seem to “outgrow” SLI will “grow into” a learning disability.

Rice et al. (1998, 2000) observed the persistence of language impairment. In both studies, the researchers examined tense acquisition in both children with SLI and children with TL. In the 1998 study by Rice et al., researchers found that while obligatory marking of grammatical tense is established at 4 years of age in children with typical language, children with SLI continue to show optional use of tense marking well into their elementary school years. In the 2000 study by Rice et al., three groups were examined: children with SLI, children with typical language matched for age, and younger children matched for language. From this study, the researchers discovered

that, over time, the children with SLI were more likely than the controls to produce bare-stem forms of the irregular past tense as well as the regular past tense –ed.

A study by Bishop et al. (2003) looked at why some children's language delays will be resolved and why some children's delays will persist over time. Bishop et al. addressed whether or not there were etiological differences between children whose early delays resolve and those who have longer-term problems. These researchers studied 5,208 sets of monozygotic and dizygotic twins born in 1994 and 1995. Data was collected when the children were 2 years of age, then follow-up data was available when the children were 3 and 4 years of age. From this study, the researchers arrived at three conclusions. First, genetic effects on low vocabulary were statistically significant. Second, although genetic effects are significant on early language development, shared environmental influences play a larger role than genetic effects. Third, heritability is higher in those children with persisting difficulties, but only with those whose parents sought professional help for their child's language delay. From this study, Bishop et al. found evidence that environmental factors shared by twins play the biggest role in causing early language delay. Bishop et al. do suggest, however, that family history of speech and language impairment be taken into account. Findings from the Bishop et al. study led these researchers to suggest that the study of genetics should focus on language impairments that persist over time, rather than early language delays that resolve.

#### Surface Hypothesis, Extended Optional Infinitive, Implicit Rule Deficit

There are multiple theories that attempt to describe the patterns of errors on grammatical morphemes during a child's language development. The three theories

currently receiving the most attention include: (1) Surface Account (SA); (2) Optional Infinitive (OI); and (3) Implicit Rule Deficit (IRD).

The knowledge deficit explanations include the Optional Infinitive (OI) account of Rice, Wexler, and their colleagues (e.g., Rice & Wexler, 1996; Wexler, Schütze, & Rice, 1998) and the Implicit Rule Deficit (IRD) account of Gopnik and her colleagues (e.g., Gopnik & Crago, 1991; Ullman & Gopnik, 1999). The processing deficit explanation is the Surface Account (SA) of Leonard and his colleagues (e.g., Leonard et al., 1997; Leonard, 1998).

The EOI, IRD, and SA make specific predictions about the type and frequency of errors concerning SLI children and their language matched peers (Leonard et al. 1997). OI, IRD, and SA all predict that the SLI children will make more errors than their age matched peers. The IRD and SA accounts predict that the SLI children will make errors in their noun morphology as well as verb morphology, while OI is silent on this. The important distinction between the IRD account and the SA account is that the IRD predicts that use of inflection is verb specific. Whenever a child repeats the use of a verb, its inflectional status will be the same. SA allows for variation in a verb's production, depending on processing demands. While the specific theoretical examination of the children's grammatical errors is beyond the scope of this paper for methodological reasons, the reader may want to keep these in mind as this study does address the development and persistence of LI issues and the type of grammatical errors (noun vs. verb) that children produce.

## Predictions

Recall that the primary purpose of the study is to examine the type and frequency of noun and verb morphological errors in school-age children in oral and written narratives. From the information reviewed thus far the following predictions are made.

1. Children will have more difficulty with verb morphology (regular past tense -ed, third person singular, copula and auxiliary BE) than noun morphology (plural -s, possessive, articles a, an, the).
2. Children will make more errors in the written narrative than the spoken narrative.
  - a. Children with LI will have more errors in both the spoken and written narratives than the typically developing children.
  - b. Children with NLI will make more errors than those with specific language impairment.
3. Children whose language impairments persisted from Kindergarten into the 2<sup>nd</sup> grade will produce more morphological errors in the 2<sup>nd</sup> and 4<sup>th</sup> grades than children whose language problems resolve.

## CHAPTER 2

### METHODS

#### Participants

The children in the present study comprise a subsample of children who participated in a larger epidemiological study (Tomblin et al., 1997). When the children participated in the Tomblin et al. study, they were between 5 and 6 years of age as of September 15<sup>th</sup> of that academic school year and attending Kindergarten. All participants were monolingual English speakers.

The participants were drawn from three regions of Iowa and Illinois. These three regions were further divided into urban, suburban, and rural settings. Urban areas were between two and three miles of the central business district and the population density was 3,000 or more people per square mile. Suburban areas were those with more than 2,000 people per square mile and rural areas had a population of less than 2,000 people per square mile (Tomblin et al., 1997).

Of the 7,218 children who were administered the language screening in the Tomblin et al. (1997) study, 51% were boys and 49% were girls. Also, 83% of these children were White, 12.7% were Black, 1.6% were Asian, 2.1% Hispanic, 0.6% Native American, and 0.3% of other or unknown racial background (Tomblin et al.). It was noted in the study that 26.8% of the children failed the language screening, while the remaining 73.2% passed. From the Tomblin et al. study, 216 children were diagnosed as having SLI.

For the present study, the oral and written narratives of a subsample of 478 children in the Tomblin et al. study were examined. The narratives were collected when the children were in the 2<sup>nd</sup> grade and then again when these same children were in the 4<sup>th</sup> grade. As part of the original assessment of these children, oral and written narratives were collected through a story generation task and transcribed.

As noted and defined previously, in the larger study by Tomblin et al. (1997), the children were exclusively categorized into four groups: (1) TL, (2) SLI, (3) NLI, and (4) LNIQ. In the current study, 236 children were typically developing. Of these, 102 were female and 134 were male. There were 93 SLI children, including 39 females and 54 males. These children were classified as SLI if they met the criteria for a language impairment and their nonverbal IQ was at or above  $-1$  SD, based on two subtests of the *Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R)*. These subtests, the Block Design and Picture Completion, were administered to the participants when they were in kindergarten. In the study, there were 67 NLI children, including 35 females and 32 males. Children classified as NLI if they met criteria for a language impairment and had a nonverbal IQ lower than  $-1$  SD. The LNIQ group consisted of 82 children, 34 females and 48 males, with a nonverbal IQ lower than  $-1$  ST. However, the LNIQ group did not exhibit a language impairment (Tomblin et al., 1997).

Fey et al. (submitted) found that at least some kindergarten children who were diagnosed as having a language impairment seemed to outgrow their language problems by second grade. Fey et al. (submitted) stated that, at least for some of the children who appeared to recover, this might better be attributed to a regression to the mean, with some children falsely identified as having LI in kindergarten. Despite the possibility that these

children may have never had LI to begin with, these children are still referred to as indeterminate LI (ILI) in the present study and that of Fey et al. Those children who were classified as having a language impairment in kindergarten that continued to have language problems in the second grade are referred to as persistent LI (PLI). For the current study, 87 children were classified as PLI, while 72 of the children were classified as ILI.

## Procedures

### Stimulus Materials

Fey et al. (submitted) describe the stimulus materials used to elicit each narrative for the study. Four sets of pictures were created, with each set containing three pictures, in order to elicit stories from the second and fourth grade children. Each child then selected two sets of the pictures. Next, the examiner chose one of the unselected sets of pictures, identified the key elements in the picture, and told a story about the picture set. By doing this, the examiner gave each child an example of what he/she should do with the set of pictures he/she selected. The participants were then asked to identify the key elements in their selected picture set. If the child failed to identify all of the key elements in the pictures, the examiner identified the key elements for the child. This procedure helped the child to notice and identify all of the important details in the story. Then the child was asked to tell a story about the set of pictures.

According to Fey et al. (submitted), after each participant told a story about one selected picture set, the examiner then instructed the child to write a story about the other set of pictures. The examiner was only allowed to give two prompts, once each, during

the course of the written narrative. If a child simply described what was in the picture, rather than telling a story, the examiner prompted the child to tell a story about the picture. If the child did not end the story with an identifiable concluding statement, then the examiner prompted the child to complete the story by saying, “Is that all?” If the child said or wrote anything else, it was included in the story. If the child failed to add an ending, the story was complete and no further changes were made.

### Coding Conventions

For the present study, each of the spoken and written narratives from the second and fourth grade participants was coded for type and frequency of grammatical errors using SALT. The verb morphology of interest included: regular past tense –ed, third person singular, and copula BE (am, is, are, was, and were). The noun morphology examined in the present study included: possessive -s, regular plurals, and articles a, an, the. Appendix A shows coding that was used to identify the type and frequency of noun and verb morphological errors. Each sample was transcribed and coded for noun and verb morphological production errors in obligatory contexts, as in Windsor et al. (2000). Using descriptive analysis methods, the percentage of errors in obligatory context according to types of errors will be presented for each group of children (see Tables 6 and 7). Again, replicating the methodology of Windsor et al., composites were developed as follows and included as repeated measures in subsequent analyses.

1. A noun composite, based on plural –s, possessive s, and article accuracy.
2. A verb composite, based on third person singular, regular past tense –ed, and auxiliary and copula BE.

3. An oral composite, based on noun and verb accuracy displayed in the oral narratives.
4. A written composite, based on noun and verb accuracy displayed in the written narratives.

In addition, two new composites were developed to examine errors produced by the children with PLI or RLI as follows:

1. A second grade composite, based on noun and verb accuracy displayed in oral and written narratives in 2<sup>nd</sup> grade.
2. A fourth grade composite, based on noun and verb accuracy displayed in oral and written narratives in 4<sup>th</sup> grade.

#### Transcription and Error Coding Reliability

According to Fey et al. (submitted), 17 examiners participated in the second and fourth grade test batteries. Seven of these examiners were speech-language pathologists, and they administered all language measures. The remaining 10 examiners had undergraduate degrees in speech and hearing or education. After the narratives were collected from the participants, the stories were transcribed onto a computer using standard *Systematic Analysis of Language Transcripts* (SALT) conventions (Miller & Chapman, 2000). There were two principle transcribers for their study, one primarily transcribing and coding 2<sup>nd</sup> grade samples and the other transcribing primarily 4<sup>th</sup> grade samples. Both transcribers were blind to the group status of the children.

As the narratives were collected from the children, 5 audiotapes of narrative samples from each set of 50 were randomly selected. A master's level speech-language pathology student then transcribed these same samples independently to ensure

reliability. Once these transcriptions were complete, SALT was used to calculate the reliability of each of six the dependent measures, five of which are relevant to this study as they are based on accurate transcription of the child's words in sentences and coding (i.e., number of different words, mean length of c-unit, total number of c-units, clausal density, and percentage of grammatical c-units) for the transcripts of each transcriber. The difference between the transcription and reliability judge's scores were then calculated and expressed as a percentage. For the dependent measures used for the study, there was no more than a 3% error and all correlations between the transcriber and reliability judges were high ( $r$ 's > .97), with the exception of the percentage of grammatical c-units. The correlations between judges for the percentage of grammatical c-units were  $r = .89$  and  $.83$  for the written and oral narratives in the 2<sup>nd</sup> grade respectively. There was as much as 9% error for written samples and 6% error for the oral samples. Upon examination of these disagreements, these researchers found that the disagreements were usually presence or absence of grammatical inflections and coding of inappropriate switches in tense.

Because this study further refined the morphological coding, additional reliability was conducted. To avoid bias in the current study, all coders were blind to the status of the children until all coding was complete. Ten percent of the samples were randomly selected and independently transcribed in order to obtain interjudge coding reliability. The difference between the transcription and reliability judge's scores was then calculated and expressed as a percentage. This code-by-code reliability was calculated to be 96% accurate (1687/1745).

## CHAPTER 3

### RESULTS

The principle concern of the study is to examine the type and frequency of noun and verb morphological errors in school-age children in both oral and written narratives. The oral and written narratives of children with TL, SLI, NLI, and LNIQ were examined as they progressed from 2<sup>nd</sup> into 4<sup>th</sup> grade. To address the predictions concerning the effects of type of error, modality of the narrative and group composition, two separate analyses were conducted, one for 2<sup>nd</sup> grade and one for 4<sup>th</sup> grade. Because three Multiple Analysis of Variances (MANOVAs) were performed in total, alpha was set at  $p = .0167$  ( $.05/3$ ). Alpha for all post hoc comparisons was set *a priori* at  $p = .05$ .

For the first two MANOVAs, Group (TL vs. SLI vs. NLI vs. LNIQ) was the between-subjects variable, while Error Type (Noun vs. Verb) and Modality (Oral vs. Written) were repeated measures. This method simplifies the design by eliminating the possibility of obtaining a four-way interaction, while still maintaining the capacity to test the experimental questions. Effects were judged to be reliable only when a significant MANOVA was followed by a significant Tukey's Honestly Significant Difference Test or Tukey's Honestly Significant Difference Test for Unequal N (Fey et al., submitted).

For this study, measures were based on composite scores expressed as percentage correct in obligatory context. For the first two MANOVAs, I used four composites (the noun composite, the verb composite, the oral composite, and the written composite) described above for each grade.

For the third MANOVA, Group (PLI vs. ILI) was a between-subjects variable, whereas Error Type (Noun vs. Verb) and Grade (2<sup>nd</sup> vs. 4<sup>th</sup>) were repeated measures. Again, composite scores were used (the noun composite, the verb composite, the second grade composite, and the fourth grade composite).

All composite scores originally expressed as percent correct in obligatory context were further transformed using the Arcsine formula. The MANOVAs were then conducted using these Arcsine transformations. For interpretative purposes, however, all post hoc descriptions will be presented as percentage correct in obligatory context.

For the purpose of clarity, analyses of main effects are presented in the following order: Error Type, Group Effects, and Modality, first for 2<sup>nd</sup> grade and then for 4<sup>th</sup> grade.

#### Error Type Effects

Recall that the first goal of this study was to determine the type and frequency of noun and verb morphological errors in school-age children, and to determine which type of error occurred more frequently. The first prediction for this study was that children would have more difficulty with verb morphology (past tense, third person singular, copula and auxiliary BE) than noun morphology (possessive s, plural -s, and articles). In this study, there was no main effect for Error Type in 2<sup>nd</sup> grade ( $p = .61$ ); however, a main effect was observed for the 4<sup>th</sup> grade analyses ( $F(1, 472) = 13.52; p = .0003$ ). Post hoc comparison using Tukey's HSD revealed that children in 4<sup>th</sup> grade performed significantly better on nouns than verbs (nouns  $M = 98.9\%$ ; verbs  $M = 96.2\%$ ;  $p = .00005$ ). Thus, this prediction was supported only in the 4th grade analyses when a significant difference was observed

between the production of noun and verb morphology, with nouns more accurately produced than verbs.

### Group Effects

Another purpose of this study was to determine whether there was a relationship between group affiliation and production of noun and verb morphology in oral and written narratives. My prediction concerning the effects of group was that children with LI would make more errors in both the spoken and written narratives than the children with TL. Furthermore, I predicted that children with NLI would make more errors than those with SLI. Main effects were observed for Group in 2<sup>nd</sup> grade ( $F(3, 474) = 5.52$ ;  $p = .001$ ) and 4<sup>th</sup> grade ( $F(3, 472) = 8.61$ ;  $p = .00001$ ). In the post hoc comparison, Tukey's HSD for Unequal N revealed that 2<sup>nd</sup> grade children with TL performed significantly better on noun and verb morphological production in both oral and written narratives than children with NLI (TL nouns  $M = 98.8\%$ ; TL verbs  $M = 96.8\%$ ; NLI nouns  $M = 97.7\%$ ; NLI verbs  $M = 92.8\%$ ;  $p = .05$ ). There was also a trend towards a significant difference in performance between children with TL and children with SLI with  $p = .09$ . There was also a main effect for Group in the 4<sup>th</sup> grade analysis. Post hoc testing using Tukey's HSD for Unequal N, revealed a significant difference between children with NLI (NLI nouns  $M = 97.8\%$ ; NLI verbs  $M = 93.4\%$ ) and the children with TL (TL nouns  $M = 99.1\%$ ; TL verbs  $M = 97.2\%$ ;  $p = .00031$ ), children with SLI (SLI nouns  $M = 99.0\%$ ; SLI verbs  $M = 96.1\%$ ;  $p = .01387$ ), and children with LNIQ (LNIQ nouns  $M = 99.2\%$ ; LNIQ verbs  $M = 95.3\%$ ;  $p = .03492$ ). In each instance, 4<sup>th</sup> grade children with TL, SLI, and LNIQ performed better on both nouns and verbs than children with NLI.

The prediction that children with NLI would make more errors than those with TL was supported in both grades. However, the prediction that children with NLI would make more errors than those with SLI was supported only in fourth grade. Means and standard deviations and percent for noun and verb morphological production across these four groups in 2<sup>nd</sup> and 4<sup>th</sup> grade are reported in Table 1 and Table 2.

Table 1.  
 Mean Percent Correct in Obligatory Context (and Standard Deviation) of Grammatical Morphemes in 2<sup>nd</sup> Grade Oral and Written Narratives.

<u>Morphemes</u>		<u>Group Affiliation</u>			
		TL	SLI	NLI	LNIQ
<u>Verb Morphology</u>					
3S	oral	98.2 (9.5)	100.0 (0)	85.7 (35.0)	100.0 (0)
	written	96.3 (11.1)	66.7 (57.7)	75.0 (35.4)	62.5 (47.9)
Past tense	oral	96.3 (13.7)	94.1 (16.2)	91.2 (23.2)	95.4 (13.1)
	written	88.1 (29.3)	69.9 (39.4)	70.6 (41.8)	80.3 (37.9)
Copula	oral	99.8 (1.8)	100.0 (.0)	99.2 (6.4)	100.0 (0)
	written	98.8 (10.1)	100.0 (.0)	98.0 (13.7)	98.5 (12.2)
Auxiliary	oral	98.2 (11.17)	96.8 (13.6)	99.5 (3.9)	97.1 (9.8)
	written	96.2 (17.2)	98.1 (10.8)	94.7 (19.4)	96.7 (16.5)
<u>Noun Morphology</u>					
Plural	oral	99.78 (2.3)	99.6 (2.7)	98.7 (5.3)	98.6 (6.8)
	written	99.18 (5.3)	98.6 (8.2)	96.6 (16.7)	95.3 (16.5)
Possessive	oral	92.86 (26.1)	92.3 (27.7)	100.0 (.0)	100.0 (.0)
	written	86.54 (33.3)	93.3 (14.9)	75.0 (50.0)	100.0 (.0)
Article	oral	99.58 (2.0)	99.1 (3.7)	99.1 (2.9)	99.0 (3.3)
	written	99.37 (3.5)	98.4 (6.6)	98.1 (6.6)	97.7 (11.7)

Table 2.  
 Mean Percent Correct in Obligatory Context (and Standard Deviation) of Grammatical Morphemes in 4<sup>th</sup> Grade Oral and Written Narratives.

<u>Morphemes</u>		Group Affiliation			
		TL	SLI	NLI	LNIQ
<u>Verb Morphology</u>					
3S	oral	98.5 (7.1)	100.0 (0.0)	81.8 (30.0)	96.7 (12.9)
	written	89.5 (27.5)	84.1 (30.2)	66.0 (42.2)	83.3 (38.9)
Past tense	oral	98.8 (8.0)	99.0 (6.4)	94.9 (16.9)	97.3 (9.2)
	written	89.1 (23.9)	82.3 (32.9)	78.0 (35.9)	88.2 (28.3)
Copula	oral	99.8 (2.4)	100.0 (.0)	100.0 (.0)	100.0 (.0)
	written	99.5 (4.4)	99.5 (3.9)	98.7 (7.4)	95.6 (17.1)
Auxiliary	oral	99.8 (2.3)	100.0 (.0)	98.9 (4.6)	98.4 (6.1)
	written	98.7 (9.0)	97.5 (8.9)	95.3(17.6)	99.6 (2.9)
<u>Noun Morphology</u>					
Plural	oral	99.1 (5.3)	99.3 (4.9)	97.8 (8.5)	100.0 (.0)
	written	97.1(12.5)	96.1 (14.4)	89.8 (26.1)	94.2 (20.7)
Possessive	oral	97.4 (16.0)	90.9 (30.2)	85.2 (33.8)	100.0 (.0)
	written	91.2 (27.8)	92.3 (27.7)	80.0 (44.7)	95.0 (15.8)
Article	oral	99.8 (1.5)	100.0 (.0)	99.7 (1.6)	99.7 (1.4)
	written	99.9 (.8)	99.6 (2.4)	99.3 (3.0)	99.4 (3.2)

As indicated in Tables 1 and 2, children with NLI, on average, had lower percentage correct in both noun and verb morphological production in both 2<sup>nd</sup> and 4<sup>th</sup> grade than children with TL, children with SLI, and children with LNIQ. In 2<sup>nd</sup> grade, exceptions included third person singular and regular past tense –ed in written narratives, auxiliary BE and possessive ’s in oral narratives and plural –s and articles a, an, the in both oral and written narratives. In 4<sup>th</sup> grade, exceptions included copula BE in oral and written narratives, and auxiliary BE in oral narratives. From these tables, it can be noted that children with NLI in the 4<sup>th</sup> grade made more errors with fewer exceptions than children with NLI in the 2<sup>nd</sup> grade.

#### Modality Effects

The second goal of this study was to identify differences between spoken and written narratives, and furthermore, to determine if more errors were produced in one context than the other. Main effects for Modality were observed in both 2<sup>nd</sup> grade ( $F(1, 474) = 80.26; p < .0001$ ) and in 4<sup>th</sup> grade ( $F(1, 472) = 109.08; p < .00001$ ). One prediction concerning modality in this study was that children would make more errors in the written narratives as opposed to spoken narratives. This prediction found support in the results of post hoc comparisons of modality for both 2<sup>nd</sup> and 4<sup>th</sup> grade. Tukey’s HSD revealed that in both 2<sup>nd</sup> (oral  $M = 98.5\%$ ; written  $M = 95.0\%$ ;  $p < .00001$ ) and 4<sup>th</sup> grade (oral  $M = 99.2\%$ ; written  $M = 96.4\%$ ;  $p < .00001$ ), there was a clear advantage for oral over written composition across all groups. Means and standard deviations for percent of noun and verb morphological production in oral and written narratives in both 2<sup>nd</sup> and 4<sup>th</sup> grade are reported in Table 3.

Table 3.  
 Mean Percent Correct in Obligatory Context (and Standard Deviation) of Noun and Verb  
 Composites in 2<sup>nd</sup> and 4<sup>th</sup> Grade Oral and Written Narratives.

Composites	2 <sup>nd</sup> grade	4 <sup>th</sup> grade	2 <sup>nd</sup> & 4 <sup>th</sup> grade
Noun	97.9 (3.9)	98.9 (2.8)	98.4 (2.4)
Verb	95.8 (7.3)	96.1 (6.7)	95.8 (5.7)
Oral	98.5 (3.1)	99.6 (1.4)	99.1 (1.6)
Written	94.9 (8.2)	95.6 (7.1)	95.2 (6.4)

### Interactions

For the first two MANOVAs (Group X Error Type X Modality) there were no interactions for 2<sup>nd</sup> or 4<sup>th</sup> grade. It is important to note that there was a trend toward an interaction between Group and Mode in 2<sup>nd</sup> grade ( $p = .04$ ) and in 4<sup>th</sup> grade ( $p = .05$ ). However, because the level of reliability was set at .0167 *a priori*, these were not considered significant.

### Persistence of Language Impairment

Recall that the fourth goal in this study addresses the literature pertaining to the persistence of language impairment (PLI) over time. I predicted that children whose language impairments persisted from Kindergarten into the second grade would produce more morphological errors in the second and fourth grades than children whose language problems

appeared to resolve (ILI). Recall that this MANOVA (Group X Error Type X Grade) was conducted with alpha was set at  $p = .0167 (.05/3)$  for the initial analysis and  $p = .05$  for post hoc comparisons.

No main effects for Group ( $p = .05$ ) or Error Type ( $p = .08$ ) were observed; however, there was a trend for a main effect for Group in children with ILI performing better in oral and written narratives than children with PLI ( $p = .05$ ).

A main effect for Grade ( $F(1,157) = 9.68; p = .002$ ) was observed. Results from a *post hoc* t-test revealed that children in 4<sup>th</sup> grade performed significantly better in both oral and written narratives than children in the 2<sup>nd</sup> grade. Means and standard deviations for percent of noun and verb morphological production across these two groups in 2<sup>nd</sup> and 4<sup>th</sup> grade are reported below in Table 4.

As noted in Table 4, production of noun and verb morphology across both modalities improved from 2<sup>nd</sup> to 4<sup>th</sup> grade with few exceptions. In the PLI group, these exceptions included oral production of third person singular and possessive, and oral and written production of plural –s. In the ILI group, exceptions included third person singular in written narratives, written production of copula and auxiliary BE, oral and written production of plural –s, and written production of regular possessive.

#### Interactions

An interaction between Error Type and Grade was observed ( $F(1,157) = 28.67; p < .0001$ ). From this analysis, it was determined that the interaction was driven primarily by a significant difference between noun production in 2<sup>nd</sup> grade and noun production in 4<sup>th</sup> grade, in that noun production significantly improved during this time but not verbs. A significant

difference was also found between noun and verb production in both 2<sup>nd</sup> and 4<sup>th</sup> grade ( $p = .0002, p = .003$  respectively).

Table 4.  
 Mean Percent Correct in Obligatory Context (and Standard Deviation) of Grammatical Morphemes in PLI & ILI.

		Group			
		PLI		ILI	
		2 <sup>nd</sup> Grade	4 <sup>th</sup> Grade	2 <sup>nd</sup> Grade	4 <sup>th</sup> Grade
<u>Verb Morphology</u>					
3S	oral	85.7 (35.0)	84.2 (28.5)	100.0 (.0)	100.0 (.0)
	written	50.0 (50.0)	79.2 (40.1)	100.0 (.0)	78.0 (32.2)
Past tense	oral	90.5 (22.1)	96.0 (15.3)	95.7 (15.6)	98.9 (6.1)
	written	60.2 (45.7)	77.0 (36.4)	80.9 (31.8)	83.8 (31.8)
Copula	oral	99.4 (5.6)	100.0 (.0)	100.0 (.0)	100.0 (.0)
	written	98.4 (12.1)	100.0 (.0)	100.0 (.0)	98.2 (8.3)
Auxiliary	oral	99.3 (4.2)	99.3 (3.8)	96.3 (15.2)	100.0 (.0)
	written	94.6 (19.6)	95.3 (16.3)	99.3 (4.1)	98.0 (8.5)
<u>Noun Morphology</u>					
Plural	oral	99.0 (5.0)	98.6 (6.7)	99.6 (2.2)	98.6 (6.8)
	written	96.4 (16.3)	91.6 (23.3)	99.2 (6.5)	95.6 (15.9)
Possessive	oral	100.0 (.0)	83.3 (35.6)	87.5 (35.4)	91.7 (28.9)
	written	66.7 (57.7)	100.0 (.0)	94.4 (13.6)	81.8 (40.5)
Article	oral	99.0 (3.9)	99.9 (1.0)	99.1 (2.7)	99.9 (1.2)
	written	98.3 (7.0)	99.1 (3.3)	98.4 (5.8)	100.0 (.0)

### Level of Mastery for Morphological Markers

According to Fey (1996), mastery is typically defined as “90 percent correct usage of the form in contexts that obligate its use (p 123).” Fey (1996) further explains that this 90% figure is high enough to indicate a near-adult level of use but still sensitive to cognitive, linguistic, social, or emotional pressures children may be feeling, causing them to occasionally make an error. Levels of mastery in 2<sup>nd</sup> grade and 4<sup>th</sup> grade across the TL, SLI, NLI, and LNIQ and the PLI and ILI groups are indicated in Tables 5, 6, and 7 as percentage correct in obligatory context. I also report the number of children who did not reach a mastery level. It is important to note that the majority of children reached mastery levels in both grades for all morphemes across all groups. There were, however, still some children in all the groups that did not reach the level of mastery in their production of some grammatical morphemes, and that this is evident in both oral and written narratives, and in 2<sup>nd</sup> and 4<sup>th</sup> grades.

Table 5.  
 Level of Mastery in Percentage Correct in Obligatory Context of Grammatical Morphemes and the Number of Children Who Did *Not* Reach Mastery in 2<sup>nd</sup> Grade.

Morphemes	Group Affiliation								
	TL		SLI		NLI		LNIQ		
	%	No.	%	No.	%	No.	%	No.	
<u>Verb Morphology</u>									
3S	oral	96	1/28	100	0/14	83	1/6	90	1/10
Past tense	oral	92	16/207	87	9/69	84	1/51	86	9/63
Copula	oral	99	2/213	100	0/90	98	8/61	100	0/76
Auxiliary	oral	96	7/195	92	1/77	96	1/52	91	6/66
Composite	oral	96		95		90		92	
<u>Noun Morphology</u>									
Plural	oral	99	2/228	99	1/91	93	4/60	96	3/79
Possessive	oral	93	3/42	92	1/13	100	0/8	100	0/8
Article	oral	98	4/236	96	4/93	99	1/67	98	1/80
Composite	oral	97		96		97		98	

Table 6.  
Average Level of Mastery in Percentage Correct in Obligatory Context of Grammatical Morphemes and the Number of Children Who Did *Not* Reach Mastery in 4<sup>th</sup> Grade.

<u>Morphemes</u>		<u>Group Affiliation</u>							
		TL		SLI		NLI		LNIQ	
		%	No.	%	No.	%	No.	%	No.
<u>Verb Morphology</u>									
3S	oral	96	1/22	100	0/12	70	4/13	100	0/15
Past tense	oral	96	9/220	87	2/76	90	5/50	92	5/65
Copula	oral	99	1/191	100	0/74	100	0/56	100	0/66
Auxiliary	oral	99	1/161	100	0/67	94	3/47	93	4/59
Composite		98		97		89		96	
<u>Noun Morphology</u>									
Plural	oral	96	9/233	98	2/89	92	5/66	100	0/81
Possessive	oral	97	1/39	91	1/11	78	2/9	100	0/8
Article	oral	99	1/236	100	0/93	100	0/67	100	0/82
Composite	oral	97		96		90		100	

Table 7.  
 Level of Mastery in Percentage Correct in Obligatory Context of Grammatical Morphemes in Narratives of Children with RLI and ILI and the Number of Children who Did *Not* Reach Mastery.

		Group							
		ILI				PLI			
		2 <sup>nd</sup> Grade		4 <sup>th</sup> Grade		2 <sup>nd</sup> Grade		4 <sup>th</sup> Grade	
<u>Verb Morphology</u>									
3S	oral	100	0/13	100	0/9	83	1/6	76	4/15
Past tense	oral	94	3/54	97	2/59	78	14/65	92	5/66
Copula	oral	100	0/71	100	0/58	99	1/79	100	0/71
Auxiliary	oral	97	2/61	100	0/52	91	6/67	95	3/60
Composite	oral	98		99		88		91	
<u>Noun Morphology</u>									
Plural	oral	99	1/68	96	3/69	95	4/82	95	4/85
Possessive	oral	87	1/8	92	1/12	100	0/13	75	2/8
Article	oral	97	2/72	100	0/72	97	3/87	100	0/87
Composite	oral	94		96		97		90	

## CHAPTER 4

### DISCUSSION

The present study aimed to closely replicate of the analyses of the Windsor et al. (2000) study by looking at noun and verb morphological errors in both spoken and written narratives. I examined the oral and written narratives of 478 children with TL, SLI, NLI, or LNIQ in second and fourth grade. I analyzed their morphological production and found statistically significant main effects for the type of error, the group a child was in, the modality in which the story was told, and the grade level of the children. The study supported two of the three predictions I originally made.

It is important to discuss these results considering the level of mastery of grammatical morphemes achieved by the children in this study. Most, although not all, of the children with TL, SLI, NLI, and LNIQ in this study had already reached mastery levels of 90% or greater (Fey, 1986) as indicated in Tables 5, 6, and 7 above. There were, however, children who did not reach mastery on at least one morpheme in both second and fourth grades and across all four groups, including the TL group.

It is surprising that some children with TL had still not reached the level of mastery by the time they were in the 4<sup>th</sup> grade. In the study by Windsor et al. (2000), all children with typical language between the ages of 7 and 12 had mastered both noun and verb morphology in both spoken and written samples. Rice et al. (1998) also observed the persistence of language impairment and found that obligatory marking of grammatical tense was established at four years of age in children with typical language. In contrast, their study showed that children with SLI as a group continued to show optional use of tense marking well into their elementary school years. Windsor et al. (2000) also found

that children with LLD had more difficulty with verb finiteness, especially in written narratives, than those children that were typically developing. The children with LLD had the most difficulty with regular past tense –ed. From these findings, Windsor et al. (2000) found that 7 out of 19 children with LLD made regular past tense –ed errors in spoken narratives, while 11 out of 17 of these children made regular past tense –ed errors in written narratives. In the 2000 study by Rice et al., these researchers discovered that, over time, the children with SLI were more likely to produce bare-stem forms of the irregular past tense as well as the regular past tense. The present study did not uniquely examine finiteness but calculated the error of case, number, and finiteness together in a composite percentage. This might account for differences in mastery, particularly in the TL group. Thus the reader should consider that the effects that I am about to discuss are generally based on low error rates, which might account for lack of support for some of the predictions in this study.

### The Effects of Error Type

Recall that the first goal of this study was to determine the type and frequency of noun and verb morphological errors made by school-age children and to determine which type of error occurred more frequently. I predicted that the children would have more difficulty with verb morphology (regular past -ed, third person singular, and copula and auxiliary BE) than noun morphology (possessive s, plural -s, and articles). This prediction was supported in only the 4th grade analysis when there was a main effect for error type in the production of noun and verb morphology. As predicted, nouns were produced with noticeably better accuracy than verbs. This supports the conventional view

that development of noun morphology precedes that of verb morphology in children who are developing language in a typical manner (Owens, 2001). This did not support the findings by Windsor et al. (2000). In the study by Windsor et al. (2000), the researchers found that children with LLD also had difficulty with regular plural –s in written narratives.

Children with SLI develop these morphological markers in roughly the same manner as children with typical language, although more slowly (Leonard, 1991, Rice et al., 1998). This study reveals that this pattern of slow development continues even in 4<sup>th</sup> grade children and, somewhat surprisingly, that noun errors are still evident, with some children not yet reaching mastery.

### The Effects of Group

Another purpose of this study was to determine whether there was a relationship between group affiliation and production of noun and verb morphology in oral and written narratives. I predicted that children with LI would make more errors in both the spoken and written narratives than the children with TL. Furthermore, I predicted that children with NLI would make more errors than those with SLI. Main effects were observed for Group (TL vs. SLI vs. NLI vs. LNIQ) in both 2<sup>nd</sup> grade and 4<sup>th</sup> grade. In 2<sup>nd</sup> grade, children with TL performed significantly better on noun and verb morphological production in both oral and written narratives than children with NLI. In 4<sup>th</sup> grade, children with TL, SLI, and LNIQ all performed considerably better than children with NLI. However, children with TL in both 2<sup>nd</sup> and 4<sup>th</sup> grade did not perform significantly better than those children with SLI or LNIQ. Recall that the grouping of the children was

based on the relative strengths of their language and nonverbal cognitive skills. The children with NLI have both verbal and nonverbal skills that are below the normal range and appear to be more at risk for having difficulty with noun and verb morphology in both oral and written narratives than the other groups. This does not appear to be the case for the children with SLI. In 2<sup>nd</sup> grade, the children with SLI are indistinguishable from the children in any of the other groups, including those with NLI. By 4<sup>th</sup> grade; however, they appear to have made gains that distance them from the children with NLI and are indistinguishable statistically from the TL and LNIQ groups. It may be that the children with SLI draw on cognitive or social resources not available to the children with NLI that allow them to develop morphosyntactic skills more successfully. From this study, it appears that children with NLI are making fewer morphosyntactical gains between 2<sup>nd</sup> and 4<sup>th</sup> grade, while children with TL, SLI, and LNIQ are progressing at a faster rate. It may be that by 2<sup>nd</sup> and 4<sup>th</sup> grade that morphological accuracy is not the best way to identify children with SLI.

When Catts et al. (2002) examined these groups of children for reading outcomes, they found that the children with NLI were at higher risk for reading disabilities than those with SLI. Fey et al. (submitted) examined this same group of children for narrative quality performance. These researchers found that children with TL performed significantly better than children with NLI on grammatical accuracy in both 2<sup>nd</sup> and 4<sup>th</sup> grades. The children with SLI did not perform at a significantly better rate than those children with NLI, although their scores were consistently higher than those with NLI. Furthermore, they found that children with TL performed significantly better than children with SLI for Number of Different Words. Fey et al. (submitted) also observed a

pattern of poorer performance in children with SLI than children with TL in measures of story length, such as Number of C-units, and story quality. These researchers did not find a statistical difference between those children with LNIQ and those with TL, except for Percentage Grammatical C-units. Children with LNIQ had average reading scores, although they did perform lower on all measures of narrative quality than those children with TL (Fey et al., submitted). Because of these findings, measures of narrative quality may be a better indicator of performance in children with LI.

### The Effects of Modality

The second goal of this study is to identify differences between spoken and written narratives and to determine if more errors are produced in one context than the other. I predicted that children would produce more errors in the written narratives than the spoken narratives. Gillam and Johnston (1992) studied spoken and written narratives of both typically developing children and language learning disabled children between the ages of 9 and 12 years. They found more errors in the writing samples for both groups of children. From that study, it was also noted that children with LLD made more written errors than those who were typically developing. In the present study, I also observed main effects for modality in both 2<sup>nd</sup> grade and in 4<sup>th</sup> grade. The children with TL, NLI, SLI, and LNIQ performed significantly better in oral narratives than written composition. This did support the findings of Windsor et al. (2000). These researchers found that children with LLD had the most difficulty with the marking of verb finiteness in written narratives, especially with regular past tense –ed,

The writing component of a narrative task adds complexity that appears to increase the rate of errors in school-age children. While writing, a person must physically put pencil to paper, encode language orthographically, and incorporate the mechanical aspects such as spelling, punctuation, and capitalization (Gillam & Johnston, 1992). Because of these extra components, research indicates that all children are more susceptible to producing errors in the written language (e.g., Gillam & Johnston; Scott & Windsor, 2000).

### Persistence of Language Impairment

The final prediction in this study dealt with the persistence of language impairment. I predicted that children whose language impairments persisted from Kindergarten into the 2<sup>nd</sup> grade (the PLI group) would produce more morphological errors in the 2<sup>nd</sup> and 4<sup>th</sup> grades than children whose language problems appeared to resolve (the ILI group). In this study, while there was a trend ( $p=.05$ ) for children with ILI to perform better in both oral and written narratives than children with PLI, this did not rise to the level of statistical reliability established for the study ( $p=.0167$ ). This may be due to the high level of mastery already achieved by both groups of children by the time they are in 4<sup>th</sup> grade (see Table 7).

I did find a main effect for grade within the PLI and ILI groups, however. Children with PLI and ILI in 4<sup>th</sup> grade performed significantly better in both oral and written narratives than children with PLI and ILI in the 2<sup>nd</sup> grade. However, given the high level of mastery for both groups, grammatical morphology may not be an appropriate way to distinguish these two groups. Narrative quality and reading measures may provide more sensitive measures of recovery. In the Catts et al. (2002) study, researchers found that children with LI who improve in their language abilities should

have better reading outcomes than those children with PLI. However, these researchers do state that children whose language problems resolve may still experience some reading difficulty. Because of these findings, reading measurements may be a better indicator to distinguish children with PLI and ILI.

### Clinical Implications

Narratives provide clinicians with an efficient and effective tool for assessing morphological production along with other information about the speech and language development of children (Westby, 1991). For example, to date this narrative task has been used to measure vocabulary and productivity (Fey et al., submitted), narrative quality (Fey et al., submitted), grammatical production (Fey et al., submitted), and as a predictor of reading skills (Catts et al., 2002). McCabe & Rollins (1994) note that similar procedures can be used to elicit both spoken and written narratives. Botting (2002) states that narratives can be used to compare populations with each other and, over time, are associated with literacy ability and pragmatic skills while at the same time being more formal than a conversation.

From narrative productions, one can measure noun and verb morphology, especially those in past tense form. From this study, I found that most children have already reached mastery on morphological markers by the time they enter the 2<sup>nd</sup> grade, but not uniformly. Not only are children in both 2<sup>nd</sup> and 4<sup>th</sup> grades still making errors in verb morphology, but some are still making errors in noun morphology as well.

However, grammatical accuracy only distinguishes children with NLI from those

children with TL, SLI, and LNIQ. Again, reading measures and narrative quality may provide more information in distinguishing children with SLI.

Although these noun and verb morphological errors continue to occur in the 2<sup>nd</sup> and 4<sup>th</sup> grade by all four groups of children, this may not be a high priority when setting therapy goals. Fey (1986) states that if all forms below the 90% mastery level are selected as goals, then too many goals are likely to be selected, thus making the procedure for therapy difficult for both clinician and client. Fey also stated that some clinicians set the criterion goal at 50% in spontaneous conversation. Therefore, if the child uses the form correctly half of the time in natural settings, then it is no longer necessary to target this particular form as a goal. Fey then stated that these linguistic acts should continue to improve without therapy and should be periodically sampled in order to ensure that these forms are spontaneously improving. He suggests that only those content-form interactions that the child is producing with 10 to 50% accuracy should be addressed first. Content-form interactions that the child uses between 0% to 10% of the time should be addressed second, followed by those content-form interactions that the child does not use sentences that obligate the use of that particular form. Based on a criterion of 0% – 50% accuracy, morphological goals should be selected for only 34 children in 2<sup>nd</sup> grade and 10 children in 4<sup>th</sup> grade in the current study based on their oral narratives. The large number of therapy materials on the market that target morphological production in school-age children, may suggest that clinicians are selecting morphological goals more often than necessary.

Narrative productions also provide information on the oral and written modalities. From this study, I found that children with TL, SLI, NLI, and LNIQ all made more errors

in their written narratives as opposed to the spoken narratives suggesting that they are more sensitive measure of morphosyntactic skills. Due to the higher level of difficulty of written narratives, this was an expected outcome.

Although children in all four groups performed better on oral narratives than written, children with NLI still presented with significantly more problems in morphological production than those with TL in the 2<sup>nd</sup> grade, and those with TL, SLI, and LNIQ in the 4<sup>th</sup> grade. Therefore, it is important to continuously monitor the development of those children with both verbal and nonverbal deficits. However, grammatical accuracy only distinguishes children with NLI from those children with TL, SLI, and LNIQ. Again, reading measures and narrative quality may provide more information in distinguishing children with SLI.

### Future Research

Recall that Fey (1986) defines mastery as being that of 90% correct in obligatory context. Most of the children in this study had already reached mastery level on noun and verb morphological markers by 2<sup>nd</sup> grade and 4<sup>th</sup> grade. In future research, it may be valuable to use younger children with LI, SLI, NLI, and LNIQ who have not yet reached these mastery levels. This may provide more detail of the variability in production of noun and verb morphological errors in both spoken and written narratives.

One limitation of this method of research is that narratives often provide a rich number of past tense noun and verb morphological markers, with few present tense morphemes, such as third person singular and copula is, are, and am. A variety of contexts may have to be specifically developed to elicit stories in the present tense as well as past tense to comprehensively examine production of grammatical morphology

As an extension of this research, it may also be of value to separate finiteness from errors of case and number that occur in these individual spoken and written narratives. This would be of value in discussing the theoretical implications of the Surface Hypothesis, Extended Optional Infinitive, and Implicit Rule Deficit.

This study was a close replication and extension of the Windsor et al. (2000) study. As in the Windsor et al. study, we examined noun and verb morphological production in children's oral and written narratives. We examined these narratives of children with TL, SLI, NLI, and LNIQ when they were in both 2<sup>nd</sup> and 4<sup>th</sup> grade. This study did generally support the findings of Windsor et al., with one exception. I found that children performed significantly better on noun morphology than verb morphology. Windsor et al. found that children with LLD had errors of finiteness with regular plural – s.

We extended their study by also examining these morphological productions in children with PLI and ILI. Future research should focus on younger children in these four diagnostic groups with separation of error of number and finiteness. In doing so, valuable insights could be obtained concerning the Surface Hypothesis, Extended Optional Infinitive, and Implicit Rule Deficit. Although narrative quality and reading measures may better distinguish between children who have language impairments and those who do not, the results of this study indicate that some children in all groups continue to have difficulty with grammatical morphology into 4<sup>th</sup> grade. Finally, this study demonstrates that collection of both oral and written narratives offer clinicians an efficient and important clinical tool in the assessment of children with LI. The use of

narratives is especially helpful in identifying difficulty with noun and verb morphology in those children with NLI.

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APPENDIX

<u>Code</u>	<u>Definition</u>	<u>Example</u>
/3s	Correct production of third person singular.	She walk/3s to the store.
/*3s	Omission of third person singular.	She walk/*3s to the store.
/ed	Correct production of regular past bound morpheme –ed.	He jump/ed over the fence.
/*ed	Omission of regular past bound morpheme –ed.	He jump/*ed over the fence.
was	Correct production of past tense free auxiliary morpheme.	He <i>was</i> feeding the birds.
*was	Omission of past tense free auxiliary morpheme	He <i>*was</i> feeding the birds.
were	Correct production of past tense free auxiliary morpheme.	The boys <i>were</i> fishing in the pond.
*were	Omission of past tense free auxiliary morpheme.	The boys <i>*were</i> fishing in the pond.
[cop]	Correct production of present tense copula.	The man <i>is</i> big
[*cop]	Omission of present tense copula.	The man <i>*is</i> big.
[aux]	Correct production of present tense free auxiliary morpheme.	She <i>is</i> playing with her dolls.
[*aux]	Omission of present tense free auxiliary morpheme.	She <i>*is</i> playing with her dolls.
/*is	Omission of present tense free auxiliary morpheme or copula..	She <i>*is</i> playing with her dolls. The man <i>*is</i> big
/s	Correct production of regular bound morpheme plural –s.	The boy ate three apple/s.
/*s	Omission of regular bound morpheme plural –s.	The boy ate three apple/*s
/z	Correct production of possessive bound morpheme .	Jennifer/z hat was pretty.
/*z	Omission of possessive bound morpheme.	Jennifer/*z hat was pretty.
a	Correct production of article <i>a</i> .	She ate <i>a</i> banana.
*a	Omission of article <i>a</i> .	She ate <i>*a</i> banana.
an	Correct production of article <i>an</i> .	Get <i>an</i> orange for me at the store.

*an	Omission of article <i>an</i> .	Get <i>*an</i> orange for me at the store.
the	Correct production of article <i>the</i> .	Pick up <i>the</i> ball.
*the	Omission of article <i>the</i> .	Pick up <i>*the</i> ball.
[numerr]	Error of number	There <i>is</i> some pigs.
[plnumerr]	Error of plural.	There are some pig/ <i>*s</i> . I have one pig/ <i>s</i> .
[pererr]	Error of person	He <i>am</i> going to the store.
[vstem]	Substitution of the bare stem for a lexical irregular past tense verb.	It <i>break</i> apart. It <i>jump</i> in there.
[vover-reg]	Substitution of an over-regularization for a lexical irregular past tense verb.	You <i>breaked</i> it. It <i>goed</i> under the chair.
[vdouble over-reg]	Substitution of a double marked verb error for a lexical irregular past tense verb.	I <i>broked</i> the cone. It <i>wented</i> in the box.
[vdouble-reg]	Substitution of a double marked verb error for a lexical regular past tense verb.	He <i>drowneded</i> in the pond. He <i>shieldeded</i> the cat from the dog.
[nstem]	Substitution of the bare stem for an irregular noun.	The <i>goose</i> were in the pond.
[nover-reg]	Substitution of an over-regularization for an irregular noun.	The <i>geeses</i> were in the pond. The <i>deers</i> were drinking water from the pond.
[ndouble over-reg]	Substitution of a double marked noun error for an irregular noun.	The <i>childrens</i> were playing in the park.
[ndouble-reg]	Substitution of a double marked noun error for a regular noun.	The <i>horseses</i> were drinking water.

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