

## ABSTRACT

Title of dissertation: LITERATE LANGUAGE FEATURE USE IN  
PRESCHOOL AGE CHILDREN WITH SPECIFIC  
LANGUAGE IMPAIRMENT AND TYPICALLY  
DEVELOPING LANGUAGE

Alida Anderson, Doctor of Philosophy, 2006

Dissertation directed by: Professor Joan Lieber  
Department of Special Education

This study investigated the rate of literate language feature (LLF) use in preschool age children with specific language impairment (SLI;  $n = 15$ ), and typically developing language (TDL;  $n = 15$ ). Language samples from two groups of children were compared in play and storybook sharing contexts with their mothers to determine whether there were differences in their LLF use. A multivariate within- and between-subjects design was used to assess preschoolers on five LLF dimensions of simple elaborated noun phrases (SENP), complex elaborated noun phrases (CENP), adverbs (ADV), conjunctions (CONJ), and mental and linguistic verbs (MLV), and on the summed LLF composite in play and storybook sharing contexts. In the LLF composite there was an interaction effect. Children with TDL had a higher rate of LLF use in play than in the story context, and children with SLI were significantly lower in their LLF use across contexts. When LLF dimensions were analyzed there was a main effect for context for the dimensions of

CENP and ADV. Children had a significantly higher rate of these features in play than in the story context. In addition, there was an interaction effect for context by group for CONJ. Significance testing revealed that children with TDL used a higher rate of CONJ in play than children with SLI; however, in story, there were no significant differences between groups. The findings have implications in areas of language and literacy and assessment and measurement with children.

LITERATE LANGUAGE FEATURE USE IN PRESCHOOL AGE CHILDREN WITH  
SPECIFIC LANGUAGE IMPAIRMENT AND TYPICALLY DEVELOPING  
LANGUAGE

By

Alida Anderson

Dissertation submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
2006

Advisory Committee:

Professor Joan Lieber, Chair  
Professor Deborah Speece  
Associate Professor David Cooper  
Associate Professor Froma Roth  
Assistant Professor Min Wang

© Copyright by

Alida Anderson

2006

## TABLE OF CONTENTS

LIST OF TABLES	viii
LIST OF FIGURES	ix
CHAPTER 1: Statement of the Problem	1
Linguistic Specificity in Early Childhood	1
Children with specific language impairment	2
The Importance of Linguistic Specificity	2
Impact of linguistic specificity deficit	3
Research on Linguistic Specificity	3
What are Linguistically Specific Features?	3
Linguistic specificity through semantic contingencies	4
Literate language feature use	4
How Does Linguistic Specificity Develop?	5
Oral-literate continuum	6
Facilitating mechanisms of linguistic specificity	8
Importance of comparing play and story sharing contexts	9
The Current Study	10
Rationale	11
Emergent literacy practices	12
Research on children with SLI	12
Research Questions	14
CHAPTER 2: Review of the Literature	15
Overview	15
Theoretical Perspectives That Inform Linguistic Specificity	15
Piagetian Theory	15
Schema theory	17
Script theory	17
Vygotskian Theory	18
Social-cognitive perspective	19
Slobin's Theory of Language	19

Summary	20
Models of Linguistic Specificity Development	21
Semantic Contingencies	21
Children with SLI	23
Oral-to-Literate Language Continuum	24
Decontextualized language skill	26
Linguistic Specificity and Contextual Factors	28
Discourse Genre	28
Conversation	28
Narration	29
Setting	30
Storybook sharing	30
Storybook sharing and children with disabilities	31
Partner Linguistic Input	33
Dialogic reading	34
Facilitative strategies in play	35
Facilitative strategies in play and story	36
Speech act use	36
Summary	38
Measurement of Linguistic Specificity	38
Subskills of LLF use	38
Semantic diversity	39
Methodological issues	40
Syntactic knowledge	41
Methodological issues	42
Summary	43
Specification of Variables Through Structural Language Analysis	44
LLF use	46
Interaction of macro- and micro-level features	51
Summary	52
Linguistic Specificity in Children with SLI	53

Definition and Etiology of SLI	53
Oral Language	54
Semantic-syntactic knowledge and expressive language delay	55
Language formulation	56
Literacy	56
Recall and comprehension	56
Academic Performance	57
Assessment of Linguistic Specificity in Children with SLI	59
Outcome measures used to assess linguistic specificity	59
Play contexts	62
Narrative contexts	63
Limitations in the Research on LLF Use	69
Variable specification and context	69
Interaction of dependent measures	71
Construct validity	71
Interaction between independent and dependent variables	72
Fidelity of procedures	74
Summary	76
CHAPTER 3: Method	78
Overview	78
Description of the Current Study	78
Recruitment and Eligibility of Participants	79
Telephone interview	80
In-home screening	80
Participants in the Current Study	82
Age	82
Ethnic background	82
Household income	83
Maternal education	84
Developmental status	85
Language functioning	86

Data Collection for the Current Study	86
Dependent Measures	86
Independent Variables	88
Procedures of the Current Study	89
Videotaping procedures	89
Materials	90
Procedural Fidelity	91
Data identification	92
Language Analysis Procedures	93
Data extraction	93
Sampling context of data collection	93
Analysis set, transcript cut, and coding	95
Transcription	95
Coding	96
Data analysis	98
Description of sampling context	98
Fidelity of Data Sources	99
Mother-child videotapes	99
Input from the dialogic partner	100
Design and Analysis	102
Use of Descriptive Statistics	102
Research Questions	102
Analytic Procedures	103
Effect Size and Power Calculations	103
CHAPTER 4: Results	105
Percentage of LLFs used by Children	105
Correlations among LLF Variables for Children with SLI and TDL	106
Children with SLI: The relationship between LLF use and context	107
Children with TDL: The relationship between LLF use and context	108
Differences in LLF Rate of Use	109
LLF composite	109



LLF Dimensions	112
Follow-up tests	112
Magnitude of Differences in LLF Use	113
ENP use	114
ADV use	115
MLV use	115
CONJ use	116
Summary	117
CHAPTER 5: Discussion	118
Differences in LLF Use Between Play and Story Contexts	119
Play and LLF composite	119
Story and LLF composite	120
Micro level LLF differences	120
Theoretical consideration of LLF differences	123
Measurement of LLF Use	126
Social vs. language research in LLF	126
Univariate vs. multivariate LLF measurement	126
Limitations	127
Sampling	127
Materials	128
Dialogic partner as a contextual variable	128
Implications	129
Language and literacy	129
Assessment and measurement	129
Directions for Future Research	131
LLF comprehension and production	131
LLF use and standard language measures	132
Language-age matching	132
Cross-cultural research	133
LLF use and contextual factors	134
LLF use and partner input	135

Interpretation of findings	137
APPENDIX A: Definitions and Examples of Literate Language Features	138
APPENDIX B: TOLDP3 Subtest Performance for Children with SLI	139
APPENDIX C: Description of TOLDP3 subtests	140
APPENDIX D: SALT-R Training Guide and Coding Conventions	142
APPENDIX E: LLF Training Evaluation Protocol	146
APPENDIX F: Videotape Fidelity Checklist	148
APPENDIX G: Description and Examples of Speech Acts	149
APPENDIX H: Power and Effect Size Calculations	150
APPENDIX I: Correlations between LLFs for children with SLI and TDL	152
REFERENCES	155

## LIST OF TABLES

1. Use of LLF Battery to Assess Linguistic Specificity in Childhood	47
2. Linguistic Specificity in Preschool Age Children with Disabilities	60
3. Linguistic Specificity Through Micro/Macro Level Variable Analyses	64
4. Percent of LLF use by Context for Groups	106
5. Correlations Between LLFs for Children in Play and Story	107
6. Correlations Between LLFs for Children with SLI	108
7. Correlations Between LLFs for Children with TDL	109
8. Effects of Group on Rate of LLF Use per Utterance	113
9. Effect of Context on LLF Use Across and Within Groups	116

## LIST OF FIGURES

1. Oral and written language differences	26
2. Interaction plot for LLF composite	111

## CHAPTER ONE

### Statement of the Problem

The main goal of language development in early childhood is the acquisition of skills that enable children to use language appropriately and strategically in a variety of situations (Becker, 1990). One facet of this competence is children's use of specific linguistic features to convey information (Paul & Smith, 1993). By the time children reach preschool age, around four years old, they are expected to produce precise oral language in contexts ranging from play to storybook sharing (Dickinson & McCabe, 1991).

#### *Linguistic Specificity in Early Childhood*

Children's engagement with a partner using specific linguistic structures such as multi-clausal utterances is one mechanism that promotes learning, as children benefit from the use of increasingly specific language in their exchange of information (Hoff & Naigles, 2002; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002; Whitehurst, Arnold, Epstein, Angell, Smith, & Fischel, 1994a). Researchers identify conversational discourse as an optimal situation for language learning. In conversations, children can practice and receive feedback on linguistic information such as semantic and syntactic features (Ninio & Bruner, 1978; Preece, 1987).

Children's specific language feature use is an important aspect of their linguistic development. English-speaking children develop their communication skills through referencing and labeling, in which they progress from using single words, usually nouns, to more complex phrases to describe objects, events, and ideas (Slobin, 1988). As children develop more sophisticated language, they use syntactically complex structures,

such as elaborated noun-, verb-, and conjunctive-phrases to describe objects, events, and ideas (Hoff & Naigles, 2002). Children's overall utterance length increases as well, from using one- and two-word utterances, to using multi-word utterances which contain more complex structures such as causal, temporal, and relational clauses (Logan, 2003). Children's multi-word utterances function in their descriptions of particular entities, in their indications of the temporal order in which a series of events has occurred, or in their restatements of happenings from routine events or novel experiences in conversations (Hedberg & Stoel-Gammon, 1986; Snow & Imbens-Bailey, 1997).

*Children with specific language impairment.* Characteristically, children with specific language impairment (SLI) have deficits in their production of specific linguistic features in discourse resulting from underlying weaknesses in semantic and syntactic skills (Conti-Ramsden, 2003; Hick, Joesph, Conti-Ramsden, Serratrice, & Faragher, 2002).

#### *Importance of Linguistic Specificity*

Linguistic specificity is important to children's development of cognitive, social, and linguistic skills. Children's linguistic specificity is important to their cognitive development because a child's use of specific language is connected to their representation of abstract concepts and ideas (Donohue & Pearl, 1995). For example, children can use structures such as past tense markers and temporal and causal conjunctives to express ideas of a causal, temporal, and relational nature. Also, children's use of specific language features enables them to represent increasingly complex and elaborated information that may not exist in the immediate context (e.g., fairy tales, dreams, imaginary play) (Van Oers, 1998).

Linguistic specificity also is important to children's social development. For example, parents and children signal their mutual engagement and joint attention skills through their use of referential communication (Donohue & Pearl, 1995). In children's production of labels and references, their increasing specificity serves the purpose of sustaining the discourse interaction with their partner (Hoff & Naigles, 2002).

*Impact of linguistic specificity deficit.* In the early childhood years, children's difficulty in the use of specific linguistic features has an impact on their ability to successfully convey their thoughts and ideas. Consequently, a young child who struggles with using these features in oral discourse is at significant risk for difficulties across a variety of key learning contexts, since they cannot communicate complex and specific information. Furthermore, young children who have difficulty with using specific linguistic features during their preschool years often continue to struggle with structural aspects of oral and written language later in their school careers (Damico & Simon, 1993). Currently, there is only associative evidence about the course of development for these children in their oral production of semantic and syntactic skills and school age competence in oral, reading, and written language tasks (see review by Scott, 2004).

### Research on Linguistic Specificity

#### *What are Linguistically Specific Features?*

Specific language features (or linguistically specific features of discourse) enable a speaker to convey information about ideas, events, and objects through the use of semantic and syntactic markers. This general definition is derived from children's development of increasingly sophisticated discourse in conversational contexts such as those involving semantic contingencies with caregivers, and in narrative discourse.

*Linguistic specificity through semantic contingencies.* Within the realm of children's use of semantically contingent utterances, researchers measure linguistic specificity through children's use of simple labels, which are usually nouns, to more elaborate descriptions and interpretations (Hoff & Naigles, 2002). Children typically produce increasingly specific utterances during semantically contingent conversations with caregivers, in which they demonstrate specific syntactic knowledge through their use of language features such as elaborated noun- and conjunctive-phrases. Linguistic specificity also is marked by increased semantic diversity, which is evident in children's use of vocabulary involving thinking and feeling verbs (i.e., mental and linguistic verbs), adverbs, and conjunctives (i.e., cohesive, temporal, and causal conjunctions).

*Literate language feature use.* The use of specific language features distinguishes children's language production in "literate" contexts such as narration and storybook sharing. Researchers generally agree that literate language feature (LLF) use comprises a set of specific features of discourse that enables children to explicitly render, explain, and elaborate on events and ideas that are displaced from the immediate environment (Justice & Kaderavek, 2004). The most commonly referred to LLFs include elaborated noun phrases (ENP), adverbial (ADV) phrases, phrases with mental ("thinking") and linguistic ("feeling") verbs (MLV), and phrases containing conjunctive (CONJ) forms (Curenton & Justice, 2004; Westby, 1985).

LLFs are measured differently in different contexts. While the same micro-level variables of specificity are identified in children's language production in semantically contingent discourse and literate contexts (e.g., mental and linguistic verb use), their methods of measurement vary. Linguistic specificity in semantically contingent



discourse is assessed at an utterance level, whereas linguistic specificity in narrative contexts is typically assessed at a micro-level through examination of variables such as LLFs. Since the construct of linguistic specificity is made up of the same micro-level features in each of these contexts, it is important to determine what contribution context might play in children's development of linguistic specificity, as measured through micro-level LLF use.

### *How Does Linguistic Specificity Develop?*

The ability to produce specific language features in conversational and narrative contexts develops through language and social interaction. Children's linguistic specificity relies on their lexical precision and syntactic marking, in which they must have sufficient semantic diversity and syntactic knowledge. Lexical precision and syntactic skills are aspects of children's development of adult grammar that appear around the age of four years of age (De Villiers & De Villiers, 1973; Miller & Chapman, 1981). Increased complexity and sophistication of language use characterizes language development in preschool age children with typical language development (TDL). Preschool age children with specific language impairment (SLI) typically have production difficulties related to their semantic diversity and syntactic knowledge (Rescorla & Lee, 2000). However, there is relatively little information about "how" either group of children develops their use of linguistically specific features such as LLFs. Also unknown is whether children's LLF use, which some researchers suggest is related to semantic diversity and syntactic knowledge, differentiates preschool age children with SLI and TDL in conversational contexts (van Kleeck, 2004).

An obstacle to the examination of contextual factors in early childhood LLF use is that measures used in spontaneous conversational contexts are not accurate in assessing micro-level skills of children with SLI (Boynton-Hauerwas & Stone, 2000). These measures typically use utterance level analysis (e.g., speech acts, initiations, responses), which are not sensitive to the deficits that children with SLI evidence in the use of particular syntactic and semantic features, such as the micro level dimensions of the LLF composite (SENP, CENP, MLV, ADV, and CONJ). The use of utterance level rather than discourse level analysis, as well as the focus on pragmatic rather than structural aspects of language use could contribute to inaccuracies, in either over- or underestimating performance in syntactic or semantic production skills in children with SLI in naturalistic contexts. Thus, some researchers propose using narrative methods of elicitation to assess specific linguistic skills in children with SLI (Botting, 2002).

*Oral-literate continuum.* The oral-literate continuum of language development can account for children's development of micro-level linguistically specific features in discourse (Kavanaugh, 1991). This continuum is based on the notion that there are common threads in children's development of oral and literate, or written language forms, with which children become more familiar with as they acquire conventional literacy skills (Dickinson & Snow, 1987). In particular, the oral-literate model emphasizes relationships between children's experience with oral and written language forms, distinguishing them along several characteristics including topic, function, and structure of language use (Scott, 1994).

A number of researchers postulate that children's early use of specific linguistic features in literate contexts may provide the bridge between their development of oral

and written language, since children use micro-level LLFs in both oral and written registers to linguistically render meaning (Kaderavek & Sulzby, 2000a, 2000b; Scott, 2004). To date, the majority of the research on LLF use has focused on school age children's discourse development from oral to written language forms in school-based contexts. This line of research does not provide information on the possible contribution of context to preschool age children's LLF use (Jones, 2003; Westby, 1994).

In characterizing linguistic specificity, some researchers describe children's development of LLF use as evidence of their "decontextualized" language (Westby, 1994). This characterization of linguistic development is based on the idea that language use ranges from concrete and contextually present, to abstract and decontextualized. Recently, Morgan and Goldstein (2004) defined decontextualized language use in early childhood as (a) concepts and notions removed from the immediate situation; and (b) used to convey information to audiences who share limited information with the speaker or who are removed from the physical context (p. 235). Thus, in contexts involving decontextualized discourse, the speaker uses structural features to convey meaning (Scott, 1994). In decontextualized discourse, all of the information needed for comprehension of the speaker's language is present within the linguistic structure, and the meaning extends beyond the immediate context of the communication act (Paul, 2002, p. 391).

LLFs have been identified as the micro-level features of decontextualized language in narrative contexts (Curenton & Justice, 2004; Paul, 2001; Strong & Greenhalgh, 2001). However, in play contexts, there is relatively little information about children's development of linguistic specificity through LLF use. In assessment of decontextualized language production in preschool age children, researchers use

measures such as speech-act or utterance type, as well as pre-post test gains on semantic and syntactic subtests of standardized language batteries (Morgan & Goldstein, 2004). Research on school age children's development of decontextualized language focuses on assessment of specific micro-level linguistic features such as LLFs. In academic contexts, children's LLF use is a facet of their decontextualized language experience. School age children are expected to use specific and precise forms of language (i.e., literate language) to increase explicitness and to reduce ambiguity in their communication (Heath, 1982; Westby, 1985).

*Facilitating mechanisms of linguistic specificity.* Whether linguistic specificity is described through utterance- or micro-level of linguistic production, there is some evidence that linguistic specificity develops through at least two “facilitating mechanisms”, or contexts of adult-interaction (Luciarelli & Nelson, 1987) and setting (Dickinson & McCabe, 1991; 2001). These findings indicate that oral-literate aspects of language development are associated with environmental factors such as the context of language use (Snow, 1991a, 1991b; Wells, 1985). Researchers describe young children's literacy skill development in language learning contexts ranging from narrative to symbolic play (Sulzby, 1986; Teale, 1986). Within an oral-literate model of linguistic specificity, researchers identify “facilitating mechanisms” by which children come to learn and use specific language such as literate features. Early childhood contexts such as those involving play and storybook sharing are considered to be facilitating mechanisms of “literacy socialization”, since children are likely to participate in communication about events and ideas with partners using specific linguistic features that

are related to literate, or written language registers (Dickinson & McCabe, 1991; Ninio & Snow, 1988).

For instance, in story sharing contexts, children's experience with literate language is an important aspect of their linguistic competence. This is because children's use of these features allows them to convey precise information that is outside of the immediate context of the conversation (Curenton & Justice, 2004). In conversational narrative contexts, children have been shown to use specific and precise forms of language such as past tense verbs and elaborated noun phrases to describe past events, imaginary happenings, thoughts, and ideas (Hoff, 2003; Rice, 2000).

Researchers also have examined linguistic specificity in early childhood through LLF use in symbolic play contexts such as dramatic play and dress-up. These contexts are literacy socializations, since they facilitate children's use of LLFs, as compared to solitary or constructive play contexts (Pellegrini, 1985). Pellegrini suggests that in pretend play, children with TDL use literate language to be linguistically specific in their interactions with peers. The next section addresses the importance of comparing LLF use across contexts in examining linguistic specificity in children with SLI and TDL.

*Importance of comparing play and story sharing contexts.* It is important to compare play and storybook sharing contexts because this comparison will reveal information on the unique contribution of context to LLF use in young children from different language groups. These contexts feature two commonly occurring activities for preschool children. Thus, it is important to consider their potential differential effects on children's language production. Currently, there is no research that compares LLF use in preschool age children with SLI and TDL. However, based on the information that we

know about children with TDL in their use of LLFs in play contexts with peers, it seems likely that the play context would be less likely to facilitate LLF use in children with SLI. Since conversation in the play context does not have an explicit structure, children create their own structure through interaction and activity, and not necessarily through their LLF use. By contrast, literacy research shows that the language structure of storybook sharing experiences facilitates children's language and literacy learning (Whitehurst et al., 1994a). A comparison of children's LLF use in play and story contexts would begin to address the unique contribution of context for children with SLI and TDL.

In summary, although there is preliminary evidence to suggest that young children with TDL use LLFs in storybook sharing and play contexts, it is not known whether these micro-level factors of linguistic specificity characterize the conversational skills in preschool children across contexts. This is an especially important area that requires more research with children who have typically- and atypically-developing language skills, since the emphasis of early childhood programs is on the development of language and emergent literacy acquisition. This also is important since children, including those with SLI experience difficulties in this area of language development (Justice, Invernizzi, & Meier, 2002; Raab & Carl, 2004; Smith, Warren, Yoder, & Feurer, 2004).

#### The Current Study

The purpose of the study was to assess linguistic specificity in preschool age children who were identified with SLI and TDL, through their use of specific micro-level linguistic features, namely LLFs in play and storybook sharing contexts with their mothers. To determine the extent to which these groups of preschool age children

differed in their production of LLFs, I compared children's language in play and story book sharing contexts for LLF rate of use per utterance.

Presumably, young children's development of micro-level LLFs occurs through a variety of language-related conditions, in which they gain syntactic and semantic knowledge. For most children, preschool programs often focus on language learning experiences that target vocabulary and syntax skills through play and narrative contexts (Justice, 2004; Kaderavek & Justice, 2004; Nathan, 2002). During children's preschool years, especially between the ages of four and five years, educational emphasis is on the use of language for socialization with peers and adults (Bredekamp & Copple, 1997). Thus, preschool age children are expected to use increasingly specific utterances in a variety of communicative contexts.

#### *Rationale*

The rationale for an examination of micro-level LLF use in conversational discourse is that it informs our knowledge on this topic for preschool age children who have SLI and TDL. We know that children with TDL develop specific and complex semantic and syntactic forms in their production of linguistically specific discourse in conversational contexts. We do not have information on how the context affects young children's production of linguistically specific discourse. We have even more limited information on the relationship between context and LLF use for children with SLI. A finding of group difference could suggest a more sensitive approach to assessment of LLF use for children who have atypical language development. Additionally, it has never been established whether there are differences among preschool age children with and without SLI in LLF use across contexts.

*Emergent literacy practices.* Another reason for examination of LLF use in preschool age children is that it could inform emergent literacy practice with preschool age children, including those children with SLI. Information on the relative contribution of context to LLF use could support intervention, insofar as it provides evidence for the ways in which context is associated with children's use of LLFs in conversational settings. In emergent literacy instruction, information on the role of context in children's LLF use could guide practice with children who struggle in this area of language production. For instance, Justice and Kaderavek (2004) developed the embedded-explicit (EE) model of literacy instruction to meet the needs of many at-risk children who participate in preschool programs. At-risk preschoolers often include children with SLI, children from low-income families, and children who have a developmental delay. The EE orientation to emergent literacy involves teaching basic skills identified through research, which include phonological awareness, print awareness, print concepts, and LLF use. In this model of literacy skill instruction, LLF use is targeted in both EE intervention contexts. The longitudinal implications of studies that feature EE interventions contribute positively toward emergent literacy, indicating their positive contribution to children's reading outcomes (see studies by Frijters, Barron, & Brunello, 2000, and Kaderavek & Justice, 2002). However, we do not currently know to what extent children use these features in spontaneous conversational contexts, or whether LLF use in early childhood differentiates children with SLI and TDL in conversational contexts.

*Research on children with SLI.* The third rationale for this study is that the findings have implications for research in the area of emergent literacy intervention.



Preliminary evidence indicates that children with TDL use LLFs to some extent in their conversational discourse, and that linguistic specificity through LLF use is important to other areas of child development. However, we do not know the extent to which children with SLI vary from those with TDL in different contexts. A finding of group difference due to context would have implications for intervention research with children who have SLI.

The few studies in which researchers compare specific language feature use in children with and without SLI examine only one or two of the features of the LLF composite. This research is limited to contexts of conversation in laboratory settings, or modified clinic settings with examiners, lessening the likelihood that results generalize to naturalistic settings such as conversational contexts with caregivers (Smith et al., 2004). Conversely, we have inaccurate data on children's development of linguistic skills due to limitations in data collection and measurement methods with children with SLI. Naturalistic contexts such as toy play tend to underestimate semantic and syntactic skills in children with SLI. This is because commonly used measures such as type-token-ratio (TTR) and number of different words (NDW) used alone, do not provide detailed information on the relative strengths and weaknesses in semantics and syntax, which children with SLI have in each of these domains of language production (Botting, 2002; Boynton-Hauerwas & Stone, 2000; Greenhalgh, 1999).

In summary, although children with SLI may have deficient oral language production, we do not know how these children differ from preschool age children with TDL in their use of LLFs. Additionally, our knowledge of micro-level linguistic specificity through LLF use in young children is limited to assessment of language

production in either elicited narrative or peer-dyadic play contexts. Thus, we currently do not know the extent to which context contributes to children's micro-level LLF use, for either children with TDL or SLI.

### *Research Questions*

Thus, the purpose of this investigation was to examine the relationship between context and language group on preschool age children's production of LLFs, which was assessed through their rate of use during play and storybook sharing contexts with mothers. Specifically, the research questions were:

1. Were there differences in LLF rate between children with SLI and TDL in play and storybook sharing contexts?
2. Were there differences in rate of use on LLF dimensions of complex elaborated noun phrase (CENP), simple elaborated noun phrase (SENP), adverb (ADV), conjunction (CONJ), and mental and linguistic verb (MLV) use, between children with SLI and TDL in play and storybook sharing contexts?

## CHAPTER TWO

### Review of the Literature

#### *Overview*

This chapter is organized into five sections. The first section addresses theoretical perspectives on LLF use in early childhood. The second section provides two models for the development of LLF use. The third section addresses issues related to context and outcome measures used to characterize LLF use in early childhood development. The fourth section presents information on young children with SLI, to include information on the definition and etiology of SLI, as well as the problems related to LLF use for these children. The final section of the chapter provides a summary of the gaps in the extant research regarding our knowledge of LLF use in early childhood.

#### Theoretical Perspectives That Inform Linguistic Specificity

Various models and theories contribute to an explanation of the process of children's language development in terms of linguistic specificity and in their increased use of particular linguistic features. Cognitive and linguistic theories of development establish the significance of linguistic specificity and its contribution to children's development of cognitive and social communication skills. Features of these perspectives include children's activities in symbolic representation, assimilation and accommodation, schema formation, and social participation, all of which influence development of linguistic, cognitive, and social skills, and theoretically, children's development of linguistic specificity.

#### *Piagetian Theory*

A Piagetian perspective on children's cognitive and linguistic skill development emphasizes the role of mental representation. Children's shift from symbolic to ideational forms of representation through language use is closely associated with their LLF use. In Piaget's (1926, 1963) preoperational, symbolic, and formal operations stages, children use increasingly sophisticated and complex language features to represent symbolic and abstract ideas. Pellegrini (1985) uses Piagetian theory to describe how children transition from symbolic to ideational stages of representational thought, in which they increasingly rely on LLFs in their conversations in play contexts. According to Pellegrini, young children's LLF use reflects their increased mental representation of events and objects. For instance, children in a preoperational stage of development use symbols or objects to represent reality (e.g., a child might pretend a doll is a baby). As children progress from preoperational into more advanced symbolic stages of development, their object representations become ideational (e.g., the child pretends to be a baby), and they use LLFs such as mental and linguistic verbs, temporal and causal conjunctions, and elaborated noun-phrases to convey their ideas in symbolic play.

According to Piagetian theory, children's linguistic specificity also helps them assimilate and accommodate information from the environment. As children acquire and integrate information to form increasingly sophisticated mental representations, they rely on increasingly specific and complex language features. Researchers examining children's LLF use in play contexts have found that they use higher rates of these features in ideational, symbolic play as contrasted with constructive or solitary object play (Culatta, 1994; Pellegrini, Galda, Bartini, & Charak, 1998). Van Oers (1998) suggests that children's use of LLFs might be linked to their development of meaningful

abstract thinking or the ability to recontextualize previously experienced events, since they can describe temporal and sequential information through LLFs such as conjunctive phrases.

*Schema theory.* Schema theory informs the current discussion of linguistic specificity, with respect to children's coordinated development of their linguistic and cognitive structures. In this perspective, which is based on Piagetian cognitive stage theory, there is a coordinated system of cognitive and linguistic structures that children acquire sequentially. Schemata are the underlying cognitive and linguistic structures that children develop as they progress from concrete operational thought to formal operational thought. For instance, during concrete operational stages of schema development, children use labels and references, and their utterances contain simple noun- and verb-phrases. As children progress to the formal operational stages of causal reasoning, their utterances become more specific and include linguistic features such as conjunctive phrases and as well as elaborated noun- and verb-phrases. According to a schematic perspective of linguistic development, children develop skills through the use of increasingly specific and elaborated features in social and linguistic interactions, in which they adjust their existing mental schema to meet the demands of their environment.

*Script theory.* Script theory is a variation of schema theory that also informs the development of linguistic specificity. Script theorists suggest that children's mental schemata are, in fact, a repertoire of linguistic scripts with particular features (Schank & Abelson, 1977). As children experience events, they develop increasingly specific and complex linguistic structures, and in turn, increasingly complex and elaborated scripts. Structural narrative analysis techniques are based on script and schema theories, and will

be discussed further in considering assessment of linguistic specificity through structural analysis of language variables.

### *Vygotskian Theory*

Vygotskian theory informs this discussion of children's LLF use in that children experience and use increasingly specific and complex language features through their symbolic interactions. Vygotskian theory states that children develop in linguistic, cognitive, and social domains through their interaction with their environment (1967). Children's optimal learning environment is called their zone of proximal development (ZPD), and is characterized by the input they receive as being at or above their own ability level. Pellegrini's (1985) model is an application of Vygotskian social interaction theory. This model provides an explanation of how children come to use LLFs to meet the demands of their environment. Pellegrini characterizes children's LLF use as their linguistic resolution between two opposing forces of "wish fulfillment (e.g., fantasy) and rule-government" in meeting the conventional demands of the environment (Pellegrini, 1985, p. 82; Pellegrini & Galda, 1998, p. 69). Thus, Pellegrini contends that symbolic play contexts are in the child's ZPD for language, social, and cognitive development, since they allow the child to function in this "wish fulfillment" stage. Pellegrini's evidence is based on the finding that preschool age children understand and use linguistically specific features such as noun phrases, conjunctive clauses, adverbs, and mental and linguistic verbs most reliably in symbolic play contexts with peers. Thus, the context of symbolic play is critically linked to children's linguistic specificity in their use of LLFs. Their LLF use presumably supports their symbolic interactions and is linked to

concrete objects in the environment, as well as to more abstract and socially mediated symbols.

*Social-cognitive perspective.* Social-cognitive perspective informs LLF use in preschool age children with SLI and TDL. This perspective draws on Vygotskian theory to illustrate how children's LLF use is related to their development of social skills (Rubin, Fein, & Vandenberg, 1983; Smilansky, 1968). The Smilansky-Parten Matrix illustrates the relationship between children's development of social and language skills such as LLFs. Rubin and colleagues' (1983) apply Smilansky's (1968) play contexts (e.g., functional/preoperational, constructive, dramatic/symbolic) and Parten's (1932) continuum of social participation (i.e., solitary, parallel, and interactive) to characterize relationships among linguistic, social, and play factors in early childhood. Pellegrini (1985), and Pellegrini and Galda (1998, p. 60) apply Rubin et al.'s (1983) model to explain the relationship between LLF use and various play contexts, in which LLF use in the play context of dramatic/symbolic play is most highly associated with the interactive type of social participation, as compared to parallel or solitary types of social participation, which are not associated with LLF use. Pellegrini (1985) reports significant inter-correlations ranging from .69 to .86 between symbolic play, interactive social participation, and LLF use among peer dyads with TDL.

#### *Slobin's Theory of Language*

Slobin's (1969) theory of language identifies universals of grammatical development in children from a cross-cultural perspective. Slobin's evidence comes from identification of cross-linguistic similarities across English (Caucasian and African-American low and middle SES groups), German, Russian, Finnish, Samoan, and Luo.

While accounting for cultural and linguistic variations of languages, as well as differences in the speech input to the child, Slobin's theory gains support from the cross-linguistic uniformity in which children develop in their stages of language development. Further, Slobin's theory of language universals identifies structures at various stages of development from babbling, to single-word utterances, to two-word utterances. At the two-word stage, structural and semantic characteristics appear to be universal across languages, which Slobin suggests is the maturation of a language acquisition device. This work suggests structural and semantic universals across languages in children's development of linguistic specificity.

Slobin's (1988) most recent work on this theory of language identifies general strategies for language acquisition, along with a universal characterization of children's development of semantic, phonological, and syntactic skills. This universal characterization of children's language development across domains helps to interpret findings on the development of morphological paradigms, canonical sentence forms, placement of operators, patterns of over- and under-extension of meaning, and grammatical morphemes, insofar as these structures provide evidence that linguistic forms and constructions have a long developmental history closely tied to discourse functions across cultures. In this way, development of LLFs could be considered within Slobin's universal characterization of children's development of syntactic and semantic skills.

### *Summary*

Cognitive and linguistic theories inform the topic of LLF use in child development. These theories emphasize the role of functional and structural aspects of



language use, both of which contribute to the current discussion of how children develop linguistic specificity. In the next section, models of linguistic specificity are presented, as they provide further support for assessment of linguistic specificity in early childhood discourse through LLF use.

### Models of Linguistic Specificity Development

There are two models that account for children's ability to use a combination of micro- and macro-level language features in a variety of contexts. Micro-level language features refer to the internal features of utterances; and macro-features are the unit of analysis at the sentence or utterance level. In the first model, linguistic specificity is characterized as children's use of semantically contingent utterances with caregivers (Ninio & Bruner, 1973; Snow, 1977). In the second model, an oral-literate continuum, linguistic specificity is defined as children's development of increasingly specific language skills through participation in discourse events such as play and literacy contexts (Kavanaugh, 1991). These models will be described further, as they contribute to understanding LLF use in the current investigation.

#### *Semantic Contingencies*

Linguistic specificity that is based on a model of semantically contingent utterances emphasizes the quality of the interaction between discourse participants. The proponents of this model suggest that children develop increasingly specific language (i.e., LLFs) through naturally occurring facilitation strategies with adults. These strategies include questioning, imitation, expanding, recasting, clarifying, correcting, and extending based on the child's utterances (Donohue & Pearl, 1995). A model for LLF use through semantic contingencies is based on the notion that these strategies naturally

scaffold the child to increased use of specific language features. Thus, children's utterances are interrelated with their conversational partner's, whose semantically contingent responses provide optimal facilitation (Ninio & Bruner, 1973; Snow, 1989; Vygotsky, 1978).

Children's development of linguistic specificity through semantically contingent verbal exchanges has been researched extensively over the past three decades (Donohue & Pearl, 1995; Hoff & Naigles, 2002; Ninio & Bruner, 1973; Ninio & Snow, 1988). Snow (1983) suggests that semantically contingent conversation is important in child language development because it facilitates: (a) overall language acquisition (Clark-Stewart, 1973; Cross, 1976); (b) communicatively useful language learning; (c) selective imitation to maintain conversation (Peters, 1983); and (d) negotiation of meaning with conversational partner. Semantically contingent conversation is significant in its relationship to the quality of conversational exchange between parents and their children, and children's IQ in early childhood (Wells, 1985).

Findings by Donohue and Pearl (1995) indicate that naturally occurring semantically contingent discourse between mothers and children is related to children's semantic diversity, as measured by children's vocabulary acquisition. Findings by Hoff and Naigles (2002) indicate preschool age children first use semantically contingent labels, and that they advance in using linguistically specific utterances containing LLFs, such as elaborated noun and verb phrases. Ultimately, children's increased LLF use supports their production of complex utterances in conversations, in which they provide interpretations of events, people, and places. For instance, in children's interpretations of events and ideas, they use LLFs such as mental and linguistic verbs to identify emotional

states, motives, and plans, as well as temporal and causal conjunctions and relative pronouns to convey relationships among actions and events.

In addition, children have been found to use increasingly complex syntax and semantic forms to convey temporal and sequential information in semantically contingent conversations (Bradshaw, Hoffman, & Norris, 1998; Koppenhaver, Erickson, & Skotko, 2001). These researchers identify LLFs such as noun and verb phrases, and temporal and causal conjunctions as the specific linguistic features that enable children to move from labeling to interpreting information in conversational contexts. Bradshaw et al. (1998) characterize preschool age children's development of semantic contingencies through levels of labeling specificity in their conversations with their mothers, in which children use successively more LLFs. At the first level of label production, children use predominantly noun phrases. In their next level of providing descriptions, children use noun phrases, adjectives, verbs, and verb phrases. In their third level of development, children provide interpretations of actions and events, in which they use temporal and causal conjunctions and relative pronouns to label relationships among actions and events. In children's descriptions of emotional states, motives, and plans, they use mental and linguistic verbs.

*Children with SLI.* For young children with SLI, naturalistic language interventions promote semantic and syntactic organization of preschoolers' language systems through strategies derived from studies of parent-child conversational patterns (Bradshaw et al., 1998; Fey, Cleave, Long, & Hughes, 1993; Raab & Carl, 2004; Warren & Yoder, 2002). Bradshaw et al. (1998) characterize these scaffolding devices as dependent and independent strategies, in which one partner's response is contingent upon

the other's utterance. However, dependent scaffolds are distinct from independent ones since they do not extend beyond the partner's utterance. These utterances are dependent upon what the speaker previously has said. Examples of dependent scaffolds in semantically contingent utterances include the use of cloze, modeling, and expansion techniques. Independent scaffolds are those that are independent of the partner's utterance, and extend beyond the partner's utterance to include interpretations, in which syntactic features are associated with conveying information about actions and events. Bellon, Ogletree, and Harn (2000) identify independent scaffolding techniques as cloze, binary choice, constituent questions, and expansions. Other researchers identify cloze and expansion techniques as overlapping in that both can be used dependently and independently by partners to scaffold conversations in semantically contingent discourse (Norris & Hoffman, 1990; Snow, 1983). Nonetheless, these techniques differ in the interface between independent and dependent scaffolds in semantically contingent conversations. This variation in the range of scaffolds used in conversational discourse explicates the role of the conversational partner in facilitating specific language feature use in children, particularly those who may have language difficulties.

#### *Oral-to-Literate Language Continuum*

Another model for linguistic specificity development is the oral-to-literate continuum. This model characterizes children's progression from the use of oral-to-literate, or written language, in which they use increasingly specific linguistic features in various contexts. This continuum provides a description of the relationships among context and linguistic aspects of children's development (Pellegrini, 1985; Rubin et al., 1983). In Pellegrini and Galda's (1998) application of the oral-to-literate continuum,

their developmental-pathway-to-literacy model illustrates the notion of a bi-directional relationship between children's development of literacy and language skills across contexts such as play and storybook sharing. However, studies by Pellegrini (1985) and Rubin et al. (1983) involve child-child play dyads, and thus cannot be compared directly to the current study of LLF use and context in children with SLI and TDL, in which maternal caregivers are a constant across contexts with their children. Nonetheless, according to these researchers and others (see Sulzby, 1985 for a review), children progress from using oral to literate language features as they develop increasingly sophisticated mental representations and symbolic thought, which is facilitated through particular factors such as the context of language use.

Emergent literacy researchers use an oral-to-literate continuum to describe the shift from children's use of oral to written registers through stages of literacy-related language skills with adults (Sulzby, 1983; 1986). In this way, features such as LLFs are the specific linguistic markers that can be used across oral and written language domains (Snow, 1983; Sulzby, 1986). In application of the oral-to-literate continuum with school-age populations, the emergent literacy view on development of LLF use is that it represents the "bridge" between oral and written language (Dickinson & McCabe, 1991; Kavanaugh, 1991). In this particular view, structural linguistic characteristics differentiate children's development in oral and written language domains (Paul, 2002; Scott, 2004).

Scott (1994; 1995) contrasts the characteristics of oral and literate, or written language to describe children's development of semantic diversity and syntactic knowledge. This application of the oral-to-literate continuum shows relationships

between children’s oral and written language development in terms of specificity with which they use features to express relationships among ideas (e.g., coordinating and subordinating conjunctions); open class-content words; noun phrases with attributive adjectives, relative clauses, and prepositional phrases. Paul (2002) uses Scott’s characterization of the differences between oral and written language to describe language development according to topic, function, and structural characteristics of each. Functionally, oral language is associated with contextualization and familiarity, whereas written language is associated with decontextualization and unfamiliarity. Structurally, oral language is associated with simpler syntax, whereas written language is associated with more complex syntactic structure. Although young children use both common and rare words in oral language, semantic skill is marked by repetition of high frequency vocabulary, whereas written language is marked by semantic diversity and specificity. Figure 1 adapts Paul’s characterization of the differences between oral and written language to present a summary of the characteristics of oral and written language, according to topic, function, and structural characteristics.

*Figure 1. Oral and written language differences*

<i>Language</i>	<i>Topic</i>	<i>Function</i>	<i>Structure</i>
Oral language	Familiar	Contextualized	Simpler syntax Repetitive/high frequency vocabulary
Written language	Unfamiliar	Decontextualized	More complex syntax Semantic diversity

(Adapted from Paul, 2001; Scott, 1994, 1995)

*Decontextualized language skill.* The continuum from oral-to-literate language use characterizes children’s development of specific language registers in African-American English, in which they use language features such as noun phrases,

conjunctions, and adverbs (i.e., LLFs) in less familiar or unknown contexts (i.e., school), as compared to familiar (i.e., home) (Charity, Scarborough, & Griffin, 2004; Heath, 1983). In this application, researchers describe how children transition from familiar oral language communication events, to unfamiliar forms of classroom-based oral and written discourse (Paul, 2002, p. 396). Accordingly, children are exposed to specific features such as LLFs in events such as story sharing and symbolic play contexts with increasing shift to less familiar contexts such as school based tasks (Pellegrini & Galda, 1998). Thus, children's language production in literacy contexts such as storybook sharing and narration is typically characterized as their first experience with explicit (Dickinson & Snow, 1987) and decontextualized (Snow, 1991b) language.

Sociolinguists tend to use an oral-to-literate model to explain children's attainment of school-based literacy skills, which is based on systematic exposure to, and teaching of linguistically specific conventions such as LLFs. Pellegrini and Galda (1998) identify LLF use as one aspect of children's development of "school based literacy", in which they associate specific linguistic features with particular contexts of use (p.11). Westby (1994), in her work with school age populations with diverse language abilities, uses an oral-to-literate continuum of development to describe children's attainment of school-based literacy skills. Westby examines LLF use in school-age children across a variety of academic contexts (e.g., language arts, science, and mathematics). She indicates differences in function, topic, and structure across children's literate and oral language development, which significantly differentiate high-performing and low-performing students (also see Pellegrini & Galda, 1998, pp. 120-155 for a review). Wallach and Butler (1994) suggest that there are associations between academic

performance and linguistic specificity in LLF use with school age children. They indicate that children who effectively use devices such as LLFs early on in their academic careers are more likely to be rewarded, encouraged, and motivated in school than children who do not. According to these authors, children meet teachers' expectations more often than children who do not and characterize students who use LLFs in their communication as children "who talk like books" (pp. 5-6).

### Linguistic Specificity and Contextual Factors

According to Dickinson and McCabe (1991), there are contextual factors, which can be identified as "facilitating mechanisms" of linguistically specific discourse between caregivers and children. These facilitating mechanisms of adult-child discourse include factors of genre, setting, and dialogic partner. Each of these factors will be discussed, as it is associated with LLF use in different contexts for children with TDL and SLI. In this study, the dialogic partner is incorporated as a constant across contexts with children who have SLI and TDL.

#### *Discourse Genre*

Various genres of discourse are important to children's language development and have been identified as ideal mechanisms for language learning in early childhood (Ninio & Bruner, 1978). In Nelson's (1989) transactional model of language development, children develop skills through social and linguistic interaction in conversation.

*Conversation.* Conversational discourse enables the transmission of specific social-pragmatic and lexical-syntactic data between participants (Hoff & Naigles, 2002). Through conversational exchange, linguistic and social-pragmatic information are typically transmitted at an optimal learning level, which is at or above the language level



of the learner (Donohue & Pearl, 1995; Vygotsky, 1978). This transactional approach, which is used by semantic contingency and oral-to-literate models, incorporates biological contributions to language development and social aspects of the language acquisition process in children's development of specific language skills such as LLF production.

*Narration.* Narration is a discourse genre in which information is conveyed during activities such as story retelling and elicitation. Narrative discourse, which shares elements of conversational discourse, is reported to facilitate explanations (Dickinson & McCabe, 2001). Shapiro and Hudson (1991) find children's conversational narratives to be more sophisticated in plot development than conversations, because children produce "proto-story features" in their oral narratives. These proto-story features are macro-level labels and comments, which follow the action of the story, also are suggestive of children's early story grammar units (Sulzby, 1985). However, children's use of these macro-level proto-features does not mark relationships among events (interpretations).

Since the genre of narrative discourse has been identified as children's earliest form of decontextualized language experience, it is reasonable to hypothesize that they would be more likely to depend on LLFs such as elaborated noun and verb phrases, conjunctions, and adverbs to communicate information outside of the immediate context of the linguistic interaction. In narrative discourse, children's increased use of elaborated noun and verb phrases and conjunctive clauses (i.e., LLFs) is a hallmark of their competence in this genre of discourse, which they develop through the mode of conversation as they relate events and ideas to their conversational partner (Greenhalgh & Strong, 2001). Thus, children's narrative language competence is considered an

important aspect of literacy and academic skill development (Sulzby, 1986). LLFs are essential to children's narrative competence, as their initial experiences with producing specific LLFs are in story and event retelling.

### *Setting*

In addition to the role of discourse genre in linguistic specificity, another factor is the setting in which the discourse occurs. Settings such as mealtime and storybook sharing facilitate LLF use among participants. In these settings there is only one activity of focus during the interaction, and language use sustains the focus (Dickinson & McCabe, 1991). In discourse settings such as mealtime conversations and car rides, children's utterances are characterized as propositions that maintain topics and provide explanations (see Preece, 1991, for a review). Children's linguistic production in these settings contrasts with their linguistic behavior in solitary settings, in which they use fewer optimal forms of communication such as commands and object-centered interactions. In addition to the influence of setting on children's use of utterances, D'Odorico and Franco (1985) suggest that in free play and joint play settings which involve peer-interaction and symbolic play, young children produce increased and more specific micro-features such as vocabulary forms than in solitary play.

*Storybook sharing.* Storybook sharing, which typically involves conversational discourse about narrative elements, tends to facilitate children's LLF use. In storybook sharing activities, children engage in discussion about print, as well as causality and relationships, and vocabulary use (Wells, 1985). There is much literature on the storybook sharing context of language use (Luciarelllo & Nelson, 1987). Storybook sharing is a conversational task between parent and child, which is viewed both as a

conversational routine (Ninio & Bruner, 1978) and as a social-interaction event (Snow, 1991). Storybook sharing activities also are considered to be “literacy socializations”, since children develop ideas about how written language works before learning to decode print through social interaction (Dickinson & Snow, 1987). In early literacy activities such as storybook reading and retelling, children also gain exposure to LLFs from a combination of input, including oral and/or print media (Dickinson & McCabe, 2001; Justice & Ezell, 2001; 2002).

Researchers who are concerned with children’s emergent literacy development study the relationship between storybook sharing and factors of the interaction between caregivers and children. This research is focused on factors surrounding children’s shift from the use of specific linguistic features in conversational play discourse to their use in literacy contexts, such as storybook reading. Kaderavek and Sulzby (2000b) define and distinguish “emergent storybook reading” from oral discourse. In emergent storybook reading tasks, children read a book and their speech is analyzed for features of written language. This is reported to be a helpful technique for understanding the way children progress in their use of oral and literate strategies. Sulzby (1986) provides a summary of children’s oral-to-literate progression in which she examined literate language registers/codes to identify 11 levels of emergent reading. Notably, on this oral-to-literate continuum, there is a developmental shift from contextualized, oral language production to written decontextualized registers, which are contained in the wording of the discourse.

*Storybook sharing and children with disabilities.* There have been a few studies on storybook sharing with children who have disabilities, including those with SLI. In one study, Koppenhaver et al. (2001) examined spontaneous speech production through

storybook sharing in young children with developmental delay (DD). They examined utterance-level communication acts in children with Rett Syndrome through labeling and commenting. The authors trained caregivers in communication facilitation techniques and found that these children's frequency of labeling and commenting increased.

In another study, Smith, Warren, Yoder, and Feurer (2004) examined context in teachers' use of naturalistic communication intervention practices with children with and without disabilities, ranging in age from 12 to 48 months. Children's diagnosed disabilities included developmental delays, autism, speech and language delays, hearing impairments, and various syndromes (e.g., Down syndrome, Rett syndrome). The authors found that teachers used descriptive talk strategies more than direct teaching interventions. The authors also reported that implementation of a direct teaching intervention was associated with a program's quality and the specialization of the training by staff members. This research had limitations in that it was not limited to either conversational context of storybook or play routine (i.e., it included snack and free play). Also, participants were heterogeneous in that they ranged in age and disability. Although this study provided information on the rate and type of input from the adult partner in a naturalistic setting with children who had disabilities, it did not include information on the micro-level variables associated with children's utterance-level production (Smith et al., 2004).

In studying specific language use in children with SLI, Kaderavek and Sulzby (2000b) examined contexts of young children's language use by comparing their production in two narrative "genres" (oral and written). This study provides a description of how children with SLI differ in specific language use in varying contexts, in which

context conditions of oral narrative and storybook retelling were counterbalanced for children with SLI and TDL. In this study, the authors compared children's production in contexts of oral and written story retelling in kindergarten age children with and without SLI. These findings showed that children with SLI had significantly weaker micro- and macro-level language skills in the oral narrative context than in the emergent reading context. In particular, children with SLI produced half as much language, as measured by MLU in oral narrative and emergent readings than their peers with TDL. However, a comparison of MLU between children with TDL and SLI across contexts showed that children with SLI produced an equivalent amount of connected discourse within the "more written language environment" of the emergent reading context. Although these findings indicate that children are sensitive to register differences of oral and written language genres, the results do not address whether this sensitivity exists across conversational contexts of play and storybook sharing. In comparing contexts of toy play with storybook sharing, Kaderavek and Sulzby found toy play to be more supportive of verbal interaction than storybook sharing context for children with SLI.

In all of these facilitating mechanisms of linguistic specificity, the adult plays a critical role as the partner with the child. The adult-child conversation given the facilitating mechanisms of setting, discourse, and activity (e.g., storybook sharing) has a facilitating effect that is not likely to occur in child-child interactions. The following section presents information on the type of input provided by the adult dialogic partner.

#### *Partner Linguistic Input*

In considering the contextual factors of discourse genre and setting, the dialogic partner plays a critical role in children's linguistic specificity. Since the majority of the

research has been aimed at caregiver-child interaction, and since the focus of the current study is on children's interactions with their mothers, the scope of this summary is limited to consideration of the mother as the dialogic partner.

*Dialogic reading.* A major goal of dialogic reading is to make children active participants in shared picture book reading rather than passive listeners to stories being read by adults (Arnold & Whitehurst, 1994). One of the principal mechanisms for achieving this is through input from the dialogic partner, in the form of questions. Whitehurst and colleagues identified five types of language prompts (CROWD) that dialogic reading partners pose to children during book sharing activities to facilitate production (1994a). These questions include (a) *completion prompts* (e.g., fill-in-the-blank questions, such as "Something went bump, and that made us \_\_\_\_\_?"); (b) *recall prompts* (e.g., questions that require the children to remember aspects of a book such as, "Can you remember some things that happened to Lena when she went to school?"); (c) *open-ended prompts* (e.g., statements that encourage the child to respond in his or her own words such as, "I told about the last page, now it's your turn. You tell me about this page."); (d) *wh-prompts* (e.g., *what*, *where*, and *why* questions such as, "What's this called?"); and (e) *distancing prompts* (e.g., questions that require the child to relate the content of the book to aspects of life outside the book such as, "Did you ever play in the snow like Peter did? What did it feel like?").

Whitehurst, Falco, Lonigan, Fischel, DeBarsyshe, Valdez-Menchaca, and Caufield (1994c) trained parents to use the CROWD questioning strategies in conjunction with the acronym PEER, which was intended to help dialogic partners remember to embed the five types of facilitative utterances outlined above into interaction sequences

in which the adult *prompted* the child to respond to the book, *evaluated* the child's response, *expanded* the child's response by repeating and adding information to it, and encouraged the child to *repeat* the expanded utterance. The authors found that parents' use of these strategies was associated with children's language development.

*Facilitative strategies in play.* Researchers also have investigated the role of the input from the dialogic partner in conversational play context as well as in storybook sharing contexts. Similar to Whitehurst and colleagues' (Whitehurst et al., 1994a; Whitehurst, Epstein, Angell, Payne, Crone, & Fischel, 1994b) dialogic reading strategies, researchers have identified the types of input that the dialogic partner provides in conversational play to primarily consist of statements and questions (van Kleeck, 2004). Van Kleeck identifies these facilitative utterances as strategies of the mainstream dialogic partner. This construct includes the use of extra textual talk (e.g., use increasingly abstract language; frame toy/story sharing as unique context; tune to child's interests and experiences) and interactional strategies (e.g., semantic contingencies, prompt the child's verbal participation). Van Kleeck's construct is based on Whitehurst and his colleagues' work on input from the dialogic reading partner, as well as research conducted in conversational contexts with parents and children with and without SLI. Thus, van Kleeck's unifying construct indicates a definitive set of utterances, which caregivers from mainstream cultural backgrounds use with their children to facilitate language production. This construct provides rationale for assumption of some homogeneity across parents in the current study, since they have a similar socioeconomic background. The studies below operationalize van Kleeck's construct by providing detailed information on the function and intention of caregivers' utterances across contexts.

*Facilitative strategies in play and story.* Dale and Crain-Thoreson (1996) studied contributions of the dialogic partner. These authors compared parental input in storybook sharing and conversational contexts with children who had language delays. In the storybook-sharing context, parents used eight facilitative utterances with their children. The types of questions included (a) yes/no; (b) what/who; (c) open-ended; and (d) follow up questions. The types of statements were (a) expansions; (b) imitations; (c) direct corrections of form; and (d) information talk. Mothers' use of expansions and information talk statements and what/who and follow-up question types was strongly associated with children's verbal responses, questions, and imitations about the story/topic, as well as their nonverbal attending (looking at mother or book). Weaker associations were identified between mothers' use of statements of direct corrections of children's language form and imitations, and mothers' use of yes/no and open-ended question types and children's verbal and nonverbal responses.

In a separate study, Crain-Thoreson (1999) identified a set of questions and statements parents used with their children with language delays to enhance linguistic performance in storybook sharing contexts. These were statements of (a) acknowledgement; (b) information; (c) correction; (d) expansion; (e) praise; and (f) modeling. Facilitative questioning techniques were identified as (a) yes/no; (b) what/who; and (c) open-ended types.

*Speech act use.* Conti-Ramsden and Friel-Patti (1983) described parental input through their use of speech acts, which the authors defined as the function or intention of the caregiver's utterance during conversation with their child. They identified five types of speech acts in caregivers' utterances during conversational play. The first is the use of



*requestives*, which are statements that demand a response from the child. Requestives take the form of a: (a) choice question (e.g., yes/no); (b) product question (e.g., who/what); or (c) process question (e.g., why/how). The second type, *assertive* speech acts describe observable aspects of the environment and can take the form of: (a) identification; (b) description; (c) explanation; or (d) expansion. The third speech act type, *directives* are attempts to get the listener to do something. Directive speech acts are: (a) direct requests; (b) indirect requests; and (c) indirect questions. The fourth type of speech act, *responsives* respond to a child's initiation, and consist of: (a) product answer (e.g., what's that – that's a XX); (b) process answer (e.g., why won't it go – because it's broken); (c) acknowledgement (e.g., I like that—I know you do). The fifth type of speech acts is *regulatives*, which function to maintain conversational flow. Regulative speech acts consist of the following types: (a) attention getter (e.g., look at it go); (b) repetition (it's a bear—it's a bear); and (c) expansion (it's a bear—it's a brown bear).

In a later study involving maternal speech act use with children with SLI and TDL, Conti-Ramsden and Hutcheson (1995) identified mothers' utterance types in their comparison between mothers' utterances with their children with SLI and younger siblings with TDL in conversational contexts. These authors identified the following types of maternal input within the framework of the discourse function to include behaviors related to contingency and breakdown. The mothers' utterances were coded as (a) initiations; (b) comments; (c) imitations; (d) recasts; (e) clarifications; (f) acknowledgements; (g) continuations; and (h) expansions. These findings showed that the function of maternal language with their children with TDL was generally responsive

and acknowledging; while the function of maternal language with siblings with SLI was primarily assertive and directive. The interpretation of the maternal input with children with SLI was that the mothers put forth effort to actively engage their child with SLI in dialogue and maintain interaction. Also, the assertive and directive function of input of the mother of the child with SLI was likely a consequence of interacting with a passive conversational partner.

*Summary.* Factors of discourse genre, setting, and input from the dialogic partner contribute to children's linguistic specificity. There is some evidence of variation in LLF related skills among children from different language groups in narrative and play contexts. Since it is difficult to determine the significance of the context due to differences between the two genres of narrative elicitation and conversation, the storybook sharing context provides a naturalistic environment in which to examine aspects of conversational discourse in comparison to discourse produced in play context. Although we know that for children who are TDL and SLI, there are differences in LLF use in conversational narrative tasks involving elicitation, we do not know the extent to which children from a different language group (i.e., children with SLI) vary in LLF use in conversational discourse skills by context of play and storybook sharing. The next section provides a description of the measures used by researchers to assess LLF use in children with SLI and TDL, across play and narrative contexts.

#### Measurement of LLF Use

##### *Subskills of LLF Use*

Language development is a complex process relying on children's prior experiences, background knowledge, and many other abilities. The development of

linguistically specificity through LLF use requires mastery of many subskills (Gillam & Johnston, 1992; Peterson & McCabe, 1994). The subskills needed to develop linguistic specificity in LLF use include semantic diversity and syntactic knowledge (Greenhalgh, 1999; Greenhalgh & Strong, 2001). Development of these subskills serves as an important step towards proficiency in LLF use.

*Semantic diversity.* Semantic diversity is associated with oral language development. According to Greenhalgh's (1999) review of the literature on semantic diversity in children with and without SLI, across 42 studies, the mean correlation between semantic diversity and later receptive and expressive language development is .67. Paul and Smith (1993) report correlations of .60 to .86 between semantic diversity, as measured through MLU and children's use of cohesive ties, *Clinical Evaluation of Language Fundamentals, Preschool Version (CELF-P)* performance on vocabulary measures, and narrative skills in preschool age and kindergarten age children with normal, impaired, and late-developing language (Semel & Wiig, 1980). Semantic diversity is often used to measure oral language performance in early childhood populations (Watkins, Kelly, Harkers, & Hollis, 1995).

Semantic diversity also is correlated with literacy development in awareness of words in preschool (Justice & Ezell, 2001; Roth, Cooper, & Speece, 2002). Justice and Kaderavek (2002) suggest that semantic diversity might be an indicator of general knowledge about books and reading, as well as specific word knowledge. Typically, children enter preschool knowing a considerable amount of vocabulary (Chaney, 1992; Van der Lely & Howard, 1993). Also, children as young as three years old can elaborate and use causal and temporal words and phrases (Klee, 1992). Young children often are

able to identify nouns and verbs as early as age four, following a general pattern of understanding descriptive and elaborative words for nouns and verbs, before learning causal and connective vocabulary such as conjunctions and adverbs (Nelson, 1991). These natural markers of semantic diversity may be absent or lacking in children with SLI (Johnston & Kamhi, 1984)

Semantic diversity is important in the acquisition of literacy (Dickinson & McCabe, 2001). Although most studies of semantic diversity training indicate that an exclusive focus on teaching language features does not improve language skills, exposure to LLFs may be related to development of semantic diversity (Greenhalgh, 1999; Peterson & McCabe, 1987; 1994). Many researchers contend that children must be familiar with conjunctions, adverbs, adjectives, and verbs to be able to produce language in literacy contexts (Liles, 1993). However, without semantic diversity, which includes exposure to, and use of LLFs, children are unable to develop more sophisticated and specific language skills.

*Methodological issues.* Although we have considerable information about the development and importance of semantic diversity across the available studies, there is inconsistency in the manner in which semantic diversity has been measured. Some investigators use type-token ratio (TTR) to assess children's semantic diversity (Klee, 1992). Others suggest the number of different words (NDW) is a more accurate method of assessment in early childhood (Greenhalgh, 1999; Watkins et al., 1995). Children's mean length of utterance (MLU), in which the mean number of words or morphemes is calculated across utterances in a language sample, can be used to determine semantic diversity (Miller, 1981). MLU can be analyzed for micro-level markers such as cohesive

ties, as well as macro-level functional aspects of discourse such as references and propositions (Liles, Duffy, Merritt, & Purcell, 1995). Naturally, MLU by itself does not capture individual differences in semantic diversity across age, context and language ability. Thus, it is important to have a reliable and valid system for language feature analysis given the potential for a diverse range of linguistic features that might be present in a sample of discourse.

Most researchers use a subset of LLFs, involving noun or verb phrase use, conjunction use, or an overall measure of semantic diversity such as TTR, NDW, or MLU (Greenhalgh & Strong, 2001). The rationale for choosing a subset of LLFs is not explained although it may be related to the relative difficulty in use of specific features in early childhood. It could be due to the fact that certain features tend to “hang together” in macro-level forms of language. For instance, children’s rates of ENP and MLV use might be used as an index of their referencing, proposition use, and elaboration and story unit production (French, Luciarello, Seidman, & Nelson, 1985). Nonetheless, differing variable specification methods for assessment of semantic diversity contribute to the inconsistency in outcomes across the research findings in this area (Greenhalgh, 1999). Greenhalgh’s findings suggest that LLF use is associated with other measures of semantic diversity (i.e., MLU, TTR, and NDW) in narrative samples of school-age children with SLI and TDL.

*Syntactic knowledge.* Another subskill of LLF use is syntactic knowledge. Syntactic knowledge includes knowledge about the sentence structure and rule systems governing word-usage, or morphology. Researchers’ investigations focus on the relationship between syntactic knowledge and linguistic specificity development. This

research is based on foundation work on young children's development of syntactic structures in oral language (Brown, 1973; de Villiers & de Villiers, 1973; Hunt, 1970; Loban, 1976). Syntactic knowledge requires understanding of linguistic structures to convey information about abstract and conceptually related ideas (e.g., time, sequence, cause, and effect). Syntactic knowledge requires that children match linguistic structures to these abstract concepts.

Syntactic knowledge is associated with semantic diversity. Paul and Hernandez (1996) report correlations of .78 between syntactic knowledge and semantic diversity skills in children at the end of preschool, and .74 at the beginning of kindergarten. In children's language development, syntactic knowledge is related to their use of the following semantic forms: nouns, verbs, adjectives, and adverbs. For example, semantic forms of verb phrases involve syntactic knowledge of verb conjugation. Noun phrases are related to syntactic knowledge of plural and singular modifiers.

*Methodological issues.* Assessment of children's syntactic knowledge occurs in a variety of ways, though the key index of syntax is MLU (Huttenlocher et al., 2002; Miller, 1981). Other assessment methods include cloze procedures in which children are provided with a sentence missing a word and they must provide the matching syntactic structures (McCabe & Rollins, 1995). In other studies, researchers focus on LLF use of only one type of conjunction, such as the use of the connective "and" (Peterson & McCabe, 1987). Narrative language analysis is another way of assessing syntactic knowledge in particular language tasks (McCabe & Rollins, 1995; Peterson & McCabe, 1983). As with the measurement of semantic diversity, the variety of approaches used by researchers to measure syntactic knowledge may influence the findings on conclusions

about the relationships between children's development of syntactic knowledge and their LLF use (Greenhalgh, 1999; Klee, 1992; Liles et al., 1995; Peterson & McCabe, 1994).

*Summary.* The subskills of semantic diversity and syntactic knowledge are most commonly associated with linguistic specificity development in LLF use, whether measured through word-level identification or overall language elicitation procedures. It is possible that syntactic knowledge is more strongly correlated with LLF use than semantic diversity, since micro-level feature use of syntactic structures indicates a child's understanding of causal and temporal relationships more so than their semantic forms (Liles, 1993). However, because of the low expectation for syntactic maturity in preschool age children, syntactic knowledge by itself is not necessarily appropriate to assess in preschool age children (Halliday & Hasan, 1976; Hunt, 1970). Currently, syntactic structure and knowledge are most commonly investigated only in school age children's discourse (Heath, 1983). Additionally, syntactic knowledge is less frequently investigated in the presence of other variables. In almost every study of preschool language development, researchers investigate semantic diversity. Only a few studies include a measure of syntactic knowledge as a predictor of language development (Huttenlocher et al., 2002). Researchers tend to agree that syntactic knowledge is important to oral language development in receptive and expressive domains, and that semantic diversity facilitates syntactic knowledge. However, the nature of the relationship between semantic diversity, syntactic knowledge, and children's LLF use in various contexts is unknown. The variety of measures used to assess these subskills contributes to a lack of information on LLF use and its role in child language development.

### *Specification of Variables Through Structural Language Analysis*

An important aspect of LLF use is that it is related to children's first experiences with relaying information in contexts such as story and event retelling. Some language researchers contend that conversational contexts that involve storytelling, whether in clinic or home-based settings are the most valid and naturalistic for observing children's development of specific language features (Scott, 1994). Particularly in conversational narrative contexts, researchers identify structural characteristics of children's language development that are related to semantic diversity and syntactic knowledge (McCabe & Rollins, 1995; Roth & Spekman, 1986). Children's linguistic specificity through LLF use in narrative contexts is marked by their development of macro- and micro-level features. Furthermore, children's increased structural language knowledge reflects their sophistication in understanding and conveying information about events and ideas through linguistic forms. The LLF construct is supported by literature from the past two decades in which researchers identify structural language features as salient characteristics of linguistic specificity in children who are school-age and preschool-age. For instance, in conversational narrative contexts such as story retelling, researchers study children's macro-level language feature development in their production of complete story or information units. According to Shapiro and Hudson (1991), young children's use of these macro-level features is an important aspect of their narrative development and marks their earliest schema formation.

Labov and Waletzky (1967) describe linguistic specificity as children's development of macro-level units of a story schema (e.g., beginning, plot, climax, and ending). Children's achievement of a "high point" in their narrative production indicates



that they have integrated their schematic thinking with language structures. Stein and Glenn (1979) describe children's LLF use through the use of formal episode structure (episode for temporal or causal relationships). Stein and Glenn's research findings link children's development of macro-level story grammar units and their use of micro-level features such as cohesive conjunctions in which they pass through stages of micro- and macro-level LLF use (1979, 1982). These stages of children's LLF development reflect their sophistication in understanding and conveying information about events and ideas through language.

Applebee's (1978) stages of chaining delineate children's use of increasingly sophisticated language features for increased complexity. In Applebee's construct, as children develop in their structuring of complex and unfamiliar events, they use increasingly complex chains of embedded clauses to link events, to produce an ideal (i.e., adult) narrative structure by the age of six years. In Applebee's (1978) stages, children demonstrate narrative sophistication through their use of specific micro-level language features. In the first stage, "heaping", young children simply list what they remember without sensitivity to relationships among the language structures used. In contrast, the "adult" stage of narrative discourse is marked by the use of specific types of embedded clauses such as temporal, cohesive, and relational clauses and elaborated noun and verb phrases. Thus, a person's use of LLFs enables them to embed clausal structures to convey relationships among ideas, objects, and events.

All of the authors thus far presented (i.e., Applebee, 1978; Labov & Waletzky, 1967; Stein & Glenn, 1979) define linguistic specificity in narrative discourse primarily in terms of the structural organization of content as well as some recognition of speakers'

communicative intentions (e.g., evaluative comments and narrative reportability).

Halliday and Hasan (1976) have developed the most detailed and inclusive model of text coherence. It can be applied to the narrative story and to texts of other genres. According to Halliday and Hasan (1976) and Halliday (1990), children develop in their use of specific micro-level LLFs (i.e., cohesive ties) through their increased use of conjunctions, adverbs, and syntactic markers (also see Brown, 1973). According to these authors, texts can be distinguished, or defined, at two levels of linguistic specificity: a more global level that specifies obligatory genre specific rules, and a more local level of textual coherence.

*LLF use.* There are a few studies in which researchers assess children's linguistic specificity through level of LLF use. The LLF composite comprises elaborated noun phrases (ENP), mental and linguistic verbs (MLV), conjunctions (CONJ), and adverbs (ADV) (Justice & Kaderavek, 2004; Westby, 1994). These micro-level features have been used to assess semantic diversity and syntactic knowledge in school-age populations with and without SLI (Greenhalgh, 1999; Greenhalgh & Strong, 2001). Two studies involve the use of these LLFs as an outcome measure for determining differences in linguistic specificity among preschool age children in conversational discourse contexts (Curenton & Justice, 2004; Pellegrini, 1985). In both of these studies, authors demonstrate that LLF use is a measurable aspect of preschool age children's utterance production. Table 1 provides a summary of these studies in which authors have specified LLF use as their measurement outcome, measured on either four or five dimensions. In one study, children's ENP use is assessed on two dimensions of simple elaborated noun phrase (SENP) and complex elaborated noun phrase (CENP) use (Curenton & Justice, 2004).

*Table 1.* Use of LLF battery to assess linguistic specificity in childhood

Study	Purpose	Results	Language group	N	Age in months	Macro	Micro	Setting
Curenton & Justice (2004)	Examine age and ethnicity differences in LLF use	LLF use is evident in TDL across ethnicity. ENP and CONJ use associated with age.	TDL	23	36-48-60	LLF	CONJ ADV SENP CENP MLV	Preschool/ narrative
Greenhalgh (1999)	Examine SLI and TDL differences in semantic diversity and LLF use	Relation of LLF rate, discourse, semantic diversity in children with SLI	SLI TDL	26	84-96-108-122	MLU NDW TTR LLF	CONJ ADV ENP MLV	School/ narrative
Greenhalgh & Strong (2001)	Determine age, gender, and language (SLI/TDL) differences in LLF use and semantic diversity	ADV, ENP associated with discourse differences between language groups; no gender differences in MLV and ENP	SLI TDL	26	84-96-108-122	MLU NDW SNAP LLF	CONJ ADV ENP MLV	School/ narrative
Pellegrini (1985)	Explore LLF use in play contexts	Pretend play associated with higher rates of CONJ, ENP, MLV and MLU	TDL	20	48-60	MLU Reference Cohesion Endo/ Exophora	CONJ ADV ENP MLV	School/ play
Ukrainetz (1998)	Examine effects of narrative intervention in LLF use	Effects for CONJ and ENP; Macro effects for sequences	SLI TDL	11	84-96-108	MLU Temporal / Causal cohesion	CONJ ADV ENP MLV	School/ narrative

sequence,  
length,  
quality,  
content  
focus of  
discourse

---

*Note.* The following abbreviations are used in Tables 1-3

ADV: adverb

Boehm: Boehm Test of Basic Concepts-Preschool (Boehm, 2001)

CONJ: conjunction

DD: developmental delay

DI: direct instruction

DSS: developmental sentence structure (Lee, 1974)

ELD: expressive language delay

ENP: elaborated noun phrase

LLF: literate language feature

MLV: mental and linguistic verb

MLU: mean length of utterance

NDW: number of different words

PK: preschool

PLS: Preschool Language Scale (Zimmerman et. al., 1992)

PPVT: Peabody Picture Vocabulary Test (Dunn & Dunn, 1989)

SELD: slow expressive language development (Paul & Jennings, 1992)

SLI: specific language impairment

SNAP: Strong Narrative Assessment Procedure (Strong, 1998)

TDL: typically developing language

TTR: type-token ratio

Curenton and Justice (2004) examine LLF use in conversational narrative contexts with preschool aged children three to five, in which children interacted with an adult examiner. These authors' findings indicate significant increases in children's LLF use with age. ENP and CONJ are the most salient markers of LLF use in narrative analysis with preschool age children from backgrounds where children are at risk from their environment. Curenton and Justice report that preschoolers use appositives such as, "*this girl, Ann, had a bike*", noun modifiers such as, "*the new red bike*", qualifiers such as, "*a bike in the house*", and relative clauses such as, "*the girl got the bike that fit her home*" in their use of elaborated and increasingly specific noun phrases in narrative contexts.

In three studies of LLF use in narrative contexts conducted with school-age children with and without SLI engaged with adults, there is evidence for differences between school-age children's mean scores in their LLF use, with children with SLI using fewer of these features than children with TDL (Greenhalgh; 1999; Greenhalgh & Strong, 2001; Ukrainetz, 1998). Consistently, in all of these studies in which LLF use is the outcome measure, rate of ENP use increases with age whether in play or narrative context (Curenton & Justice, 2004; Greenhalgh & Strong, 2001; Greenhalgh, 1999; McKeough, 1984; Pellegrini, 1985; Ukrainetz, 1998). ENP use, to a lesser extent than other LLFs, differentiates performance among school age children with and without SLI (Greenhalgh, 1999; Greenhalgh & Strong, 2001; Ukrainetz, 1998). However, we do not have information on micro-level differences for preschool age children in different contexts.

Of the four micro-level features that make up the LLF bundle, Peterson and McCabe (1983) report children's conjunction use to be the most discriminating in terms of age-related change. This is expected based on other researchers' findings that conjunction use is a particularly important micro-level feature of children's cohesion and narrative sophistication. Further, findings from Slobin (1988) and Silva (1984) identify children's developmental use of *when*, *while*, and *as* in narrative contexts as significant micro-level features of linguistic specificity in discourse development. Silva describes age-related differences in children's use of *when* to *while* in these contexts to express simultaneous relationships in narrative discourse. Slobin's work supports Silva's findings on the developmental progression for young children's use of these conjunctions

(i.e., *when*, *while*, and *as*) to express simultaneous relationships in narrative contexts with adults.

Mental and linguistic verb (MLV) use is another dimension of LLF use that is an important characteristic of linguistic specificity development. Culatta (1994) shows strong association between young children's rates of MLV use and their narrative sophistication in terms of story length and complexity. Of the findings using the LLF dimension to assess linguistic specificity (Curenton & Justice, 2004; Greenhalgh, 1999; Greenhalgh & Strong, 2001; McKeough, 1984; Pellegrini, 1985; Ukrainetz, 1998), two studies indicate that children's MLV use is associated with overall increases to their MLU scores (Curenton & Justice, 2004; Pellegrini, 1985).

In examining LLF use in the play context, Pellegrini (1985) uses the LLF composite as the outcome measure to assess linguistic specificity in dyadic conversations of preschoolers with TDL during play. This preliminary study provides evidence for children's early LLF use in play contexts. In Pellegrini's (1985) study of LLF use in preschool age children from middle-income backgrounds, he identifies play categories based on earlier work by Piaget (1926), Smilansky (1968), Vygotsky (1978), and Parten (1932). Pellegrini categorizes play contexts based on the structure and function of language used by participants. This categorization makes up a matrix of play categories that serve as predictor variables for LLF rate of occurrence as the dependent measure, on the following dimensions of (a) conjunctions (temporal and causal); (b) noun phrases; (c) reference (endophora and exophora); and (d) verbs (MLVs and tense markers). In this study, Pellegrini reports consistently high correlations (.62 to .93) between play categories of symbolic play and LLF rate of use among preschool dyads with TDL.

Other researchers' descriptive findings support the preliminary research on LLF use in play contexts with children with TDL and peers. For instance, Sachs, Goldman, and Chaille (1985) report that preschool age children engaged in dyadic play with a set of pretend doctor toys produce higher rates of specific vocabulary (medical terms and functions) as compared to non-thematic play, such as construction or block-building. French, Lucariello, Seidman, and Nelson (1985) also describe the relationships between the content of discourse and context. In this study, the authors measure content of discourse (i.e., linguistic specificity) through children's production of language that contains the goal/theme, actions, objects, and actors, and context (type of event based fantasy routine), in which mean percentages for each of these components are calculated for participants and compared across contexts. The findings suggest that in play contexts such as fantasy play, the content of child discourse involves higher rates of object and action talk, which are the more literal and contextualized components of fantasy play. By contrast, contexts such as construction building are associated with children's production of statements involving the goal/theme and action components, which are more abstract and decontextualized components. The results of investigations by French et al. and Sachs et al. support Pellegrini's framework; however, they involve macro-level analysis of language variables, and thus do not provide direct evidence of micro-level linguistic specificity (i.e., LLF frequency of occurrence) in play contexts.

*Interaction of macro- and micro-level features.* Researchers emphasize the importance of relationships among children's micro- and macro-level language feature development in conversational contexts (Liles et al., 1995). For instance, when speakers use LLFs such as cohesive ties (e.g., conjunctions and adverbs), they embed and link

thoughts and ideas together for increased macro-level effects. Liles (1985a, 1987) reports that children's macro-structural competence in narrative and conversational discourse is significantly related to the use of the following micro-level LLFs: (a) adverbs (e.g., *next* and *therefore*); (b) conjunctions (*and*, *but*, and *then*); (c) ellipsis (omission of an item found elsewhere in narrative); (d) lexical and structural parallelism (word repetitions); and (e) references (pronouns, demonstratives). Research indicates that of the cohesive ties, conjunction use (e.g., *and*, *but*, *then*) is the most salient micro-level marker of conversational discourse competence in school age since it facilitates children's production of episodic units, and also enables them to embed one episode within another, resulting in increasingly sophisticated narrative discourse (Liles, 1985b, 1987).

*Summary.* Structural analysis of language variables contributes to researchers' procedures for identifying specific micro- and macro-level language variables, in which context and language ability are factors. In particular, the LLF composite has been used preliminarily with young children to assess linguistic specificity; however, there has been little information gathered on the use of this measure with children having SLI across different contexts. Further, there are differences in the dyadic partners involved in the interaction with the child, making it difficult to compare findings across contexts of play and narrative, since the play context features child-child dyads and the narrative context involves adult-child dyads. (This limitation in the research on LLF extends to the current study, since the current study involved mother-child dyads instead of child-child dyads.) Since the dialogic input provided by mother and child partners was likely to differ from a in the play context, we do not know the extent to which the partner's input contributed to the child's LLF use, nor do we know exactly how the Pellegrini (1985) findings inform



mother-child play dyads in LLF use. The next section addresses the difficulties that children with SLI face in the area of linguistic specificity, and the studies that address these issues.

### Linguistic Specificity in Children with SLI

This section presents information on children with SLI including a summary of the difficulties they encounter in their development of oral language skills of syntactic knowledge and semantic diversity, which contribute to their difficulties in using specific features such as LLFs in discourse production. This section provides definition and etiological perspectives, as well as a summary of the major developments on SLI research related to semantic diversity, syntactic knowledge, and the relationship of these language skills to children's linguistic specificity.

#### *Definition and Etiology of SLI*

Young children who are identified with SLI score between one and one-and half standard deviations below age level in two of the five language domains of semantics, syntax, pragmatics, phonology, and morphology (Tomblin & Records, 1997). These language deficits occur in the absence of any obvious underlying factors such as hearing loss, mental impairment, physical impairment, emotional disturbance, or environmental deprivation.

Etiologically, children with SLI experience limitations in the speed and capacity of information processing (Bishop & Edmundson, 1987). This limited capacity is thought to represent an underlying impairment in auditory perception, specifically in processing and sequencing of rapid acoustic stimuli (Tallal & Piercy, 1978). A functional-connectivity model of linguistic processing might best describe the

interrelationships between phonological and lexical systems to explain how processing interactions affect language development (Roth et al., 2002; Snow, 1991b). This integrative model, however, does not resolve the issue of whether SLI is based on “underlying grammatical impairment” (Rice, 2000; Watkins et al., 1995), or whether children with SLI experience specific grammatical and syntactic deficits as the result of underlying phonological-auditory memory deficits, which is referred to as the “fast-mapping hypothesis” of SLI (Chiat, 2001).

Despite some theoretical disagreement about the nature of SLI in early childhood, children with SLI exhibit marked deficits in their production of linguistically specific features across a variety of contexts. According to Scott (1995), children with SLI have particular difficulty with comprehension and production of narratives as compared to conversational discourse, due to their deficits in syntactic knowledge and semantic diversity. Findings by McLachlan and Chapman (1988) and Miller (1981) indicate that children with SLI have a greater rate of communication breakdown (word retrieval with repair strategies) in narration per communication unit, a unit of measure used to segment a language sample that includes each independent clause with its modifiers, than in conversation. Mothers of children with SLI indicate that in conversational play contexts, their children also produce fewer words and have lower rates of interaction and successful friendship bids, as well as higher rates of adult-directed speech acts, as compared to their same-age peers without SLI (Guralnick, Conner, Neville, & Hammond, 2002; see Guralnick & Neville, 1997 for review).

*Oral Language*

The most commonly reported oral language problems in early childhood include deficits related to semantic diversity and syntactic knowledge (Kamhi & Catts, 1986). Rice (2000) characterizes the oral language of young children with SLI as significantly different from that of typically developing peers, in complexity of both the syntactic and semantic forms that they produce. These types of oral language weaknesses are associated with deficient use of linguistically specific features such as LLFs, and are thus important to address in early intervention.

*Semantic diversity, syntactic knowledge, and expressive language delay.* Young children with SLI who have limitations in their semantic diversity and syntactic knowledge often have early language delays, which manifest at the toddler level in a delayed ability to formulate sounds and words (Paul & Jennings, 1992). Preschool age children with SLI have slow acquisition of basic production skills for phonological and lexical units that impact their formulation of sentences and extended discourse (Paul & Smith, 1993). According to Paul and Smith (1993), the struggles of preschool age children with early expressive language delays are more than just an outcome of their deficient use of micro-level features from lacking subskills in semantic diversity and syntactic knowledge. These weaknesses in semantic and syntactic domains result in expressive language delays that extend beyond production of grammatical sentences, to deficits in linking propositions; as well as encoding, organizing, and retrieving precise and diverse words from memory. Thus, deficits in semantic diversity and syntactic knowledge typically appear in contexts in which children are required to deploy specific language such as in narrative tasks and are integrally linked with language production.

*Language formulation.* According to Paul and Smith (1993), underlying language skill impairments in children with SLI are not limited to semantic diversity, but are more generally involved with expressive language formulation. A number of researchers' findings identify structural differences between preschool age children's story and event retellings in comparing children with SLI to age-matched peers with TDL (Liles et al., 1995; Paul & Smith, 1993). These findings indicate that in narrative tasks, there is a general tendency for children with SLI to recall fewer events and to produce shorter stories with fewer episodes than their peers (Gillam, McFadden, & van Kleeck, 1995; Roth & Spekman, 1986).

### *Literacy*

Many researchers describe the interrelationships among young children's development in specific oral language and literacy skills, which contribute to linguistic specificity difficulties for children with SLI (Johnston & Kamhi, 1984; Justice & Kaderavek, 2004; Snow, Burns, & Griffin, 1998). Young children with SLI use fewer LLFs such as elaborated noun- and verb-phases and complex sentences in narrative tasks, compared to typically developing peers (Liles, 1987; Nelson, 1991). In early literacy or narrative contexts, researchers identify children with SLI as being among those who are significantly at risk for literacy failure in early school age due to deficient use of features such as LLFs (Snow, 1991a).

*Recall and comprehension.* Two important literacy skills are children's ability to comprehend and recall information from oral and written material presented during contexts involving specific and precise language. Recall and comprehension difficulties in children with SLI exist across a variety of contexts. Bishop and Adams (1991) suggest

that children with SLI have difficulty recalling specific information and responding to inferential questions about orally presented narratives. Weismer (2000) reports that children have difficulty responding to literal and inferential questions in narratives which involve the use of pictures. Johnston and Kamhi (1984) suggest that recall and comprehension difficulties in children with SLI originate from underlying weaknesses in semantic diversity and syntactic knowledge. These specific linguistic subskill deficits contribute to difficulties in establishing and accessing knowledge from mental representations and/or long-term memory, which are critical aspects of recall and comprehension (Idoll & Croll, 1987). Presumably, children with SLI's early language delays in linguistic specificity subskills of semantic diversity and/or syntactic knowledge also play a significant role in their difficulty with mapping linguistic structures onto mental representations (Chiat, 2001). Whether children with SLI have recall and comprehension difficulties due to difficulties with forming mental representations or due to accessing knowledge from mental representations, their delayed specific linguistic subskills are related to both the literacy competencies of recall and comprehension.

#### *Academic Performance*

Linguistic specificity in children with SLI is important to their overall language competence and is related to their success in academic contexts. McCabe and Rollins (1995) report that children with specific language deficits in preschool initially do not understand specific features such as LLFs, and thus are limited in their ability to convey specific meanings to others as they encounter increasingly decontextualized academic contexts. This is particularly evident when children are engaged in story telling and recall tasks, in which children with SLI are reported to have significantly lower MLU as

compared to age matched peers with TDL skills. The slow language development of children with SLI typically persists into the late preschool period, making them significantly at risk for academic failure once they reach school age (Paul, 2002; Paul & Smith, 1993).

Young children with persistent and unresolved oral language deficits in semantic diversity and syntactic knowledge experience academic problems in conventional literacy acquisition at school age (Kamhi & Catts, 1986). Catts, Fey, Zhang, and Tomblin (2001) identify preschool age children with deficits in semantic diversity and syntactic knowledge as being at a significant risk for literacy and reading achievement difficulties in kindergarten, whether or not they continue to qualify as having SLI in these specific language domains. Bishop and Adams' (1991) findings on the relationship of referential communication skills in preschool children with SLI to persistent academic problems in school age show that four-year-old children with SLI, who have language problems at five-and-a-half years old, continue to show difficulty in conventional literacy acquisition at eight-and-a-half years old.

There also is considerable evidence that children with SLI are at-risk for later reading failure as they progress in school (Roth et al., 2002; Scarborough, 1998). For example, in studies of conventional reading and writing skills, McFadden and Gillam (1996) describe the impact of specific linguistic feature deficits of children with SLI on their acquisition of conventional literacy skills in decontextualized oral and written language contexts. Jones (2003) provides evidence of the relationship between LLF use in oral language and written narrative output in first grade children. Other research findings by Bishop and Edmundson (1987), and Feagans (1982) indicate the importance

of linguistic specificity in children's performance on early decontextualized narrative language tasks, which is associated with academic outcomes in children with SLI.

### *Assessment of Linguistic Specificity in Children with SLI*

Significant findings exist from the past several decades of research on children with and without SLI, which indicate that children with SLI face particular difficulties in their acquisition of linguistically specific features of language. These findings include the range of measures used to assess children's language development in semantic diversity and syntactic knowledge, which are two necessary subskills in linguistic specificity (see McLean & Cripe, 1997, for a review). The major research developments in early childhood communication disorders are through intervention and descriptive-comparative studies of young children who struggle in developing functional and structural language skills. These studies are conducted in a variety of play and storybook contexts with caregivers, clinicians, and peers in settings ranging from homes and clinics, to classrooms. Along with the variation in context, researchers use a range of measures to assess linguistic specificity.

*Outcome measures used to assess linguistic specificity.* Given the theoretical background of linguistic specificity in discourse production, we know that the context in which a language sample is gathered plays a role in the production of linguistically specific features for children with different language abilities (Miller, 1981). In some studies, child language is assessed in play and narrative contexts. The settings are home, clinic, or school based environments. The dialogic partner is the caregiver, clinician or investigator, or language-age matched peer. Because both descriptive and intervention research studies are concerned with children's development of linguistic specificity

through structural analysis of language variables, their results inform the current study on the relationship between context and outcome measures used with children having different language abilities.

Findings from descriptive studies are distinguished from the intervention research by the differences in researchers' use of dependent measures. In the descriptive research in narrative contexts, outcomes are primarily focused on micro- and macro-structural language feature use. This contrasts with functional language goals in conversational play contexts that are evident in the majority of the intervention research (Nathan, 2002; Raab & Carl, 2004; Smith et al., 2004; Warren & Yoder, 2004). One of the reasons for this might be that there are competing variables and possible interactions between other factors such as the adults' actions and intentions, which limit the conclusions we can draw (Dickinson & McCabe, 2001; Ninio & Snow, 1988). Table 2 provides a summary of the research in play contexts to highlight contributions from both strands of descriptive and intervention research to the relatively uninvestigated topic of measurement of linguistic specificity in early childhood through measurement of macro- and micro-language features.

---

*Table 2.* Linguistic specificity in preschool age children with disabilities

---

Study	Purpose	Results	Language group	N	Age in months	Macro	Micro	Context
Alpert & Kaiser (1992)	Examine effects of maternally taught milieu procedures	Expressive language increases across clinic and home	ELD	6	35-51	MLU NDW		Clinic Home Play
Camarata, Nelson, &	Examine effects of direct/indirect	19 of 21 subjects met individual	SLI	21	48-82	Targeted forms	Grammatical morphemes per utterance	Clinic Play



Camarata (1994)	treatment on grammatical morpheme use	critterion						in samples
Cole & Dale (1986)	Examine effects of direct vs. indirect semantic and syntactic treatment	Effects for both groups; direct treatment had greater gains	SLI	44	38-69	MLU PPVT DSS PLS	Syntactic structures Semantic forms	PK Play Narrative
Fey, Cleave, & Long (1994)	Examine effects of direct vs. indirect treatment in targeted use of grammatical forms	No group difference across settings; Direct treatment had greater micro gains in clinic setting	SLI	18	48-60	MLU DSS	Grammatical forms (main verb, personal pronouns)	Clinic Home Play
Fey, Cleave, Long, & Hughes (1993)	Examine context effects in treatment groups for syntactic knowledge	Significant gains for both treatment groups over control; no context differences	SLI	30	44-70	DSS	Verb and pronoun use	Clinic Home Play
Siefert & Schwartz (1991)	Examine context effects on acquisition of verbal concepts	Play-based intervention group scored higher than control on Boehm.	SLI DD	57	51-73	Boehm		PK Play
Warren & Kaiser (1986)	Examine effects of classroom-based intervention on semantic diversity	Intervention group increased in spontaneous vocabulary	SLI	8	34-56	MLU PPVT	Targeted lexical and grammatical morphemes	PK
Weistuch, Lewis, & Sullivan (1991)	Examine effects of maternal comments on children's use of targets	Treatment group increased in MLU, word categories, and word combinations	DD	38	24-60	MLU	Word categories and word combinations	Clinic Home

*Play contexts.* These intervention studies involve children's specific language feature use during play contexts in home- and clinic-based settings. The findings from these studies indicate that factors such as facilitation technique (i.e., direct or indirect), interaction partner (parent or clinician), and setting (e.g., clinic, home, or preschool) are important considerations to the efficacy of language interventions with young children (McLean & Cripe, 1997; Smith et al., 2004). Studies by Fey et al. (1993) and Fey, Long, and Cleave (1994) show that using a combination of clinician-directed and home-based intervention techniques embedded in play contexts lead to more powerful language outcomes for young children with SLI than either technique taken alone.

Similarly, Weistuch, Lewis, and Sullivan (1991) show the effects of the combination of clinic and home based interventions involving play using word games with targeted word categories and combinations with young children who have SLI. In this study, the authors measure gains in language behavior using mean changes to MLU and maternal commenting behavior. In play contexts, analysis of MLU is the outcome measures used to assess syntactic form, which includes analysis of grammatical morphemes. Semantic diversity is assessed by MLU and NDW (e.g., Alpert & Kaiser, 1992; Warren & Kaiser, 1986).

The only study located in which researchers examine linguistic specificity in play contexts through micro-level feature analysis in young children with SLI is by McKeough (1984), who examines the effects of sociodramatic play on linguistic specificity, as measured by children's use of micro-level linguistic features (see Table 3). McKeough reports significant correlations between dramatic play enactments and children's use of linguistically specific features in narrative retelling tasks with groups of

children, ranging in age from four- to ten-years old. In this study, children with language delays are matched on language-age with at-risk peers and normally developing age-mates. McKeough compares micro-level feature use in children who engaged in dramatic play prior to narration with a control context of no-dramatic play; however, there was no comparison group in this study. The findings indicate that the combination of dramatic play and narrative retelling consistently results in higher rates of use for the micro-features CONJ and MLV verbs across both language ability and age groups of children than either context by itself.

*Narrative contexts.* The studies in Table 3 are investigations of specific language feature use in young children engaged in conversational narrative contexts with adults. Narrative contexts include story sharing, story telling and retelling, and narrative elicitation tasks. Each of these contexts is associated with different language variables that are examined in structural analysis of narrative discourse. For instance, oral narrative involves production of macro-level story units such as beginning, middle, and end, and does not involve a stimulus such as a picture or a story prompt (Kaderavek & Sulzby, 2000b). By contrast, storybook sharing is a context in which a child shares a narrative with a caregiver, while reading and discussing the pictures and the text. Narrative elicitation and retelling are scripted contexts in which children respond to a picture or narrative stimulus with a prompt to retell the story. Table 3 below provides a summary of the macro- and micro-features used as outcome measures by researchers to assess linguistic specificity during discourse in early childhood and school age populations with and without SLI.

*Table 3.* Linguistic specificity through micro- and macro-level variable analyses

Study	Purpose	Results	Language group	N	Age in months	Macro	Micro	Setting
Graybeal (1981)	Describe recall deficits in groups	# Micro features # story units, location of micro features differentiate groups	SLI TDL	12	84-108	Story units Location of micro features	ENP CONJ ADV	Clinic/ narrative
Liles & Duffy (1995)	Describe nature of SLI in narrative production	Content organization (macro) and linguistic structure (micro) are the most salient factors differentiating groups	SLI TDL	30	84-144	Story units Content organization	ENP CONJ ADV	Clinic/ narrative
Liles & Merritt (1987)	Describe effects of variable selection on discourse quality	Combination of micro and macro variables (grammatical T-units and cohesive ties) differentiate groups	SLI TDL	20	108-121	Grammatical T-units/T-units Cohesive ties	ENP CONJ ADV	Clinic/ narrative
Liles & Merritt (1992)	Describe measurement micro and macro level variables	Combination of micro and macro variable selection was more reliable for narrative quality than either taken alone	SLI TDL	14	96-144	Grammatical T-units/ T-units Complete cohesive ties	ENP CONJ ADV	Clinic/ narrative
Liles (1985)	Describe contextual factors in children's	# Cohesive ties was related to mean #	SLI TDL	23	84-121	Grammatical T-units/ T-units Cohesive	CONJ ADV	Clinic/ narrative

	discourse cohesion	grammatical T-units and words in subordinate clauses				ties		
McKeough (1984)	Describe relations between linguistic structure, cognition, and memory	Age effects of MLV, MLU, and NDW with context	TDL	60	48-120	Story units Cohesive ties Semantic diversity (NDW)	CONJ MLV	Clinic/ Play-narrative
Paul & Smith (1993)	Describe discourse skills across language groups of PK children	MLU, cohesive ties, story units differentiate groups with syntactic, semantic, and morphology deficits	SELD SLI TDL	23	48	Story units NDW	ADV CONJ MLV	Clinic/ narrative
Paul et al. (1996)	Describe discourse differences in SELD/SLI/TDL kindergarten-school age	MLU, ADV, CONJ, MLV, information units differentiate groups; SLI syntactic and vocabulary deficits persist in SLI as compared to TDL and SELD	SLI SELD (at risk) TDL	26 30 30	60-96	Temporal, causal, information units NDW	ADV CONJ MLV	Clinic/ narrative
Peterson & McCabe (1983)	Describe methodology issues in assessment of narrative	Type of task determines competency in production of narrative discourse	SLI TDL	20	48-102	MLU NDW	CONJ ADV	Clinic/ narrative
Peterson & McCabe (1994)	Describe contextual factors in development of when and where	Type of task determines competency in use of when and where in narrative discourse	SLI TDL	10	60	MLU NDW	CONJ ADV	Clinic/ narrative
Purcell & Liles	Describe self-initiated	Intersentential (micro) and	SLI TDL	14	96-144	% Episode organization	CONJ	Clinic/ narrative

(1992)	repairs in narrative discourse	episode organization (macro) skills overlap across groups				(sequence of story units)		
Strong & Shaver (1991)	Describe differences in cohesion for children with SLI	Stability increases with experience in story telling (Macro effects due to micro cohesion)	SLI TDL	39	96-108	Story units Mean cohesion adequacy MLU	CONJ	Clinic/ narrative
Van der Lely & Howard (1993)	Describe effects of age and task demands on discourse quality	# Micro features and NDW is associated with immediate recall in both groups No effect of picture pointing and repetition	SLI TDL	6	72-108	Cohesive units Semantic diversity (NDW)	ADV CONJ MLV	Clinic/ narrative

---

The majority of these studies are descriptive investigations of linguistic specificity with preschool age children. These researchers use at least two of the four dimensions of LLF use to characterize children's linguistic specificity in narrative contexts. There is one intervention study involving narrative context in which Cole and Dale (1986) examine treatment effects of direct and indirect language intervention in a preschool classroom using a narrative context with young children from at risk backgrounds. In this study, 44 language-delayed preschoolers received either direct instruction or interactive instruction in the narrative context for eight months. In both intervention settings, children showed significant improvement in their LLF use. There were no differences between the two groups at posttest, or any significant aptitude by treatment

interactions for cognitive or language pretest measures. The findings indicate that the narrative context is associated with children's increased LLF use.

All of the researchers who examine linguistic specificity through structural analysis techniques assess children's use of both conjunctions and adverbs. In seven of these studies, authors identify causal, temporal, and cohesive conjunctions as significant factors differentiating the discourse production of children with and without SLI (Liles, 1985a; Liles et al., 1995; McKeough, 1984; Merritt & Liles, 1987; Paul & Hernandez, 1996; Paul & Smith, 1993). The one study that does not report significant effects for micro-level adverb use in narrative context is by McKeough (1984).

In eight of these studies, researchers use macro-level analysis of story or information units to characterize linguistic specificity in young children with SLI (Graybeal, 1981; Liles, 1985; Liles et al., 1995; McKeough, 1984; Merritt & Liles, 1987; Paul & Smith, 1993; Paul & Hernandez, 1996; Van der Lely & Howard, 1993). In seven of these eight studies, researchers examine linguistic specificity in young children through cohesion analysis (see Liles, 1993 for review). The authors report significant positive correlations between children's use of cohesive ties and the overall quality of their discourse in narrative contexts (Liles, 1985a; Liles et al., 1995; McKeough, 1984; Merritt & Liles, 1987; Paul & Hernandez, 1996; Paul & Smith, 1993).

These findings do not clarify the relationship between linguistic specificity through LLF use, context, and language ability factors since there is a lack of information about LLF use in preschool age children across contexts. In addition to the inconsistency in the dependent measures used to determine linguistic specificity, there is little, if any, information on the effects of context and language group on linguistic specificity.

Further, there is only preliminary evidence to suggest that children with SLI and TDL differ in LLF use in different contexts. This preliminary evidence is an important area for further investigation because findings would contribute to understanding children's communicative competence in association with their language and learning skills. This research does provide a basis for measurement of linguistic specificity through assessment of structural language variables, specifically on the dimensions of LLF use across different contexts with young children who have SLI and TDL.

In considering the assessment of linguistic specificity across contexts with children who have SLI and TDL, one remarkable aspect of the state of the current research is that children's language use in various contexts is distinct. For instance, in all of the studies involving LLF use in narrative contexts, the settings are usually clinics or classrooms. This is surprising in light of the intervention research involving play contexts, which provides evidence for the significance of the blend between the clinic and home setting in the intervention efficacy (see Raab & Carl, 2004, and Smith et al., 2004 for reviews). This point will be discussed in the summary section, as it exemplifies limitations due to feasibility.

This review of research on language feature use in young children with SLI and TDL reveals issues related to context and group factors, which contribute to the challenges of assessing linguistic specificity in preschool age children. The third aspect of this review of the extant research on linguistic specificity in early development is related to methodological issues raised by researchers, which contribute to issues in assessment of linguistic specificity in varying contexts with children having SLI and TDL. In the following section, I present information on the use of language analysis



techniques with children from different language groups to provide evidence for the use of the LLF composite in measuring linguistic specificity in early childhood.

*Limitations in the Research on LLF Use*

In addition to the issues related to measurement of semantic diversity and syntactic knowledge, outcome measures, and the role of context on linguistic specificity, there are other limitations to the current research on LLF use in young children. The first limitation is the scant number of descriptive studies of LLF use in general, which limit conclusions from the extant research. In addition to the limited number of findings on this topic, there are feasibility issues in the study of LLF use in preschool age populations across contexts, which might limit the power and generalizability of findings.

Fundamental differences exist in procedures used in research involving play and narrative contexts, which limit the comparison of the results across these contexts. For instance, researchers who examine children's linguistic specificity in play as compared to narrative contexts tend to use different definitions and procedures (e.g., elicitation, data collection, and analysis). The differences between play and narrative research extend to specification of variables (definition and interaction), procedural fidelity, and measurement techniques (data collection and analysis).

*Variable specification and context.* Outcome measures used by researchers in their examinations of young children's language development in play contexts across home and clinic settings tend to vary from the measures used in narrative contexts. Typically, in home-based play contexts, researchers focus on the quality of parent-child interactions and functional communication variables such as frequency of propositions, interactions, and responses (e.g., see studies by Girolametto, Verbey, & Tannock, 1994,

and Girolametto, 2002). The micro-level outcome measures that characterize children's language development in play contexts typically involve expressive vocabulary scales, targeted criterion variables, and rates of interaction variables such as adult-recasts and expansions (e.g., see studies by Warren & Yoder, 2002, and Weismer & Murray-Branch, 1993).

Outcome measures used in play contexts in clinic- or classroom-based settings with young children who have communication disorders tend to involve analysis of language features through the use of a standardized developmental language assessments such as the *Peabody Picture Vocabulary Test (PPVT)*, (Dunn & Dunn, 1989), or *Preschool Language Scales (PLS)*, (Zimmerman, Steiner, & Pond, 1992) (see Table 3). The authors of 4 of the 10 studies of children's linguistic specificity in play contexts use mean production inventories such as MLU and NDW to analyze specific aspects of children's micro-level performance in goal areas such as semantic diversity, syntactic knowledge, and grammatical morpheme use (Alpert & Kaiser, 1992; Camarata, Nelson, & Camarata, 1994; Warren & Kaiser, 1986; Weistsuch et al., 1991).

Particularly evident in the research are problems related to definitions and measurement of variables under investigation across narrative and play contexts for measures of semantic diversity and syntactic knowledge. One of the major problems of specifying variables is the use of various dependent variables in the research on literate language. For instance, Pellegrini omits micro-level adverb use from his LLF composite, which he uses as a predictor variable of decontextualized play contexts (1985; 1998). Also, Pellegrini and others (Liles, 1993; McKeough, 1984) emphasize the importance of macro-level features such as endophora, exophora, and references as subcategories of

ENP use. By contrast, Curenton and Justice (2004) and Strong and Greenhalgh (2001) do not include macro-level analysis, defining LLF use through micro-level variable analysis. Within the area of micro-level analysis, researchers vary in their definitions for discrete feature analysis. For instance, in similar narrative contexts of LLF use, Greenhalgh and Strong use ENPs and verb phrases; whereas Curenton and Justice use simple and complex ENPs. However, the micro-level LLF composite consists of the four most frequently used variables, which are used to assess children's semantic diversity and syntactic knowledge, across factors of context and language ability.

*Interaction of dependent measures.* One issue related to variable selection for assessment of linguistic specificity across contexts is the extrapolation of findings from studies in which researchers show support for LLF use of only one or two of the four micro-features in narrative or play contexts. The findings on children's disaggregated feature use provide evidence for the underlying significance of each of the (i.e., both macro-level and micro-level) LLFs under consideration. However, there is a lack of information and consistency in the composite of features used to describe linguistic specificity. We have limited evidence of a relationship among these features and their use in different contexts. Our current research findings include a handful of studies in which researchers use the composite of LLFs in one context with children who have TDL.

*Construct validity.* In the use of the LLF battery to assess linguistic specificity in early childhood across contexts, under similar conditions of discourse genre and dialogic partner, we must consider the validity of the LLF construct. Although LLF use has been examined in play contexts with preschool age children having TDL, these researchers

have identified the obstacles in assessment of linguistic specificity in determining appropriate outcome measures for children's language production in play contexts. Play researchers agree that one of the criteria distinguishing play from other behavior is the *psychological disposition* of its participants, in which their behavior is marked by "purposelessness" of its goal-direction (Pellegrini & Galda, 1998, p. 60). Thus, expectations of language outcomes other than those serving a functional or transactional purpose do not necessarily match the intent of a child's play behavior, calling into question the construct validity of LLF use in play contexts. However, it is this point that validates the LLF construct as a way to assess linguistic specificity, insofar as it captures children's language use across social-participation, function, and cognition (Rubin et al., 1983).

Pellegrini and colleagues (1985; 1998) suggest that there is a contradiction between the psychological disposition of the participants engaged in the process of play and the notion of play behavior as serving a developmental function, which makes play difficult and subjective to measure. An issue that limits the conclusions on the relationship between LLF use as a valid measure of linguistic specificity in play is that there is a lack of information on the relationship between context and LLF rate of use in young children. The current study would provide evidence for the use of the LLF construct to assess linguistic specificity across contexts with children from different language groups. The current study also accounts for context and group factors in examining dimensions of linguistic specificity through micro-level LLF analysis.

*Interaction between independent and dependent variables.* In addition to the variation in dependent measures used to assess linguistic specificity in young children

with SLI, variables associated with context have a significant role in the study of language feature development. For instance, the preliminary evidence on LLF use in narrative contexts might indicate that children are exposed to, and therefore use more LLFs in narrative as compared to non-narrative contexts. However, this cannot be determined from the current research since the majority of the findings on micro-level LLF use are in narrative contexts, in which participants range from preschool to school age children with and without SLI (Curenton & Justice, 2004; Greenhalgh, 1999; Greenhalgh & Strong, 2001; Ukrainetz, 1998). The outcome measures that researchers use to characterize linguistic specificity in play contexts do not completely or consistently measure semantic diversity and syntactic knowledge skills in children from different language groups.

In addition, the procedures for identification of SLI, which include matching children with SLI and/or at-risk children with typically developing peers on age and/or language group factors are well documented to ensure validity across the findings reported among this group of studies reviewed in this small sample. However, researchers raise another issue in identifying children with SLI. Many researchers describe significant variability within groups of young children with language difficulties (Paul & Smith, 1993). These children might exhibit deficits in linguistic specificity in narrative contexts, as compared to peers with TDL; however, their trajectory for development of linguistic specificity is relatively unknown in non-narrative contexts of conversational discourse (i.e., play). While we know the developmental trajectory for LLF use in the early preschool years, we do not have information on language learners with diverse abilities (Paul & Hernandez, 1996).

There are threats to validity in terms of the interactions between language group and context in examining LLF use. It is unknown from the current research base the extent to which each of these important factors contribute to young children's linguistic specificity, as measured through rate of LLF use in various contexts. Across findings in the research, authors suggest that contextual variables (e.g., time, experience, and interaction) are related to differences in use for each of the LLFs, as well as the mean production of features across the LLF composite for children with TDL. LLF analysis in narrative context is a good index of development over an extended time period because of its functional nature and structural complexity. However, this has yet to be determined conclusively in comparison to other contexts, such as in play with children from different language groups, such as those with SLI.

*Fidelity of procedures.* Although language variables such as rate of LLF use, MLU, and T-unit production are more easily quantified than observational measurement of actions and intentions used in play routine data collection procedures, procedural confounds exist in data collection and analysis phases of narrative examinations which threaten reliability, validity, and fidelity of the results. In half of the studies, authors provide information on the context of LLF use. In all of these cases, researchers orally read a picture book with participants and used elicited storytelling and recall procedures. The one study involving LLF use in a play context does not provide sufficient information for replication of these procedures with children having SLI (Pellegrini, 1985). In the majority of studies, authors report sufficient information regarding procedural fidelity for replication. However, in three studies that involve contextual

variables, authors do not provide descriptions of contexts and procedures for reliable replication (Graybeal, 1981; McKeough, 1984; Pellegrini, 1985).

In transcription and coding, all of the studies included in this review provide some description of the procedures used for transcribing language samples. However, only two authors provide sufficient information on training and coding procedures to produce reliable ratings across transcriptions (Curenton & Justice, 2004; Greenhalgh, 1999). Most researchers report the use of *Systematic Analysis of Language Transcription-Research Version, SALT-R* (Miller & Chapman, 1996), a computerized language analysis program that increases reliability and validity of coding for language features. However, it should be noted in considering the feasibility of this type of data analysis, that training in SALT-R is time consuming and the cost and licensing of the software is a factor in its accessibility and use.

In addition, the hand coding of language samples for data entry into SALT-R can threaten internal validity of the results. For instance, LLF coding for entry into SALT-R must be completed by hand, following transcription and data entry into a SALT-R software program file. Intercoder reliability is necessary to ensure internal validity of this type of data analysis using the LLF battery, as SALT-R only recognizes micro-features some of the micro-features (CONJ, ADV). The other features must be hand coded and then re-entered into SALT-R. Although the authors of all of the studies report the use of SALT-R coding conventions, only a few authors include a detailed level of description in their LLF coding and hand-scoring procedures to ensure fidelity (Curenton & Justice, 2004; Greenhalgh, 1999; Greenhalgh & Strong, 2001; Liles et al., 1995; Merritt & Liles, 1987). In two studies in which the authors examine LLF use in non-narrative contexts,

their discussion sections do not include fidelity of coding procedures (McKeough, 1984; Pellegrini, 1985). Of the remaining studies that provide information on fidelity of data collection and analysis, authors of five of these studies include information on how they address them in their study (Curenton & Justice, 2004; Greenhalgh, 1999; Greenhalgh & Strong, 2001; Liles et al., 1995; Merritt & Liles, 1987). In these five studies, there is sufficient description of procedures, with samples and instructions; however, the lack of a standard format and use of coding conventions across them limits interpretation from one set of findings to the next.

Thus, a general lack of consistency in data analysis procedures limits the conclusions that we can draw on this topic. Further, the research on LLF use in narrative contexts is marked with inconsistent use of language elicitation, data-collection, and analysis techniques, all of which limit comparison and generalization across studies. In only three studies, authors include information on the data collection of a baseline number of at least 50 utterances (Curenton & Justice, 2004; Greenhalgh, 1999; Greenhalgh & Strong, 2001). None of the studies includes intelligibility ratings for participants or information regarding video and audio tape recording and collection of child-language samples.

### *Summary*

There are several concerns related to the existing research on linguistic specificity in early childhood across context and language group factors. The measurement of specificity through LLF use in early childhood contexts of discourse necessitates further investigation since LLF use is a valid index of semantic diversity and syntactic knowledge in some contexts (i.e., narrative discourse). Currently, there are no studies in



which researchers examine linguistic specificity using the LLF composite or its dimensions with preschool age children with SLI in either play or storybook context. At present, several methodological issues must be addressed to address questions about children's linguistic specificity through LLF use across varying contexts for children with SLI and TDL.

In addition to the lack of rigorous comparison studies of LLF use in different contexts with children from different language groups, feasibility factors limit the research base in this area. These issues are related to the study of LLF use with preschool age children with SLI, particularly in obtaining resources needed for identification of participants, and measurement and analysis of language variables with technical adequacy. A feasible and technically adequate approach to study in this area is presented in the next chapter, which further illuminates feasibility issues of data collection and analysis of child language samples for LLF use with preschool age children having SLI and TDL. The next chapter describes the current study, which was designed to investigate possible solutions to the issues raised in this review, related to measurement of linguistic specificity in early childhood across play and storybook contexts for groups of children identified with SLI and TDL.

## CHAPTER THREE

### Method

In this chapter I present the methods for the examination of linguistic specificity in preschool age children with and without specific language impairment (SLI). This was measured through children's rate of LLF use in play and storybook sharing contexts with their mothers. This investigation involved the use of previously collected data from two projects on home literacy. In these studies, participants were preschool-age children with SLI and their age-matched peers with typically developing language (TDL). The data set for the current study was sampled from a series of eligibility screening activities and initial home visits. These activities occurred in the past year as part of two home literacy projects involving parents and children. Information and details on recruitment, eligibility, and data collection procedures pertaining to these early literacy studies, which are funded by the National Institutes of Health (NIH # 1 R03DC004933-01A2) are presented in this chapter.

This investigation was based upon my access to videotaped samples of preschool-age children with SLI and their age-matched peers with TDL in communicative interactions with their mothers from the two home literacy projects. I was provided with access to data by Dr. Laura Justice, Assistant Professor in the Curry School of Education at the University of Virginia, Charlottesville, and Principal Investigator of the NIH-funded literacy projects.

#### *Overview*

The first section of this chapter is a description of the current investigation. The second section of this chapter provides background information on participants, who

were identified as meeting the criteria for either SLI or TDL group in the current study. This section includes information on recruitment, eligibility, and assessment procedures with children who I identified as participants for the current study. The third section provides information on instrumentation, design, and analysis methods.

### Description of the Current Study

In the current study, I examined the role of context and language ability, or group on young children's LLF rate of use in conversational contexts of play and story sharing with mothers. Participants were 30 preschool age children, between the ages of 48 and 60 months. There were 15 children with SLI, and 15 with TDL. The play and storybook sharing activities took place in children's homes. All of the participating caregivers were mothers of children, except for one caregiver, who was the maternal grandmother of a child in the study. However, for simplification purposes, I have referred to all caregivers as mothers in the document.

For this study, children's LLF use was analyzed in both play and storybook sharing contexts. Mothers' language samples were analyzed for speech act use at the utterance level, to provide description of the function and intention of the input from dialogic partners.

### *Recruitment and Eligibility of Participants*

Determination of eligibility of children consisted of the following events: (a) recruitment; (b) telephone interview; and (c) in-home screening. To recruit families for participation, there were mass mailings and verbal announcements to speech-language pathologists and educators across Maryland, West Virginia, and Virginia. Area speech-language pathologists provided information about the study to parents, who then

contacted laboratory personnel by telephone to participate in the first of three eligibility-screening activities. An initial sample pool of 120 families participated in the telephone interviews in April of 2003.

*Telephone interview.* From telephone interviews, 35 families were recruited for further project activities in one home-literacy project, and 60 participants in another home-literacy project. If parents reported that their child was (a) between 48 and 60 months old; (b) had a first or home language of English; and (c) had no known history of neurological, gross motor, or hearing impairment, a home visit was scheduled. If the criteria were not met for an in-home screening, families were notified of this and were thanked verbally for their participation. Eligibility requirements ensured that participants included only preschool age children between 48 and 60 months. This is because children within this age range typically acquire conventional literacy and language skills as they progress from preschool to kindergarten age (Sulzby, 1986). Also, participants were required to be native speakers of English because quality and development of language skills is different for children with limited English proficiency, or for whom the primary language spoken in the home is not English (Ninio & Snow, 1988).

The eligibility criteria of typical developmental status in selected areas (e.g., motor, hearing, and cognition) established that children's linguistic specificity in LLF use did not interact with other developmental issues. Thus, the use of this criterion was matched to the purpose of the current investigation.

*In-home screening.* The purpose of the in-home screening phase was to validate previously reported information by parents on children's (a) hearing status; (b) cognitive

status; and (c) language status. These eligibility-screening activities began in June 2003 at prospective families' homes under the supervision of Dr. Justice. Trained graduate students in speech and language pathology assessed prospective study participants' hearing, cognitive, and language, while parents completed a questionnaire to indicate if their children's developmental history included speech, language, motor, or cognitive impairments.

The examiners provided instructions to children, using demonstration and practice items whenever appropriate. Examiners did not provide reinforcement or corrective feedback during assessment activities, except praise for on-task behavior as necessary. They administered tasks in the same order to each child to avoid possible effects which might occur if similar tasks were presented consecutively; or if more difficult tasks were presented prior to easier tasks (e.g., frustration might occur early in the assessment). At the conclusion of assessment activities, examiners gave children a small token (i.e., stickers). Throughout the course of these activities, there was no attrition as the result of relocation or absence-related issues.

In a single session (approximately 30 minutes), children received the following: (a) bilateral hearing screening at 30dB; (b) cognitive screen of the *Matrices Subtest* of the *Kaufman Brief Intelligence Test (KBIT)*; Kaufman & Kaufman, 1990); and (c) language assessment using six subtests from the *Test of Oral Language Development-Primary, Third Edition (TOLDP3)*; Newcomer & Hammill, 1997). These six subtests were reported to have a high predictive accuracy for diagnostic decisions based on the full diagnostic protocol for SLI (Tomblin & Records, 1997).

Children were considered to be eligible if they met the following criteria: (a) acceptable level of hearing at the start of participation, as indicated by administration of a bilateral hearing screening; and (b) a score within normal limits (-1 SD or higher) on a test of nonverbal cognition, namely the *KBIT Matrices subtest*. To determine SLI or TDL status, children who received two subtest scores at or below the tenth percentile on the *TOLDP3* were identified as children with SLI. Children who scored above an SLQ of 85 were identified as children with TDL. Parents' responses to questions concerning their child's current language ability provided additional information on children's eligibility status.

#### *Participants in the Current Study*

Of the 60 children screened, 35 met criteria for inclusion in the SLI group from which the current sample of 15 children with SLI was randomly selected. The majority (60 of the 70) one home literacy project's participants met the inclusion criteria set from which the 15 children with TDL were randomly selected.

*Age.* Children with SLI and TDL were comparable in terms of age. The mean age for children with SLI was 54 months, with a range from 50-60 months ( $SD=3.44$ ). The mean age for children with TDL was 55.4 months, with a range of 49-60 months ( $SD=3.52$ ). There were 16 males and 14 females in this sample, with some differences between SLI and TDL groups in sex. In the SLI group, there were six females and nine males. In the TDL group, there were nine females and six males.

*Ethnic background.* In the group with SLI, the majority of mothers identified themselves as Caucasian (73%), with 26 percent self-identified as African-American or multi-racial. Seventy-three percent of the group with TDL was self-identified as

Caucasian, with four mothers identifying themselves as having a multi-racial background, and one mother identifying her family as having an Asian-American background, comprising 26 percent of the group with TDL.

*Household income.* Participating families in this sample reported household income levels between \$7,548 and \$130,000. The reported income of families of children with SLI ranged from \$7,548 to \$100,000, with a mean income level of \$49,339 ( $SD = \$28,470$ ). The reported family income by mothers of children with TDL ranged from \$36,000 to \$130,000, with a mean income of \$78,000 ( $SD = \$35,539$ ). The mean income level of families of children with TDL was significantly higher than for families of children with SLI,  $t(27) = 2.39, p = .024$ . Differences between the two groups in income might have played a role in children's rate of LLF use in the current study.

Research on the relationship between income level and literacy in preschool age children indicates that children from lower income families are at higher risk than children from higher income families for delays in language development (Juel et al., 1986; Whitehurst & Lonigan, 1998). Research on young children's specific literacy skill acquisition shows relationships between SES level and literacy skill development through task performance on: 1) letter knowledge and phonological sensitivity (Bowey, 1995); 2) letter-name and letter-sound correspondence (Duncan & Seymour, 2000); and 3) phonemic awareness, print decoding and print production (Dickinson & Snow, 1987). Dickinson and Snow (1987), however, found that kindergarten age children from different SES levels did not differ in their oral language performance. Also, in LLF production, Curenton and Justice (2004) found that preschool age children from low SES groups produced a similar number of LLFs in narrative contexts. This research provides

evidence of a strong significant relationship between SES and literacy skill development, with some question as to the relationship between SES level and oral language development, and namely, in linguistic specificity through LLF use. Nonetheless, a difference between groups in SES in the current sample could be a confounding factor.

*Maternal education.* Mothers were asked to report their highest level of education, which ranged from high school to some level of graduate training. The education level of the group of mothers of children with SLI was significantly lower than in the group with TDL,  $t(23) = 2.14, p = .041$ , as based on a Welch's modified t-test procedure for unequal variances, since the Levene's test for equality of variances was significant at the .05 level. The results of this test showed a significant difference between mothers of children with SLI and TDL in their reported education level. However, I conducted a more appropriate test for strictly ordinal variables as with the case of the maternal education ordinal scale (e.g., mothers ranked their highest number of years of education attained from 1 to 5). In this case, the Mann-Whitney nonparametric test was more applicable than Levene's for testing the significance of the difference between groups on this demographic variable (Snedecor & Cochran, 1967). Using the Mann-Whitney procedure, the difference between mothers of children with SLI and TDL in maternal education was not significant,  $U = 72.5, p = .098$ .

Although the results of the nonparametric test were not significant, the reported differences between groups were as follows. In the group of mothers of children with SLI, five mothers reported a college level of education, and three mothers reported having a high school level of education. In the group of mothers of children with TDL, five mothers reported a level of college education. The majority of mothers had some



level of graduate training in both groups, with six of the mothers of children with SLI and 10 of the mothers of children with TDL reporting this level of education.

Thus, differences between mothers in their education level could have impacted children's LLF use. The research on maternal education relates to the literature on differences between SES groups and language and literacy skill development in children, in which parental education level is highly correlated with SES (Hart & Risley, 1992). Other research related to SES background, maternal education level, and child language skills document the differences between higher and lower SES groups in literacy activities such as book ownership and shared-reading frequency (e.g., Heath, 1982; McCormick & Mason, 1986; Teale, 1986). While this research reveals that more highly educated mothers have greater success in providing their children with language skills that contribute to early success in school than less well-educated mothers, a growing body of recent research suggests that the way parents raise their children may be more important than the parents' occupation, income, or educational level (Benjamin, 1993).

*Developmental status.* The Kaufman Brief Intelligence Test (*KBIT*; Kaufman & Kaufman, 1990) Matrices subtest provided an index of children's cognitive status. This subtest measured children's nonverbal skills and ability to solve new problems (fluid thinking) by assessing their ability to perceive relationships and complete analogies. All Matrices items involved pictures or abstract designs rather than words.

On this cognitive index, standard scores for children with SLI ranged from 88 to 160, with a mean of 107 ( $SD = 18$ ). Scores for children with TDL ranged between 90 and 120, with a mean of 103 ( $SD = 7$ ). There were no significant differences between

children's performance on the KBIT between groups of children with SLI and TDL,  $t(18) = .774, p = .449$ .

*Language functioning.* In this sample, all of the children spoke English at home. Additionally, participating children were given the *Goldman-Fristoe Test of Articulation (GFTA, Goldman, 2000)*. A significant milestone in normal language development of very young children is their ability to produce the various consonant sounds at appropriate ages. By using the first level of the GFTA and pictures of Sounds-in-Words subtest, young children can be identified for possible delays in their development of articulation skills (Goldman, 2000). This measure was used to rule out confounds with articulation and LLF use for the current study.

#### Data Collection for the Current Study

The data for the current study were from a pool of participants, who were preschool age children with SLI and TDL. Children with SLI resided in Maryland, Virginia, and West Virginia. Children with TDL lived in the vicinity of Charlottesville, Virginia. The sample for the current study consisted of 30 children who interacted with their mothers in play and storybook sharing contexts.

#### *Dependent Measures*

This study involved the use of structural language analysis techniques to examine the characteristics of children's conversational utterances across contexts for rate of LLF use. I assessed the dependent variable, rate of LLF use per utterance on the following dimensions: (a) simple elaborated noun-phrases (SENP); (b) complex elaborated noun phrases (CENP); (c) mental and linguistic verbs (MLV); (d) conjunctions (CONJ); (e) adverbs (ADV); and (f) total rate of LLF use (LLF) per utterance. Syntactic structures

such as elaborated noun- and verb-phrases refer to the use of nouns, or verbs, and their modifiers (i.e., adverbs and adjectives) for portraying ideas through words, as well as description and elaboration of ideas. Conjunctive phrases refer to the use of phrases containing conjunctions to express ideas of a causal, temporal, and relational nature. Appendix A provides definitions and examples of LLFs.

Children's rate of use for each of the LLF dimensions, as well as for the LLF composite was measured as a proportion of the number of utterances produced in each context. An utterance was defined as a word, phrase, or clause, including main clauses with all subordinate clauses attached to it. For example, the utterance, "the big dog" has one CENP. Another example of an utterance, "I say he's a big dog" has two LLFs, one MLV (say) and one CENP (a big dog).

The following rules for segmenting utterances in transcripts were based on Lund and Duchan's (1993) suggested use of intonational, syntactic, and contextual information in the following way to make decisions about the determination of what constituted an utterance: (1) The end of an utterance is indicated by a pause that is preceded by a rising or falling intonation contour; (2) The end of a grammatical sentence is the end of an utterance; (3) Two or more sentences can be said in one breath without a pause, but each should be treated as a separate utterance for transcription and analysis; (4) A group of words, such as a noun or prepositional phrase that cannot be divided without losing meaning is an utterance, even though it is not part of a complete sentence, if it is followed by a pause of more than two seconds or by a pause preceded by a rising or falling intonation contour; and (5) Sentences with subordinate, embedded, or relative clauses are counted as single complex sentences.

### *Independent Variables*

There were two independent variables in the study. The first independent variable, context, had two levels, play and storybook sharing. The second independent variable was group, in which children had either specific language impairment (SLI) or typically developing language (TDL).

In the current investigation, I used the SLI criteria that Justice and colleagues developed for use in their two home literacy projects. Catts and colleagues (2001) established these diagnostic standards for identification of SLI in preschool age children, in which children were considered to have SLI if they performed at least 1.25 standard deviations (SD) below the mean on two or more measures of oral expression or listening comprehension in areas of morphology, syntax, and semantics. Subtest performance for children with SLI on the core battery of subtests of the TOLDP3 is included to confirm diagnosis of SLI for designation in the SLI group in the current study (see Appendix B). TOLDP3 subtest performance was the diagnostic tool used to identify children as SLI in the current study. It provides information on children's performance on the composite scores, which comprise linguistic features of the six subtests of the TOLDP3.

Performance on the subtests of the TOLDP3 for children with SLI ranged from below to well below average across both semantic and syntax language measures. From this overview of children's individual performance on subtests, which designated their status as SLI, there was no overlap between children's areas of weakness and LLF use, the dependent measure for the current study. I determined this from reviewing children's subtest scores, in conjunction with subtest descriptions from the TOLDP3 test manual as appended (see Appendix C).

Calculation of TOLDP3 scores for children with TDL and SLI for spoken language and listening quotients provided measures of expressive and receptive language skill, respectively. There were significant differences between children's performance on expressive and receptive measures between groups of children with SLI and TDL,  $t(28) = 17.13, p = .000$ , and  $t(28) = 12.35, p = .000$ , respectively.

On the expressive measure of the spoken language quotient of the TOLDP3, children with SLI scored between the first and 37<sup>th</sup> percentile ( $M = 13.2, SD = 10.01$ ). Spoken language quotient scores of children with TDL ranged from 42<sup>nd</sup> to 98<sup>th</sup> percentile ( $M = 85.5, SD = 12.92$ ). In receptive skill, as measured through the listening quotient, scores for children with SLI ranged from in the 3<sup>rd</sup> to 73<sup>rd</sup> percentile ( $M = 37, SD = 20.99$ ). Scores of children with TDL were between the 44<sup>th</sup> and 91<sup>st</sup> percentile ( $M = 77.40, SD = 11.61$ ).

#### *Procedures of the Current Study*

Of the approximate 90 children screened, who met eligibility requirements, 15 children with SLI and 15 children with TDL were selected at random for inclusion in the current study. Following the screening activities, eligible families participated in videotaped play and storybook sharing activities. Project personnel, including the Director, project coordinators, and trained research assistants collected videotaped samples of mothers and their children during play and storybook sharing, which were the sampling contexts under investigation in the current study.

*Videotaping procedures.* In the collected samples of mother-child interaction, participants engaged in play, followed by storybook sharing activities. In the current study, children's language use during the initial play context was compared with their

language use during the storybook sharing context. In the play context, participants were provided with a selection of toys to use. In the storybook sharing context, mothers were given a storybook to read with their children. The total duration of the mother-child interaction was between 9 and 20 minutes, with a mean duration of 15 minutes ( $SD = 2.4$ ). The minimum time in play was 6 minutes and 30 seconds. The maximum time in play was 16 minutes, with a mean of 11 minutes ( $SD = 1.98$ ). The time spent in the story context was approximately four minutes. The minimum interaction time lasted approximately 2 minutes, and the maximum was 6 minutes and 30 seconds, with a mean of 3 minutes and 30 seconds ( $SD = 2.4$ ).

During videotaped sessions, trained examiners used the same instructions with each mother-child dyad. During these sessions, examiners supplied materials and signaled a shift in the context with a newly introduced set of materials. To ensure consistency, the order of these contexts was the same across participants: play occurred initially, followed by storybook sharing. Since all participants engaged in the same order of the contexts, this presented a limitation to the findings in terms of a possible order effect.

*Materials.* In the first 10 minutes of each observation session, children participated in a play context. They had an assortment of toys to choose from including two furry animal hand puppets, a cat and a penguin. There also was a set of transportation toys, which included a helicopter, several cars, signs, and figurines with a floor mat showing a diagram of a town. Other play items included a set of 64 colored crayons with paper and a picture storybook. These toys were selected because they were familiar and engaging to preschool age children. The kind of dialogue that was expected

during the mother-child interactions included description and elaboration (e.g., crayons and paper) and pretend play (e.g., puppets and vehicle with floor mat) based on the available toys. In the first context, the examiner provided the following instructions to participants: “*Please engage in ten minutes of free play using these toys*”. At the end of the play period, examiners asked participants to put away materials in preparation for the story context.

In the storybook sharing context, the examiner removed toys from the play area and gave the picture book, *Where’s Rusty?* (Amery, 1999) to participants. During the story reading activity, the examiner provided one directive to mothers, “*to read as [they] normally do*” with their child. The storybook was 16 pages in length and contained flaps in which children could follow along with the story by pulling the flaps down and discovering what was behind the door of each page. The narrative featured two children, a brother and sister, who were looking for their lost dog, Rusty, on a farm. Each page of the story presented a farm animal in a unique location of the farm. Based on the interactive design of the flap book and the familiarity of the topic of farm animals, the kind of dialogue that was expected during the mother-child interactions in the story context included description and elaboration.

#### *Procedural Fidelity*

Examiners were trained to observe the amount of language produced by children during phases of mother-child interaction to establish a baseline sample of children’s oral language production. To be considered eligible, children were required to produce language samples with 50 or more utterances across play and storybook sharing contexts. If a child produced a language sample of fewer than 50 utterances during the videotaped

mother-child interaction sessions, the child was given additional “play-time” at the end of the storybook sharing context. During this time, examiners used direct elicitation techniques to obtain at least 50 utterances from the child. None of the children in the current sample required these additional elicitation procedures.

The overall time spent in the play and storybook-sharing contexts of mother-child interaction was essentially the same within and between groups, lasting approximately 10 minutes in play, and approximately five minutes in storybook sharing. However, due to the variability of time for each child in each context, LLF rate of use for children was calculated as a proportion of the number of LLFs in each context divided by number of utterances in each context. The resulting LLF scores for children were rate per utterance calculations for each of the LLFs and for the total composite in each context.

During play and storybook contexts, examiners used minimal and consistent instructions with children. This ensured that contexts were equivalent for comparison between groups.

*Data identification.* Personnel randomly selected a subset of 30 samples (15 SLI and 15 TDL) for use in the current investigation. This external control ensured that the data analysis was conducted blind to group. Thus, I transcribed and coded samples without knowledge of which children had SLI and which had TDL. The reason for this was that there could be coder-expectancy effects if the same researcher who observed and videotaped the interaction was to recall it during the transcription and coding phases of data collection, which could contribute bias to the analysis. This data identification procedure also ensured confidentiality of the identity of participants. A cross-referenced



list of dyad identities was filed separately, so that the children in each language sample could be identified.

### *Language Analysis Procedures*

Language analysis procedures of the study involved data collection, transcription, and coding of language samples from the videotaped samples of mother-child interaction.

*Data extraction.* To analyze child language from videotaped sources, some of the interaction data needed to be converted from analog (video) to digital media format. The first step of this process was in data extraction (i.e., importing), in which video samples were converted into digital media format. First, videotaped samples were captured and then imported onto digital-video-disk (DVD) media for further processing using IMOVIE computer software (Apple Computers, 2001). Following importing and creating of digital media files in three formats of DVD master (.dv), visual (.mov), and audio (.aif) file formats, language samples across play and storybook sharing contexts could be transcribed conventionally. These were critical aspects of this data collection since transcribers and coders used audio and video media sources to review transcription and coding data for participants.

*Sampling context of data collection.* As Miller (1986) has recommended, the first step in collecting language samples is to obtain representative sampling of participants' spontaneous language. The term "representative" refers to both reliability (the degree to which repeated samples are similar in content) and validity (the degree to which the sample represents the participant's productive language ability). Once the representativeness of samples has been established, participants' performance can be reliably interpreted as an index of their linguistic knowledge. The following descriptive

information is presented to establish the representativeness of sampling in the current study.

In collecting these data, the sampling context was consistent across participants, which was spontaneous conversation between mothers and children in play and storybook sharing contexts. There was limited time variability, with the total duration of the samples lasting between 10 and 15 minutes per mother-child dyad. Fidelity measures were taken in data collection to ensure that samples were comparable in terms of length. Reliability of data collection was ensured through sampling, transcribing, and coding procedures used in this study. Sampling context is discussed first and followed by transcription, coding, and analysis procedures.

The interactive relationship established between the mother and the child was basic to language sample collection in the current study. The dialogic partner, in this case, the mother, had a particular role as the communication partner with her child. Input from these dialogic partners was assessed for its function and intention, according to speech act use in each of the sampling contexts. A summary of the mothers' input according to speech act use is provided in the following section.

In addition to consistency of the input provided by caregivers, all of the mothers demonstrated a comfortable rapport with their children during play and story activities. The resulting language samples have sufficient spontaneity to function as a valid index of children's productive language performance. Sometimes, during the videotaping children asked about the purpose of the session, and their mothers responded that there was a camera recording them. With this explanation, children's interest in the recording equipment quickly faded as they focused on the activity and conversation.

*Analysis set, transcript cut, and coding.* The analysis set (i.e., subset of utterances that the analyses were based on) contained complete and intelligible verbal utterances. It excluded utterances that: (1) were abandoned and interrupted; (2) contained unintelligible segments; or (3) were nonverbal. Standard language measures were based on the utterances in the current analysis set. These analyses were generated using the SALT-R program. Transcript cutting was used to determine how much of the transcript to include in the analyses. The default transcript-cut, which was the entire transcript (nothing cut) was changed to restrict the analysis to specific sections of the transcript (play and story contexts). The "Transcript-cut" option within the "Setup" menu of SALT-R was used to change the current transcript-cut. The transcript-cut was specified in terms of timing lines, which noted examiners' entrance to the play context to signal the activity shift to storybook sharing. For coding purposes, the SALT-R coding option was used to mark LLF use for the five dimensions, and for maternal speech acts. This feature in SALT-R enabled quantification of these measures.

*Transcription.* I transcribed the child language samples from DVD master copies in random order, according to children's assigned numbers. Transcription procedures followed the conventions established by the *Systematic Analysis of Language Transcripts, Research Version (SALT-R, Miller & Chapman, 1996)*. Two research assistants were trained to criterion in transcription of child language samples according to SALT-R conventions (see Appendix D). Intra-transcriber reliability was set at 95 percent across five training sample transcriptions. Following training and transcription of language samples, a second SALT-R coder independently checked completed all transcripts against the DVD master files for accuracy of the following conventions, as

established in SALT-R. These included agreement on the use of speaker labels or the identification of the speaker; dysfluency codes, which constituted inaudible words or non-words; and finally, accuracy of data-entry. To differentiate between child and parent utterances, labels specified on the first line of each transcript file a “C” for child and “P” for parent; and each utterance thereafter began with a label to identify the speaker. The reliability coder recoded the samples for revisions, repetitions, and interjections according to Basic SALT-R program specifications. Dysfluencies, as identified in the previously elicited and transcribed samples, were placed within parentheses to exclude them from word counts. Any disagreements were resolved by conferencing.

*Coding.* I used two coding systems following completion and checking of each SALT-R transcript. Following the transcription of language samples in SALT-R file format and rechecking of transcription accuracy, the author and two trained graduate students coded transcripts for mothers’ speech act use and children’s LLF use. Initial coding of speech acts was conducted by two trained graduate students, who were trained to criterion in coding of mothers’ speech acts in transcripts. The same reliability procedures were followed for coding as in transcribing in SALT-R. On the coding of speech acts, point-by-point interrater reliability was 87% initially. After two transcripts, the interrater score across three transcripts reached 99%. All disagreements were resolved by conference.

Following completion and checking of speech act coding, language samples were coded for dependent measures of LLF use in child utterances. The author and a third graduate student followed an initial training protocol to identify LLFs in child utterances, which included practice exercises from *The Syntax Handbook* (Justice & Ezell, 2002) and

completion of an evaluation of LLF identification in child language samples (see Appendix E). LLF coders reached 96% or higher on the evaluation before point-by-point reliability procedures were conducted. Initial interrater agreement was 85%. After three transcripts, the interrater score was 99.33%. All disagreements were resolved by conferencing. Following training procedures, coders independently identified each of the following dimensions of LLF use in child utterances in language samples to determine the number in each context. The rules for coding each of the LLF dimensions followed those used by Cumenton and Justice (2004) (see Appendix A).

Speech act and LLF codes were entered directly into computerized data files of all language transcripts, which had been previously created using the basic SALT-R program. Files were created for each dyad in each context (i.e., play and storybook sharing). In each of these contexts, files were created using SALT-R in which LLF and speech act use existed in each context by file name and ID number (e.g., LLF003 was the file that had LLF coding for participant 003). The codes for children's use of simple and complex elaborated noun phrases, adverbs, mental/linguistic verbs, and conjunctions were [SENP], [CENP], [ADV], [MLV], and [CONJ], respectively. These symbols were entered into existing SALT-R data files for calculation of counts in each context by the program. The use of the SALT-R program generated the total number of LLFs, in which the symbol was [LLF]. Data generated from the use of the SALT-R computer program enabled calculation of rate on each of the dimensions of LLF use for children in SLI and TDL by group and context. These data were entered into a statistical software program for further analysis of the independent variables on the dependent measures of LLF rate of use.

*Data analysis.* I analyzed language samples from children in each of the contexts for rate of use for each of the LLFs under consideration, as well as the rate of use for the LLF composite. As suggested by Westby (1985) and in the key study on LLF analysis in preschool age children by Curenton and Justice (2004), coding of the dimensions of the LLF composite can provide an index of literate oral language production as well as an overall index of literate language production. LLF rate of use has been shown at a preliminary level, to be a feasible and valid measure of semantic diversity and syntactic knowledge in young school age children with SLI (Greenhalgh, 1999; Greenhalgh & Strong, 2001).

*Description of sampling context.* I conducted preliminary descriptive analyses of the sampling context for children with SLI and TDL to determine whether there were group differences in play and story contexts. Differences in means were determined by independent samples t-tests, either Welch's or Standard, based on an initial test for equality of variances using Levene's (1960) test. To determine whether the sampling contexts were comparable, I examined differences in time and number of utterances across contexts for groups with SLI and TDL. Time and number of utterances in play and story contexts did not differ significantly between groups in either context. In the play context, both groups of children spent on average between 10 and 12 minutes,  $t(18) = .78, p = .445$ . They produced between 70 and 80 utterances in play,  $t(28) = 1.16, p = .257$ . In the story context, children spent between 3 and 4 minutes,  $t(28) = .97, p = .340$ . They produced between 20 and 23 utterances in the storybook sharing context,  $t(28) = .379, p = .708$ . In sampling, as evident through the review of the related literature, investigators have been advised to specify lengths of language samples analyzed for LLF

use. This is because disaggregated feature use and semantic diversity might vary as a function of language sample length (Greenhalgh, 1999; Liles et al., 1995).

### *Fidelity of Data Sources*

The checks for fidelity of procedures used in data collection were completed as part of the two home literacy projects, from which the data for the current study was obtained. The larger data set had information from eligibility screening phases, which included questionnaire, interview, and assessment activities with participants. To establish procedural fidelity during these phases for determining group status, approximately 25 percent of the videotaped activities were observed for consistency and accuracy of administration. These sessions were randomly selected for procedural fidelity of examiners': (a) sequencing of tasks; (b) presentation of directions and practice items; and (c) use of feedback.

*Mother-child videotapes.* Procedural fidelity checks were conducted on videotaped samples of mother-child interaction in play and storybook sharing contexts to ensure consistency across contexts, one of the grouping variables of the study. Fidelity checks of videotaped samples were conducted using data sheets as appended (see Appendix F). These sheets were used to establish the consistency of procedures with participants across play and storybook sharing contexts. Procedural fidelity was determined by scoring 20 percent of the play and storybook contexts (i.e., six of 30 sessions) for the following: (a) duration of each session and (b) number of child utterances. Fidelity checks included a third section on the interaction between project personnel and dyads for consistency of personnel (a) instructions; (b) feedback; and (c) sequencing of materials.

A second trained observer trained to criterion using point to point protocol with the first coder, used the data sheets to recode selected videotaped sessions (six tapes) to establish reliability data for the mother-child videotaping. This fidelity coder randomly selected half of the remaining videotaped sessions (12), and evaluated them for consistency using the appended data sheet (see Appendix F). A fidelity score for each sample, represented as a percentage, was constructed for the majority of the videotaped samples (18). Each sample received a fidelity score, expressed as a ratio of the total number of points earned, by the possible number of points awarded by coders from the data sheets. The resulting ratio was multiplied by 100 to obtain a percentage score for each sample. The fidelity score across the majority of videotaped samples was 100 percent.

*Input from the dialogic partner.* The purpose of this study was to provide information on how context and group factors were associated with LLF use in preschool age children engaged in interaction with their mothers. Thus, it was necessary to describe the function and intention of the input from mothers. To provide information on the mothers' input, utterances were characterized according to function and intention of speech act. The speech act coding system was adapted from Conti-Ramsden and Friel-Patti (1983), and Sutton et al. (in press). These authors used a speech act coding system to characterize maternal utterances during interactions with children having SLI. The coding system categorizes utterances according to strategies which researchers identified in parent-child play and storybook sharing interactions (e.g., Dale et al., 1996; van Kleeck, 2004; Whitehurst et al., 1994a, 1994b). The coding system identifies the function and intention of the parental linguistic behavior during parent-child interaction



across five types of assertive, requestive, directive, responsive, and regulative speech acts. The speech act codes, definitions, and examples used in this study are listed in Appendix G. It is important to note that the method selected is of unknown influence on the LLF-type utterances of children, so no assertions about causality can be made.

I found that mothers of children with SLI and TDL used requestive speech acts, or interaction strategies most frequently in both play and story contexts. Mothers of children with TDL used a higher frequency of assertive and responsive acts in the play context than mothers of children with SLI,  $t(27) = 2.34, p = .027$ , and  $t(25) = 3.92, p = .001$ , respectively, which could be defined as either extra textual or interactional strategies. There were no significant differences between mothers of children with SLI and TDL in their speech act use along the five types of assertive, requestive, directive, responsive, and regulative speech acts in the story context,  $t(28) = .315, p = .755$ ,  $t(28) = 1.59, p = .121$ ,  $t(28) = 1.86, p = .122$ ,  $t(28) = .609, p = .547$ , and  $t(28) = .529, p = .601$ , respectively. Since the purpose of the speech act coding system in the current study was to describe the function and intention of the caregivers' utterances in story and play contexts, I did not hypothesize a relationship between speech act types and LLFs. However, since there were differences between mothers of children with SLI and TDL in the play context, there might have been an influence due to maternal speech act use on children's LLF use in the play context. Also, the direction of influence could have been going in the opposite direction, from child LLF use to maternal speech act use, wherein the play context, children used more LLFs which influenced maternal speech act use.

## Design and Analysis

Thus, two groups of children, those with SLI and TDL were compared in the two contexts of play and storybook sharing to describe differences between grouping factors on the dependent measures for LLF rate of use. The two independent variables were context and language group. The between-subjects factor was group, in which participants were children with SLI and TDL. The second independent variable was the within subjects factor of context, in which there were two levels of play and story. The dependent variable was measured on six dimensions and expressed as children's rate of use for: (a) SENP; (b) CENP; (c) MLV; (d) ADV; (e) CONJ; and (f) total LLF. Rate of use on each dimension was calculated as a count of the total number of each LLF produced, divided by the number of utterances used in each context, and expressed as a rate per utterance for each context.

### *Use of Descriptive Statistics*

I generated descriptive statistics for children's percentage of LLFs per number of total words (NTW). I also calculated descriptive statistics for children's LLF use for each of the features under consideration, and for the LLF composite. I calculated these statistics across independent variables of context and group. Descriptive information, including means, standard deviations for the LLF variables and correlations were calculated to characterize the nature of the relationship between the LLF composite and its dimensions in play and story contexts.

### *Research Questions*

The research questions were as follows:

1. Were there differences in LLF rate of use between children with SLI and TDL in play and storybook sharing contexts?
2. Were there differences between children with SLI and TDL in LLF rate of use on dimensions of CENP, SENP, ADV, CONJ, and MLV use in play and storybook sharing contexts?

### *Analytic Procedures*

To answer the research questions, I used univariate and multivariate analysis procedures. I addressed the first question of whether there were differences in LLF rate of use between children with SLI and TDL in play and storybook sharing contexts using a two-way ANOVA, in which the grouping factor was context (play and storybook sharing). This enabled comparison within SLI and TDL groups, to determine the extent to which children differed in their LLF use between play and story contexts.

For the second question, the five LLF dimensions were measured using one MANOVA. A separate two-way ANOVA was run for the LLF composite having six dimensions, which included the five dimensions plus the summed LLF composite. Significant interactions of group by context were tested for simple main effects using standard t-test procedures.

### *Effect Size and Power Calculations*

In this study, Cohen's  $d$  was used to calculate effect sizes of group and context on LLF variables (Thalheimer & Cook, 2002). I used Cohen's  $d$  effect size calculation because it has two advantages over other effect size measurements. First, it is considered to be standard and its calculation permits a comparison to large numbers of published studies. Second, Cohen's (1988) suggestion that effect sizes of .20 are small, .50 are

medium, and .80 are large enables a comparison of an experiment's effect-size to known benchmarks. According to Cohen's system, effect sizes can be classified into the more specific bands of: 1) negligible effect ( $\geq -0.15$  and  $< .15$ ); 2) small effect ( $\geq .15$  and  $< .40$ ); 3) medium effect ( $\geq .40$  and  $< .75$ ); 4) large effect ( $\geq .75$  and  $< 1.10$ ); 5) very large effect ( $\geq 1.10$  and  $< 1.45$ ); and 6) huge effect  $> 1.45$ . In the current study, Cohen's  $d$  was calculated by using pooled standard deviations for independent samples t-tests (group effect sizes) and standard deviations in difference scores (context effect sizes).

I used Cohen's (1988) standards of .20 as small effect size, .50 as medium effect size, and .80 as a large effect size as a measure of the magnitude of effects, for the purposes of power calculation. I used a significance level of .05 as the threshold for statistical significance. Using Cohen's (1988) statistical power analysis, assuming an effect size of .80, an adequate number of subjects per group were identified to be 15 in order to give a power of at least .80 for the related dependent t-test (see Appendix H). The independent two-sample (two-sided) t-test procedure was used because there was no prediction about the direction. Using the two-sided t-test, assuming an effect size of .80, adequate power (i.e., at least 80% would detect an  $ES = 1.1$ ) could be reached with 26 subjects. However with the available sample size of 15 per group, there was a 56% chance of finding a difference among groups.

## CHAPTER FOUR

### Results

In this chapter I provide the results of the analysis across the contexts of play and storybook sharing for children with SLI and TDL. First, I provide descriptive information on LLF measures including differences between groups in percentage of LLFs used in each context. Next, I present correlations between the LLF composite and its dimensions across contexts and groups to establish a baseline level of cohesion between the LLF dimensions and the LLF composite. In the third section, I address findings of main effects and interactions for the LLF composite across contexts for children with SLI and TDL. This section also addresses findings for effects on the LLF dimensions across contexts for children with SLI and TDL. In the final section, I address the significance of these findings with respect to effect size calculations for group and context.

#### *Percentage of LLFs Used by Children*

To provide an overview of the percentage of LLFs in children's overall language, I calculated the percentage of LLFs to number of total words (NTW) for children with SLI and TDL in play and story contexts (see Table 4). In this sample, 23% of the total number of words used in play were LLFs. Twenty percent of children's word use in the story context were LLFs. When comparing between groups, in play, children with SLI produced 18% of their total words as LLFs, in comparison to children with TDL with 27%. In the story context, however, the groups were equivalent in producing around 20% of their number of total words as LLFs.

---

*Table 4. Percent of LLF use by context for groups*

---

Variable	Percent LLF use in Play <i>M (SD)</i>	Percent LLF use in Story <i>M (SD)</i>
Total (n=30)	.23 (.15)	.20 (.08)
SLI (n=15)	.18 (.03)	.20 (.09)
TDL (n=15)	.28 (.20)	.21 (.07)

---

*Correlations among LLF Variables for Children with SLI and TDL*

I conducted a correlational analysis to determine the extent to which each LLF dimension was associated with the LLF composite. The bivariate Pearson-product correlations between the LLF composite and its dimensions for children with SLI and TDL in play and story contexts are shown in Table 5. The means and *SDs* of rates of use for the LLF variables and complete correlation matrices for SLI and TDL populations are appended (see Appendix I). Means and *SDs* of rates of use for the LLF variables for SLI and TDL groups can be found below in Table 8.

In the play context, there were high correlations among each of the LLF dimensions and the LLF composite (see Table 5 below). The LLF composite in play was significantly correlated with SENP in play ( $r = .66, p < .01$ ), CENP in play ( $r = .57, p < .01$ ), ADV in play ( $r = .67, p < .01$ ), CONJ in play ( $r = .83, p < .01$ ), and MLV play ( $r = .46, p < .05$ ).

There was a similar pattern in the story context. The LLF composite in the story context for children was significantly correlated with SENP story ( $r = .85, p < .01$ ), CONJ story ( $r = .69, p < .01$ ), CENP story ( $r = .36, p < .05$ ), and ADV story ( $r = .43,$

$p < .05$ ). MLV use in the story context was an exceptional finding, in which it was negatively correlated with LLF use in the story context ( $r = -.16$ , ns). This finding can likely be explained by the limited use of MLV in the story context.

*Table 5. Correlations between LLF composite and dimensions for children*

Variable	SENP	CENP	ADV	CONJ	MLV	LLF total
LLF Play	.68**	.57**	.67**	.83**	.46*	.97**
LLF Story	.85**	.36*	.43*	.69**	-.16	.41*

Note. \*  $P < .05$ , \*\*  $P < .01$

*Children with SLI: The relationship between LLF use and context.* There were moderate to high correlations between the LLF composite and each of the LLF dimensions in the play context for children with SLI (see Table 6 below). This was similar to the findings in the overall sample of children. LLF use in play was correlated with SENP play ( $r = .53$ ,  $p < .05$ ), CENP play ( $r = .47$ , ns), ADV play ( $r = .35$ , ns), CONJ play ( $r = .59$ ,  $p < .05$ ), and MLV play ( $r = .39$ , ns).

In the story context, there was a similar pattern of moderate to high correlations. Rate of LLF use in the story context for children with SLI was highly correlated with SENP story ( $r = .88$ ,  $p < .01$ ), and CONJ story ( $r = .82$ ,  $p < .01$ ). Rate of LLF use in the story context for children with SLI was moderately correlated with CENP story ( $r = .40$ , ns) and ADV story ( $r = .38$ , ns). As with the finding on MLV use among the total sample of children due to limited use, MLV use in story was an exceptional finding in this case as well, in which it was negatively correlated with LLF use in the story context ( $r = -.19$ , ns).

*Table 6. Correlations between LLF composite and dimensions for children with SLI*

Variable	SENP	CENP	ADV	CONJ	MLV	LLF total
LLF Play	.53*	.47	.35	.59*	.39	.90**
LLF Story	.88**	.40	.38	.82**	-.19	.48

Note. \*  $P < .05$ , \*\*  $P < .01$

*Children with TDL: The relationship between LLF use and context.* As in the case of the overall sample, and for children with SLI, there were moderate to high correlations in the rate of use for children with TDL between the LLF composite and each of its dimensions in the play and story contexts (see table 7 below). Rate of use for the LLF composite in play showed moderate to high correlations with SENP in play ( $r = .78, p < .01$ ), CENP in play ( $r = .46, ns$ ), ADV in play ( $r = .73, p < .01$ ), CONJ in play ( $r = .82, p < .01$ ), and MLV play ( $r = .28, ns$ ).

In the story context, the same pattern of moderate to high correlations among the LLF dimensions and the LLF composite existed. Rate of LLF use in the story context was highly correlated with SENP story ( $r = .81, p < .01$ ) and ADV story ( $r = .52, p < .05$ ), and moderately correlated with CENP story ( $r = .38, ns$ ) and CONJ story ( $r = .51, ns$ ). The negative correlation for the dimension of MLV with LLF use in the story context was likely due to the lack of use ( $r = -.14, ns$ ).



Table 7. Correlations between LLF composite and dimensions for children with TDL

Variable	SENP	CENP	ADV	CONJ	MLV	LLF total
LLF Play	.78**	.46	.73**	.82**	.28	.99**
LLF Story	.81**	.38	.52*	.51	-.14	.51

Note. \*  $P < .05$ , \*\*  $P < .01$

*Differences in LLF Rate of Use*

In this section, I present findings on the differences in LLF rate in children with SLI and TDL in play and story contexts on the LLF composite, using an ANOVA, and on differences between groups on the LLF dimensions, using a MANOVA procedure.

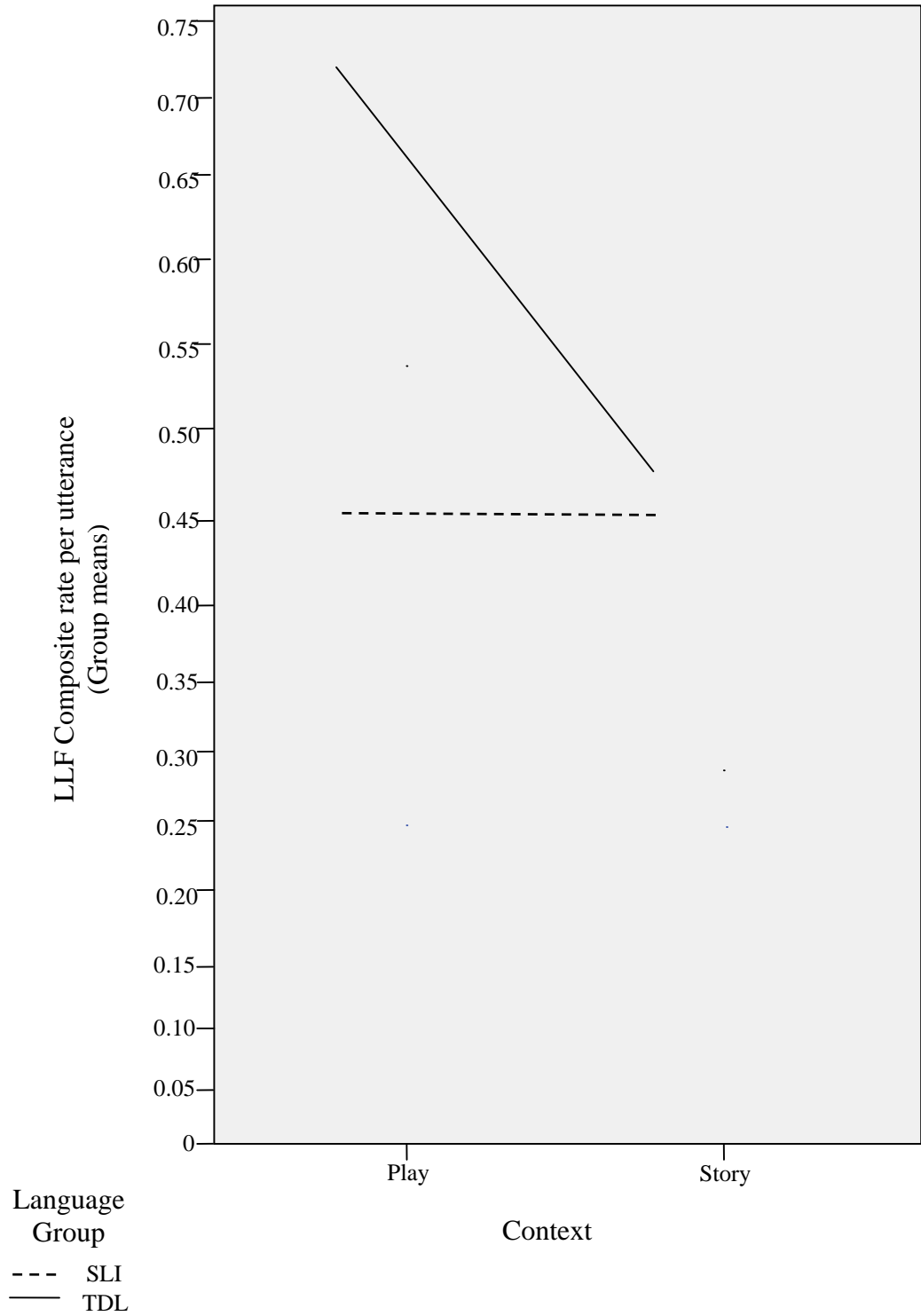
Means, standard deviations, effect sizes, and significance levels for the LLF variables for groups are listed below in Table 8. Means, standard deviations, effect sizes, and significance levels for LLF variables for each group by context are presented in Table 9.

*LLF composite.* In Research Question One I asked: Were there differences in LLF rate of use between children with SLI and TDL in play and storybook sharing contexts? To address this question, I used a repeated measures ANOVA with group as the between-subject variable, and context as the within-subject variable. The results of the between-subjects test to determine differences between groups in LLF rate of use across contexts revealed a statistically significant difference,  $F(1, 28) = 5.14, p = .03$ . There was a significant interaction between context and group,  $F(1, 28) = 4.91, p = .04$ . Follow up independent t-tests of the interaction effect show that children with TDL had a significantly higher rate of LLF use in the play context than children with SLI,  $t(28) =$

4.10,  $p < .001$ . In the story context, there was no significant difference between groups in LLF rate,  $t(28) = .33$ ,  $p = .74$ .

The difference between groups in the rate of LLF use in the play context was greater than the difference in the story context. Children with TDL used a significantly higher LLF rate in play than in story; whereas children with SLI did not show significant differences in their LLF rate between play and story contexts. The interaction plot (Figure 2) below illustrates this interaction. Children with SLI had an LLF rate that was uniformly low across both contexts; whereas children with TDL had a higher LLF rate during play, but relatively low LLF rate during the story context similar to the children with SLI.

Figure 2. Interaction plot for LLF composite



*LLF dimensions.* In Research Question Two I asked: Were there differences between children with SLI and TDL in LLF rate of use for CENP, SENP, ADV, CONJ, and MLV use in play and storybook sharing contexts? I used a repeated measures MANOVA test with group as the between-subject variable, and context as the within-subject variable. For the LLF dimensions, there was a significant interaction,  $F(5, 24) = 2.94, p = .03$ . Since the results of the multivariate analysis showed an interaction, the next step was to examine the interactions for each of the dimensions of the LLF composite to determine where significant effects lay.

I conducted tests of significance using a series of repeated measures ANOVA tests, in which context was the within-subjects measure, and group was the between-subjects factor. Four of the five dimensions showed no significant interaction effect. There was an interaction effect for CONJ,  $F(1, 28) = 8.36, p = .007$ . Since CONJ was the only LLF dimension showing a significant interaction effect, it was thus reasonable to look at main effects for dimensions CENP and ADV. There was a main effect of context for CENP,  $F(1, 28) = 6.73, p = .015$ , and ADV,  $F(1, 28) = 5.95, p = .021$ , indicating that the difference in context was due to CENP and ADV use, in which children used higher rates of these two features in the play context.

*Follow-up tests.* To examine simple main effects contrasts for interactions on CONJ, I used follow up t-test procedures. These results showed that children with TDL used a significantly higher rate of CONJ use in the play than in the story context,  $t(15) = 3.58, p = .003$ . There were no differences between children with SLI and TDL in rate of CONJ use in the story context, or between play and story contexts for children with SLI,  $t(15) = 1.07, p = .303$ . Results of these tests indicated that for CONJ use, there was a

significant difference between SLI and TDL groups, with children with TDL using a higher CONJ rate in play than children with SLI. The results also show that for children with SLI, there were no differences in rate of CONJ use due to context ( $p = .303$ ); However, there were differences in the TDL group, as indicated by the results of the paired dependent samples t-tests, in which there was a finding of significance due to context ( $p = .003$ ).

*Magnitude of Differences in LLF Use*

Children with TDL and SLI differed in their use of the LLF composite in the play context and in total, in which children with TDL used significantly higher rates of LLFs than children with SLI. Means, standard deviations, effect sizes, and significance levels between groups on each of the LLF dimensions and on the LLF composite are shown below in Table 8. There were significant differences between groups in the use of LLFs in the play context, in which children with TDL used significantly higher ( $.05 > p > .01$ ) LLF rates on dimensions of CENP, ADV, CONJ, and MLV in play than children with SLI. Groups did not differ in the story context on any of the LLF dimensions or on the LLF composite.

*Table 8. Effects of group on rate of LLF use per utterance*

Measure	TDL n=15 M (SD)	SLI n=15 M (SD)	Cohen's d Effect Size	P-Value
LLF Composite – Play	.71 (.20)	.46 (.13)	1.5	<.01***
LLF Composite – Story	.49 (.21)	.46 (.29)	.18	.38
SENP PLAY	.28 (.09)	.23 (.10)	.52	.08
SENP STORY	.26 (.15)	.24 (.19)	.16	.33
CENP PLAY	.07 (.03)	.05 (.03)	.79	.02*
CENP STORY	.05 (.06)	.03 (.04)	.32	.19
ADV PLAY	.19 (.08)	.10 (.09)	1.03	<.01***

ADV STORY	.10 (.10)	.09 (.11)	.10	.39
CONJ PLAY	.10 (.05)	.04 (.04)	1.38	<.01***
CONJ STORY	.03 (.06)	.06 (.10)	.37	.84
MLV PLAY	.07 (.03)	.05 (.04)	.76	.02*
MLV STORY	.05 (.05)	.04 (.04)	.17	.33

---

Note. \*  $P < .05$ , \*\*  $P < .01$ , \*\*\*  $P < .001$

*ENP use.* ENP use consisted of simple elaborated noun phrases (SENP) and complex elaborated noun phrases (CENP). In this sample, children with SLI and TDL differed significantly in their use of CENPs in play and story sharing contexts. Children with TDL produced a higher rate of CENPs in play than their peers with SLI ( $p = .02$ ). There were no significant differences between groups in the story context in CENP use. Additionally there were no significant differences between children's SENP production in either context. Effect size (ES) for CENP use for children with SLI was .47, for children with TDL was .49, and across groups ES was .49, indicating a medium effect of context on CENP use, in which the play context was associated with higher rate of use than story.

In SENP use, there were no significant differences between groups in each context. The effects due to context were negligible, ranging from .02 for children with SLI, to .13 for children with TDL (see Table 9 below). Additional examination of children's use of these features revealed that there were between group differences in the number of different SENPs that children with SLI and TDL used. The rate of SENP use between children with SLI and TDL was not significantly different; however there were significant differences in the diversity of SENPs that children with SLI and TDL produced. For instance, a child with SLI used a limited number of SENPs (e.g., *a dog*, *the dog*, *the dogs*) repeatedly. In contrast, in the same period of time, a peer with TDL

who had the same SENP rate, used four times as many different SENPs as the child with SLI.

*ADV use.* ADV rate differed significantly between groups in the play context. Children with TDL used a higher rate of adverbs than children with SLI ( $p < .01$ ). Groups did not differ in the story sharing context. There was a significant effect of context on adverb use ( $p = .03$ ) across children with SLI and TDL, in which the effect size ranged from a medium effect ( $ES = .43$ ) across groups, to a huge effect ( $ES = 1.61$ ) for children with TDL. The effect of context on ADV use for children with SLI was negligible ( $ES = .07$ ).

*MLV use.* Children's MLV use consisted of their production of mental (e.g., *think, feel, know*) and linguistic (e.g., *read, talk, say*) verb forms. Children's rate of MLV use differed significantly between groups. Children with TDL used a significantly higher rate of MLVs in the play context than children with SLI ( $p = .02$ ). The effect size of the group difference in the play context was large at .76, and small in the story context at .17. The effect sizes of context on MLV use for different groups indicated that within the group of children with SLI, there was a negligible effect ( $ES = .14$ ) of context on these children's MLV use. By contrast, there was a medium size effect of context on MLV use for children with TDL ( $ES = .40$ ). Across groups, the effect size of context on MLV use was small ( $ES = .27$ ).

*CONJ use.* In this study, children's CONJ use consisted of their use of both subordinating and coordinating conjunctions. In the play context, children with TDL used a significantly higher rate of CONJs than children with SLI. The effect size of the differences between groups in CONJ use in play was very large ( $ES = 1.38, p < .01$ ).

However, in the story context, there were no significant differences between groups in rate of CONJ use, with a negligible effect size between groups on this variable (ES = .10).

*Table 9. Differences in context for LLF use across and within groups*

Children with SLI and TDL (n=30)

Measure	Mean Difference	Std. Deviation Difference	Effect Size	P-Value
LLF Composite	.11	.29	.39	.04*
SENP	.01	.17	.04	.82
CENP	.02	.04	.48	.01**
ADV	.05	.11	.43	.03*
CONJ	.02	.10	.18	.33
MLV	.02	.06	.27	.14

Children with SLI (n=15)

Measure	Mean Difference	Std. Deviation Difference	Effect Size	P-Value
LLF Composite	<.01	.31	.01	.99
SENP	<.01	.20	.02	.94
CENP	.02	.04	.47	.09
ADV	.01	.14	.07	.78
CONJ	.03	.11	.28	.30
MLV	.01	.06	.13	.62

Children with TDL (n=15)

Measure	Mean Difference	Std. Deviation Difference	Effect Size	P-Value
LLF Composite	.22	.23	.97	<.01***
SENP	.02	.15	.13	.63
CENP	.03	.05	.49	.08
ADV	.09	.05	1.61	<.01***
CONJ	.07	.07	.92	<.01**
MLV	.03	.06	.40	.15

Note. \*  $P < .05$ , \*\*  $P < .01$ , \*\*\*  $P < .001$



*Summary.* The answer to each research question of whether there was a significant difference in LLF use between children with SLI and TDL across play and storybook sharing contexts was dependent upon the definition of the LLF construct. When children's LLF use was defined and measured as a univariate construct, significant effects were observed by group and context on the LLF composite. There was a significant difference between groups in rate of LLF use in play and story contexts, in which children with TDL produced a significantly higher LLF rate in play than children with SLI. There were, however, no significant differences between the groups in LLF rate in the story context.

When children's LLF use was defined and measured as a set of dimensions, the multivariate design allowed for each LLF component to be examined separately. When analyzed this way, there were differences that had not been detected in the comparison of groups using the LLF composite measure. Using the dimensional construct, there was a context effect for CENP and ADV rate of use, in which children produced a higher rate of these features in play than in the story context. Also, SENP rate of use had no effect associated with it. Evidently both groups of children used this feature measurably across contexts. Additionally, there were significant findings for a context by language interaction for the CONJ dimension. There was a significant difference between play and story context for the TDL group and not for the SLI group on this dependent measure. This group effect for the CONJ dimension followed the same pattern as the overall LLF composite, in which play context was associated with a higher rate of LLF use for children with TDL, and not for children with SLI; and children in both groups produced comparable and significantly lower rate of LLFs in the story context.

## CHAPTER FIVE

### Discussion

In this discussion I present the major issues related to my findings on LLF use in children with SLI and TDL in play and story contexts. These issues are related to the differences observed in children's LLF use between play and story contexts, and different methods of LLF measurement. The final section of the chapter addresses the limitations and implications of the current study, as well as directions for future research.

In this study, the two independent variables were group (SLI and TDL) and context (play and story). Group was the between-subjects variable, and context was the within-subjects variable, on which I assessed the dependent measures of LLF rate for the composite and its dimensions. When measuring LLF rate as a univariate construct, children with TDL had a higher rate of LLF use in play than children with SLI. In the story context, there were no differences between groups. Children with SLI were uniform in their rate of LLF use across contexts; whereas children with TDL had a significantly higher rate of LLF use in play than in story context, and their significantly lower rate in the story context was similar to children's with SLI.

When I considered LLF as a multivariate construct, there was a main effect of context on two of the LLF dimensions (CENP and ADV), in that children had a higher rate of these LLFs in the play context than in the story context. Moreover, there was a group by context interaction on one of the LLF dimensions (CONJ), in that children with TDL used a higher rate of CONJ in play than children with SLI. There was no main effect of group, context, or an interaction effect for SENP or MLV use. These findings

indicated that the play context had an effect on rate of use for some of the LLF dimensions for all children.

#### *Differences in LLF Use Between Play and Story Contexts*

*Play and LLF composite.* The current study confirms a context effect for LLF use (McKeough, 1984; Pellegrini, 1985). Pellegrini (1985) found that play was associated with young children's LLF use. However, Pellegrini compared symbolic and constructive play contexts, finding an effect for LLF use in the symbolic play context. Pellegrini suggested symbolic play was more "literate" than constructive play. Although the current study differs substantially from Pellegrini's with the addition of a story context as well as the use of mother-child dyads as compared to peer dyads, the current findings confirm children's LLF use in the play context. Further, the two studies are alike in the use of micro level LLF variables. It should be noted, however, that in the Pellegrini study, although LLF use was the dependent measure, the unit of analysis was a frequency count between peer-dyads instead of a rate for individual children. Pellegrini's sample was also limited to children with TDL and did not match the age of the children in the current study.

Other evidence of a context effect for play on LLF use comes from McKeough (1984) in her examination of LLF use in sociodramatic play and narrative contexts with groups of 4-, 6-, 8-, and 10-year-old children. McKeough found an effect for context that was associated with children's rate of LLF use across age groups. However, she limited her LLF measures to CONJ and MLV, and reported that children used higher rates of LLFs in the play context than the in the narrative context. McKeough's sample did not include children with SLI, nor did she include a control group in her study.

These studies found that children do use LLFs in a play context. This was confirmed by the current study for the TDL population, but not for the children with SLI, who did not use as high a rate of LLFs in the play context. This suggests that play did not elicit the same type of language features for children with SLI.

*Story and LLF composite.* In the story context, there was no difference between SLI and TDL groups in LLF composite use. The lack of a difference for groups in the story context could mean that there was an equalizing effect given the more scripted context of the story sharing. The lack of a difference between groups in the story context for the LLF composite might also suggest that the story context provided a “facilitating mechanism” of linguistic specificity for children with SLI, in a way that the play context did not. Storybook sharing activities have been referred to as literacy socializations since the text and adult partner linguistically scaffold children in their communication about events and ideas using specific features of discourse (Dickinson & McCabe, 1991; Ninio & Snow, 1988). Thus, the discourse produced by children with SLI during storybook sharing was as linguistically specific as their peers with TDL, given their comparable rates of use for the composite. This interpretation does not confirm previous findings, in which researchers compared oral language skills in children with SLI and TDL in narrative contexts, to find that children with TDL have significantly more advanced micro-level skills (Liles, 1985; Paul & Smith, 1993).

*Micro level LLF differences.* There was a significant main effect for context for two of the dimensions, CENP and ADV. In play, children used significantly more of these features than in story. There was no group effect for these LLF dimensions, however. Although these results seem to suggest that LLF use for these features could be

explained by differences in context, rather than the group factor, this is at best a tentative conjecture. Whether the play context might be more facilitative of these types of LLFs than story sharing requires further research. CENP and ADV are typically used in children's descriptions and elaborations of ideas and events (Hoff & Naigles, 2002). Descriptions and elaborations occurred in activities such as coloring and pretend play with figures and puppets, as compared to children's utterances in the storybook sharing context. For instance, a child with TDL used the following descriptive and elaborative statements containing CENPs and ADVs such as, "The hermit crabs has red pink sand" and "Here is a really pretty pink sunset." In car play, a child with SLI used CENPs and ADVs to describe what was happening during play on the car mat with figurines: "There a fire engine right on there" and "We really wanna go a new beach over there." In this same play scenario, a child with TDL provided descriptions and elaborations of events by saying, "This is the man who sits in the helicopter" and "This whole thing is the train track." Although the rate of use for CENP and ADV was higher for children with TDL, both groups had higher rates of these LLFs in play than in story. Thus, we might consider the play context a facilitating mechanism for children's LLF use in their production of CENP and ADV.

In contrast, CENP and ADV use was significantly less in the story context. Thus, children's utterances were less descriptive and elaborative. For instance, a child with TDL said during the story activity, "he eating the cereal". Similarly, a child with SLI said during the story activity, "I wanna open the page". These utterances contrast the types of descriptive and elaborative utterances used by both groups of children during the play context, in which there was a significantly higher rate of CENP and ADV use.

There was a group by context interaction for CONJ use. The TDL group used significantly more CONJ in play, although the two groups used similarly lower rates in the story context. This finding indicates a sensitive and strong effect among children with TDL, but no effect for CONJ rate of use among children with SLI. This group effect for CONJ use might be explained by children with TDL's use of this feature to convey causal and temporal ideas in play through the use of CONJ. For instance, in play, a child with TDL used utterances with CONJ to indicate causal and temporal thinking in play: "But how could she do that", "and then the shark's right there", "but where should she go if she's trapped", "now he's at his police office working", and "then he'll go home". These utterances contrasted the language use in children with SLI, whose utterances were mostly descriptions involving SENP, CENP, and ADV features.

The interpretation of this finding could be that this was a group effect, that CONJ behaved differently from the other four LLFs, for which there was a context effect. The dimensions of SENP, CENP, ADV, and MLV behaved the same way, by context, and not by group. This interpretation of group difference supports previous research on LLF use, in which CONJ use was found to be the most discriminating among the LLFs in terms of age-related changes in preschool children (Peterson & McCabe, 1983). The fact that children with SLI did not use as many CONJs in play suggests that they had more difficulty with expressing causal and temporal ideas in their utterances in the play context. Thus, play was not a facilitating mechanism as for children with TDL.

The dimensions of SENP and MLV had no main effects associated with them. There were no differences in either group across context. These LLFs did not show effects possibly because of the relative frequency of use for each of these features.

Children used MLVs least of all the LLFs in either play or story context. Contrastingly, SENPs were the most frequently occurring LLF, and children used them equally across contexts. This is consistent with the previous research on noun and noun-phrase use, which shows that children use these features predominantly among LLFs (Bates et al., 1994). However, as noted previously in a microanalysis of children's language samples, there were differences in diversity of SENP use between children with SLI and TDL. There is therefore, a need for further research to determine potential reasons for the finding of no context or group effect for SENP use. Perhaps the combination of SENP and CENP would be a more appropriate measure of linguistic specificity across play and story contexts for children with SLI, since children from both groups showed uniform rates of SENP use and significantly higher rates of CENP use in play than in story context to provide descriptions and elaborations of events and ideas.

*Theoretical consideration of LLF differences.* Using Piagetian and Vygotskian theories, it seems likely that the context influenced children's language use such that play brought out LLF use in a way that the story context did not. Children's LLF use in play, according to Piagetian theory, marks their use of language to move from concrete to abstract representational thought. In the play context, children were engaged in activities that involved schematic thinking such as pretend play with cars and trucks and puppets, and they used LLFs as part of their play. Also, in the play context, children were likely to engage in social interaction, using LLFs to meet the demands of their environment (e.g., participating in a symbolic play activity with their play adult partner). Also, in the play context, when children were involved in an activity such as coloring, they were likely to use abstract language in their elaborations of their ideas and descriptions of their

drawings. The context effect was evident in children's use of the LLF dimensions of CENP and ADV in the play context. From Piagetian and Vygotskian theoretical perspectives, these features are indices of children's symbolic interaction and linguistic development, since children had a higher rate of them in the play context than in the story context. Since children's rate of SENP use was high across contexts, this could indicate this feature's development as a baseline level language feature across contexts. MLV use was limited in this sample across contexts and groups.

The difference between groups in the rate of use for the LLF composite and for the CONJ dimension might be explained by the fact that children with SLI did not use LLFs in the play context in the way that children with TDL did. For instance, children with SLI who were engaged in symbolic or pretend play with their mothers used more nonverbal behavior such as hand gestures and eye contact, and other verbal behavior, than children with TDL, who used LLFs.

In considering differences between groups in play and story contexts from Vygotskian perspective, children with SLI might not have used LLFs to mediate or interact with their adult play partner. Instead, they might have engaged in social interaction using nonverbal or paralingual communication to meet the demands of their environment (e.g., participating in a symbolic play activity with their play adult partner). A Vygotskian theoretical perspective also suggests that children use increasingly specific language features such as LLFs to interact successfully with others, and that the play context could provide more abundant opportunities for interaction than the storybook reading context. Although there was individual variation, mother-child dyads were relatively limited to the parameters of the storybook sequence, in which mothers



generally read a page of the story and queried or prompted their child for a response. Based on the Rubin et al.'s (1983) social-participation scale of interactive level, and the play behavior or symbolic, the findings that children used a higher rate of LLFs in the play context than in the story context might be explained by the theory that children used these features most readily in their ZPD for learning, which was in the play context.

The effect of context for dimensions CENP and ADV in play, in which children used a higher rate of these LLFs in the play context than in the story context, could be interpreted as children's reliance on these LLFs for descriptions and elaborations to represent symbolic and abstract ideas in their transition from symbolic to ideational stages of representational thought. Another interpretation of the results in light of Vygotskian theory is that the symbolic interaction aspects of the play context elicited LLF use in children in a way that the storybook sharing context did not, because it did not involve symbolic play.

There were group differences on the LLF composite, in which the play context elicited a higher rate of LLF for the composite of features for children with TDL as compared to the rate of use for the children with SLI, who did not differ between contexts of play and story for the LLF composite. The fact that there were no differences between play and story contexts for the group with SLI suggests that the play context did not have the same effect on this group as it did on the group with TDL. Since the play and story contexts yielded a similar LLF rate of use for children with SLI, Piagetian and Vygotskian theories only partially explain the behavior of children with SLI. While these children's LLF use can be explained by these theories in the use of CENP and ADV, in which children used higher rates in play than story, the overall lack of difference for

children with SLI on the LLF composite is likely to be due to between group differences in CONJ use. Thus, differences in children's use of the LLF composite and in terms which mark causality, temporal, or sequential relations are likely to reflect between group differences.

#### *Measurement of LLF Use*

*Social vs. language research in LLF.* Generally, researchers who study children in play and social contexts use the univariate construct for LLF, whereas researchers who study children in narrative and linguistic contexts use a multivariate LLF construct. For instance, Pellegrini's (1985) use of the univariate LLF composite contrasts with the multivariate LLF construct used by language researchers (e.g., Curen-ton & Justice, 2004; Paul & Smith, 1993). This is an important consideration given the current finding of no difference between groups in the story context. This finding differs from previous research, comparing LLF skills in children with SLI and TDL in narrative contexts (e.g., Liles, 1985; Paul et al., 1996). In previous findings, children with SLI performed less well than their age-matched and language-matched peers with TDL who were preschool and school age. However, in the majority of these studies, tasks involved narrative retelling activities in which researchers examined LLF skills separately.

*Univariate vs. multivariate LLF measurement.* Another aspect of LLF measurement raised by this study is the difference between univariate and multivariate definitions of LLF used by researchers. The result of using an overall summed composite score in a particular context might result in over or underestimating LLF skills. For instance, in using a univariate definition of LLF, I found a significant interaction effect of group by context for the sum of the dimensions of the LLF composite across play and

story contexts for SLI and TDL groups. Next I used a multivariate definition of LLF in order to address the extent to which children with SLI and TDL differed on the LLF dimensions in play and story contexts. When I defined LLF rate of use with the multivariate construct having five dimensions, the results indicated a significant interaction effect for context by group on one dimension, and context effects on two dimensions, which was a change from the finding for the univariate LLF composite. The findings for LLF as an inherently multivariate construct with five dimensions revealed a context effect and an interaction effect. This was important since the increased sensitivity of the multivariate approach accounted for differences in the dimensions that were not evident from the results of the test of the univariate LLF composite.

#### *Limitations*

There are several limitations to this study. They include a lack of control due to context and sampling issues. For feasibility reasons, play and story contexts were determined a priori, resulting in an order effect. To rule out an order effect, I would need to randomize the order of the context conditions to counterbalance play and story among children. I do not know what, if any, confound this introduced into children's use of LLFs in the story context over the play context. Since the rates were higher in play, it seems unlikely that there was an order effect.

*Sampling.* The lack of significant group effects on the majority of the LLF dimensions of the LLF composite may have occurred due to the small sample size of each group in the study ( $N=15$ ). It is possible that the small size of this sample prevented a determination of a significant difference between groups or an interaction for CENP, SENP, ADV, and MLV dimensions. Based on the power analysis that I ran, it would be

possible to confirm the results with an increased sample size of 26. However, with the available sample size of 15 per group, there was a 56 percent chance of finding a difference among groups using the two-sided t test. The findings could have gained more power ( $ES = .66$ ) using a one-tailed t-test procedure for a sample size of 15.

Another limitation of the sample was that there were significant differences between groups in reported income levels. These between group differences in income level might have played a role in children's LLF use in the current study, insofar as children with SLI were from lower SES backgrounds. Thus, the significantly lower LLF rates of children with SLI could be attributed to SES rather than a group or context effect. I did not covary SES because income level did not correlate with rate of LLF use ( $p = .42$  and  $p = .73$ , for SLI and TDL groups respectively).

*Materials.* Although the materials promoted interaction between participants in the play and story contexts, the selection of materials in the current study was determined a priori, and thus may limit the interpretation of the findings. For instance, the toys available might be related to the differences between groups in the play context. To address this limitation, materials used in the play context would need to be systematically controlled to rule out confounding effects. Also, materials in the storybook context presented a limitation in that only one book was used with participants. A more appropriate method would be to use several equivalent books and randomize their selection in order to control for possible confounding effects between LLF use and the storybook selection.

*Dialogic partner as a contextual variable.* A final limitation of this study was that I did not control for the input from the dialogic partner, who were the mothers of children

in the current study. Thus, it introduced an unknown set of factors into the data. I provided a description of the input from dialogic partners via speech act coding to address this issue. I found that mothers of children with TDL and SLI seemed generally equivalent in their input across contexts. Although the input from these dialogic partners was equivalent at a descriptive level, this area represents a limitation and clear need for further study.

### *Implications*

The findings of this study have implications in areas of language and literacy, assessment and measurement, and research with young children who have SLI and TDL.

*Language and literacy.* The first implication pertains to language and literacy practices with children who may be limited in their use of LLFs, which includes children with SLI. Evidence from this study on LLF use in preschool age children with SLI and TDL in play and story contexts adds to existing information on best practices for facilitating language in settings such as preschools and home environments where these activities are likely to occur. This finding has implications for supporting child language facilitation techniques in typically occurring play contexts, in which children with TDL use LLFs differentially from children with SLI. This finding suggests that children with SLI might benefit from language facilitation in play activities involving linguistically specific and syntactically complex language such as LLFs; however it is not yet clear what is the nature of the relationship between caregiver speech acts and child LLF use.

*Assessment and measurement.* The findings from this study have implications for assessment in the area of language production with children who may have difficulty producing specific semantic and syntactic forms such as LLFs. The findings on the LLF

dimensions provide developmental information that might be used in language assessment. For instance, SENP and MLV use was consistent across groups and contexts; However, CONJ use was significantly associated with a context by group interaction effect for TDL and SLI groups. Additionally, there was a context effect for CENP and ADV use, with children using higher rates in play than in story. In addition, certain LLFs might be measures of semantic diversity for some children (e.g., CONJ) and others might be syntactic markers (SENP) in all children (TDL and SLI). Examination of the dimensions shows group differences between SLI and TDL in CONJ use between play and story contexts, whereas groups significantly differ in the overall use of the LLF composite. The dimensional approach to LLF assessment specifically represents children's scores on the range of features. For instance, in SENP use, the finding of no difference between SLI and TDL groups across play and story would not have been evident from the use of the composite alone. This detailed information has implications for language assessment of semantic and syntactic forms. This comparison of LLF use in SLI and TDL groups suggests there may be a developmental progression for these features, with SENP use first, followed by CENP and ADV use. However, this would need further testing to establish a developmental trajectory.

Additionally, this study has implications for measurement of linguistic specificity through the LLF construct with preschool age children who may have SLI or other language learning difficulties. One of the shortcomings of the previous research in measurement of semantic and syntactic knowledge with children with production difficulties is that their performance on standardized tests underestimates their linguistic knowledge (Botting, 2002; Boynton-Hauerwas & Stone, 2000). The LLF construct offers

a multidimensional approach to measuring children's linguistic specificity. In this study, a univariate, as well as a multivariate (i.e., on the vector of dimensions) analysis of LLF provides developmental information on the child's language production skills considering the application of the LLF construct. The sensitivity of the multivariate dimensional approach reveals an interaction between group and context that is not identifiable by using the univariate definition of LLF. The current study contributes to the importance of using a multivariate set of scores to examine the LLF construct, since each of the features can be taken individually as well as in a composite. Additionally, the findings from the current study replicate and extend McKeough's (1984) findings of a significant main effect for context and an interaction effect for children's rate of CONJ and MLV use, in comparing children with SLI and TDL in play and narrative contexts.

#### *Directions for Future Research*

There are several directions for future research in the area of LLF use in preschool age children with SLI and TDL across contexts. These directions pertain to the relationship between LLF comprehension and production, LLF use and standard language measures, contextual factors, and partner input.

*LLF comprehension and production.* A direction for future research is in examining the relationship between comprehension and production of LLFs. Although the current study was concerned with examining expressive skill in children through LLF use, there are possible comprehension issues that limited children's LLF production, both in terms of their LLF diversity and rate of use. For instance, there might be a pattern of LLF use that is directly related to a child's comprehension of that feature. Future studies of LLF development could examine the relationship between children's comprehension

and production of LLFs in play and story contexts. Future studies of LLF might also consider the dialogic exchange between partners, in examining children's comprehension in relation to their use of utterances containing LLFs. Additionally, children's LLF diversity could be studied in relation to their receptive and expressive LLF skill development.

*LLF use and standard language measures.* One clear direction for future research resulting from this work is the investigation into the relationships between standard language measures (e.g., MLU) and LLF. These analyses could be examined in concert with the data on children with SLI and TDL, and with the group language outcomes on the TOLDP3 for expressive and receptive indices. This might provide information on the relationships between semantic diversity, syntactic knowledge, and the LLF composite and its dimensions. Future research studies of LLF use involving relationships between standard language measures and group and context variables could be a logical next step in examining the LLF construct as a means by which people develop linguistic specificity in discourse across contexts. Currently, the research is limited to examination of skills in children who have TDL, with some representation from those children with SLI and who are from an at-risk background, as defined by income-level status.

*Language-age matching.* Although chronological age-matching of children with SLI and TDL reflects the state of the research at this time, it also presents a limitation when understanding these findings for the purposes of intervention and planning with children who have language and learning difficulties. Language-matching children with SLI and TDL could provide a more accurate estimate of the ways in which context and group factors interact with respect to LLF variables. Future investigations of LLF use for



children with SLI might focus on comparison of LLF use in children with SLI and language-matched peers across contexts. The results would provide more precise information on the relationships between developmental, group, and contextual factors involved in children's linguistic specificity.

*Cross-cultural research.* This study was conducted with English-speaking children; however it is possible that linguistic specificity through LLF use is related to children's universal feature use, thus strengthening the argument for examination of linguistic specificity in early childhood. Slobin's (1969) work identifies the universals of grammatical development in children from a cross-cultural perspective. These early findings indicate cross-linguistic similarities across English (Caucasian and African-American low and middle SES groups), German, Russian, Finnish, Samoan, and Luo. Although these languages have cultural and linguistic variations, as well as differences in the speech input to the child, they are uniform in their stages of language development. Further, Slobin identifies linguistic universals at the various stages from babbling, to single-word utterances, to two-word utterances. At this two-word stage, structural and semantic characteristics appear to be universal across languages, which Slobin suggests is the maturation of a language acquisition device. This work suggests structural and semantic universals across languages in children's development of linguistic specificity. However, later research findings indicate that there are multiple factors involved in cross-cultural acquisition of specific features such as locative expressions (Johnson & Slobin, 1977). This research examines the development of locative expressions in English, Italian, Serbo-Croatian, and Turkish-speaking children ages two-, three-, and four-year-old. The locative expressions correspond to English "in," "on," "under," "beside,"

"between," "in back," and "in front." These findings indicate that there are cross-linguistic similarities and differences in young children's development of these terms, which are related to linguistic complexity, familiarity, and conceptual difficulty of each term. Slobin (1988) identifies general strategies for language acquisition, along with a universal characterization of children's development of semantic, phonological, and syntactic skills, suggesting that the findings on the development of morphological paradigms, canonical sentence forms, placement of operators, patterns of over- and under-extension of meaning, and grammatical morphemes provide evidence that linguistic forms and constructions have a long developmental history closely tied to discourse functions across cultures. In this way, development of LLFs could be considered within Slobin's universal characterization of children's development of syntactic and semantic skills. The state of the current research indicates that there is a need for further consideration of the markers of linguistic specificity (e.g., LLFs) across different languages. This area of further research might specifically address cross-linguistic similarities and differences in young children's development of LLFs, in relation to some of the factors identified in the current study, such as context of use, language group, and partner input.

*LLF use and contextual factors.* Another direction for future study is in the examination of contextual factors associated with LLF use in children with TDL and SLI. In particular, a future direction might be in examining various contexts of play and LLF use to determine whether there are context effects associated with play activities for different groups. For instance, LLF use might be examined in different types of play contexts for children with SLI and TDL. Based on our current and previous findings, we

might hypothesize that children use LLFs differentially in play contexts involving pretend play (e.g., dolls, dress-up) versus constructive play (e.g., blocks, play-doh); however, we have much less information on the extent to which children with SLI and TDL might differ in LLF use as a function of these play contexts.

Another area for future research based on the findings on the differences in LLF use in play might be in the use of specific types of play activities as elicitation strategies for LLF facilitation with children with SLI, since we know that children with SLI are at a significant disadvantage in their linguistic specificity in this typically occurring context. A similar direction might involve comparing different story context conditions for group and context effects on LLF dimensions and composite rates. For example, children's rate of LLF use could be compared in two different types of storybook sharing contexts with their mothers in which the text structure was differentiated (e.g., narrative vs. expository), or in which book presentation was varied (e.g., picture-book vs. pop-up book).

Additionally, there could be investigations of the themes of play materials in conjunction with story components. For instance, the same toy items (dog, boy, farm) might be illustrated in a book and used in play materials in order to control across contexts, to further isolate and examine the role of the LLF variables in the child's language production within the play and story context.

*LLF use and partner input.* Another contextual factor to consider in future research is the relationship between the input from the dialogic partner and LLF use. Mothers of children with SLI showed a greater number and range of speech act use in the storybook sharing context, which could be interpreted as a “protective factor” for linguistic interaction in a decontextualized context such as story sharing. Since linguistic

interaction in the play context typically did not require this linguistically specific support to maintain the interaction, mothers of children with SLI did not show the same speech act use across contexts, and children with SLI did not show the same rate of LLF use as their peers with TDL. As compared to children with TDL, the lower rates of LLF use in children with SLI in the play context but not in story, in conjunction with their mothers' change in speech act use from play to story context suggests a possible relationship. However, this speculation requires systematic investigation of tentative hypotheses, such as whether there is a relationship between maternal speech act use, context, and child LLF use in TDL and SLI groups.

Since the purpose of the speech act coding system in the current study was to describe the function and intention of the mothers' utterances in story and play contexts, there was no posited examination of the relationship between speech act types and LLFs. Thus, it is possible that differences between mothers of children with SLI and TDL in the play context might have been due to the influence of maternal speech act use on children's LLF use in the play context. Alternatively, child LLF use could have influenced maternal speech act use, where in the play context children used more LLFs that determined frequency and type of mothers' speech acts. Future research could address the bi-directional influence of LLF use on maternal speech act use, as it relates to interactions in play and story contexts for children with SLI and TDL.

*Interpretation of findings.* The current findings should be interpreted with caution, with respect to the comparison of contexts. When interpreting the findings in the story context, it is important to recognize that the words on the pages of the storybook could have had literate features. According to dialogic research, this would have influenced

children's use of these features (Whitehurst et al., 1994a). However, there was no guarantee that mothers were reading the book text verbatim to their children. In its enactment, there was a wide range from dyad to dyad of what the story context looked like. In future research, more control in the story context might eliminate that variability.

Another issue in interpreting the results of the comparison of contexts is that the language use in the story context was adult driven and the child was typically in the responsive mode. In the play context, the child was familiar with the activities and toys and had language around those toys already, making it more likely that the child would initiate and direct communication in play. Based on these facilitative aspects of the play context, the fact that children with SLI behaved differently in the play context is worthy of further exploration.

A third issue in interpreting the findings across these two contexts is that language in general was suppressed in the story context, as compared to play. In future research it may be useful to employ a different metric such as LLFs per minute to examine this issue.

## APPENDIX A

### *Definitions and Examples of Literate Language Features*

(Adapted from Curenton & Justice, 2004; also see Pellegrini, 1985 and Greenhalgh & Strong, 2001)

1. **Adverb (ADV):** ADVs are a particular syntactic form used to modify verbs. These modifiers increase the explicitness of action and event descriptions. ADVs provide additional information about: time (e.g., *suddenly, again, now*), manner (e.g., *somehow, well, slowly*), degree (e.g., *almost, barely, much*), place (*here, outside, above*), reason (*therefore, since, so*), and affirmation or negation (e.g., *definitely, really, never*).
2. **Conjunction (CONJ):** CONJs are used in discourse to organize information and clarify relationships among elements. They can be categorized as either coordinating or subordinating. Coordinating CONJs include *and, for, or, yet, but, nor, and so*. Subordinating CONJs include: *after, although, as, because, for, if, how, since, still, that, though, unless, when, where, while, and why*.
3. **Elaborated Noun Phrase (ENP):** An ENP is a group of words comprising a noun at its head and one or more modifiers providing additional information about the noun. Modifiers may include articles (e.g., *a, an, the*), possessives (e.g., *my, his, their*), demonstratives (e.g., *this, that, those*), quantifiers (e.g., *every, each, some*), wh-words (e.g., *what, which, whichever*), and true adjectives (e.g., *tall, long, ugly*).
  - a. **Simple elaborated noun phrase (SENP):** SENPs consist of a single modifier and a noun. Examples include *big doggy* (adjective + noun), *that girl* (determiner + noun), and *those ones* (demonstrative + noun).
  - b. **Complex elaborated noun phrase (CENP):** CENPs consist of two or more modifiers and a noun. Examples include *big red house* (adjective + adjective + noun), *a tall tree* (article + adjective + noun), and *some mean boys* (quantifier + adjective + noun).
4. **Mental and Linguistic Verb (MLV):** MLVs are a relatively small group of verbs referring to various acts of thinking and speaking. Mental verbs include *think, know, believe, imagine, feel, consider, suppose, decide, forget, and remember*. Linguistic verbs include *read, write, say, tell, speak, shout, answer, call, reply, and yell*.

APPENDIX B

*TOLDP3 Subtest Performance for Children with SLI*

TOLDP3 percentile scores for children with SLI

Dyad	Age in Months	Subtest Scores						Composite Scores					
		PV	RV	OV	GU	SI	GC	SL	LI	O	SP	SE	SY
1	54	9*	9*	16	63	2**	5**	5	27	2	5	5	8
2	52	9*	9*	16	37	25	9*	8	16	12	8	5	16
3	60	50	5**	16	37	2**	5**	1	73	1	1	2	1
4	59	9*	25	9*	25	16	16	14	35	16	8	19	13
5	56	50	9*	16	25	25	9*	13	35	12	8	16	13
6	51	50	37	37	5**	16	9*	25	50	21	16	39	16
7	55	25	9*	37	25	9*	9*	9	21	5	16	16	8
8	53	75	75	37	9*	9*	25	37	58	35	27	65	16
9	50	63	9*	25	50	9*	16	18	58	5	16	23	16
10	51	16	5**	16	16	5**	9*	4	12	2	8	5	4
11	52	25	5**	25	25	5**	9*	6	21	2	12	10	5
12	51	63	5**	16	50	5**	16	13	58	2	12	16	13
13	50	9*	5**	16	5**	16	16	4	3	5	12	4	5
14	58	84	75	50	25	2**	5**	27	58	21	16	77	3
15	58	63	5**	9*	37	25	16	14	50	8	8	13	19

Note. \* < 10<sup>th</sup> percentile = 1.25 SD below the mean \*\* < 8<sup>th</sup> percentile = 1.5 SD below the mean

PV=picture vocabulary

RV=relational vocabulary

OV=oral vocabulary

GU=grammatical understanding

SI=sentence imitation

GC=grammatical completion

SL=spoken language

LI=listening

O=organization

SP=speaking

SE=semantics

SY=syntax

## APPENDIX C

### *Description of TOLDP3 Subtests*

Adapted from Newcomer, P.L., & Hammill, D.D. (1997). *Test of Language Development: Primary* (3<sup>rd</sup> Ed.). ProEd, Inc: Austin, TX.

The TOLDP3 tests major components of language, linguistic features, which are identified as phonology, syntax, (including morphology), and semantics. The test also categorizes language according to systems called listening (receptive), organizing (integrating-mediating), and speaking (expressive). This linguistic frame of reference of features and systems shows the relationship among concepts of the test model and the subtests of the TOLDP3.

There are nine subtests of the TOLDP3. The semantic and syntactic subtests are the core subtests; three phonological subtests are supplemental subtests. The core subtests are primary in that their results are combined to form the composite scores (i.e., spoken language, listening, organizing, speaking, semantics, and syntax). These subtests are measures of semantics and syntax. Subtests measuring phonology are supplemental components of the TOLDP3. The exclusion of phonology from spoken language, listening, organizing, speaking, and spoken language composite scores provides a clear separation of speech competence from language competence and permits greater efficiency in identifying specific disorders in either of those areas. The six subtests, which make up the core diagnostic battery used to identify SLI participants, will be described further.

**Subtest 1: Picture Vocabulary (PV).** This 30-item semantic subtest measures the extent to which a child understands the meanings associated with spoken English words. The child is not required to respond orally; they need to point to one of four pictures that best represents the meaning of a word spoken by the examiner.

**Subtest 2: Relational Vocabulary (RV).** This 30-item semantic subtest is an associative task that measures a child's ability to understand and orally express the relationships between two words. No pictures are involved in the format; the child must understand the meanings of the spoken words, recognize their semantic category, and express the relationship.

**Subtest 3: Oral Vocabulary (OV).** This 28-item semantic subtest measures a child's ability to give oral definitions to common English words such as *bird* or *castle* that are spoken by the examiner. No picture cues are used to aid decoding. The most succinct, definitive response earns 1 point; however, two or more, less definitive descriptors of the word may also earn 1 point.

**Subtest 4: Grammatical understanding (GU).** This 25-item syntactic subtest assesses the child's ability to comprehend the meaning of sentences. Although the importance of semantics can never be negated in a task involving sentence understanding, this format places primary emphasis on the syntactic aspects of the sentence. The task requires no verbalization; the child must select from three pictures the one that most accurately represents the stimulus sentence supplied by the examiner. Syntax is emphasized because the pictures are produced so that their content is relatively constant.

**Subtest 5: Sentence Imitation (SI).** This 30-item syntactic subtest is designed to measure aspects of children's ability to produce correct English sentences. Success on the subtest reflects their familiarity with appropriate word order and grammatic markers. A principle underlying this subtest is that it is easier for children to repeat or imitate grammatic forms that are part of their linguistic repertoires than it is to repeat those that are unfamiliar to them. The format requires that the child imitate sentences that are spoken by the examiner.



Subtest 6: Grammatical Completion (GC). This 28-item syntactic subtest assesses children's ability to recognize, understand, and use common English morphological forms. It places particular emphasis on their knowledge of inflections. The format, a cloze technique, requires that the examiner read unfinished sentences and that children supply the missing morphological form. Although the subtest is classified as a measure of speaking ability, it measures listening and organizing skills as well because the response is largely dependent on the children's ability to decode the stimulus sentence. Among the items included are those that require knowledge of plurals, possessives, verb tenses, comparative and superlative adjective forms. Research has suggested that this type of language skill has significant intercorrelations with many aspects of academic achievement.

Composites: The two dimensional model of linguistic systems and features provides a foundation for the TOLDP3. Each subtest encompasses a linguistic system (listening, organizing, or speaking) and a linguistic feature (semantics, syntax, or phonology). Thus, subtests may be grouped in accordance with common features or systems to generate the following composites: (a) Listening (PV and GU); (b) organizing (RV and SI); (c) speaking (OV and GC); (d) semantics (PV, RV, and OV); (e) syntax (GU, SI, and GC); and (f) spoken language (PV, RV, OV, GU, SI, and GC).

## APPENDIX D

### *SALT-R Training Guide and Coding Conventions*

(Adapted from *The University of Virginia, Preschool Language and Literacy Laboratory, SALT-R Training Manual, 2005*)

#### **1. Familiarize yourself with the SALT transcription guide (approx. 2 hours)**

Open the SALT transcription guide (PDF that can be found on the computers for which SALT has been installed). Read through the following sections and watch the videos until you feel comfortable, checking off each item as you complete it. Write down any questions you have as you go along.

- Introduction
- Transcribing Language Samples
  - Begin a new transcript
  - SALT transcription conventions
    - Transcript format
    - Non-utterance lines
      - Speaker line
      - + Identification lines
      - = Comment lines (video)
      - - Timing lines (video)
      - : or ; Pause lines (video)
    - Segmentation
      - Word segmentation (video)
      - Utterance segmentation (video)
      - Gestures and nonverbal turns (video)
      - Overlapping speech (video)
      - Pauses within utterances (video)
    - Ending punctuation
      - Statements and questions (video)
      - Intonation prompts
      - Abandoned utterances (video)
      - Interrupted utterances (video)
    - Mazes and Part Words
      - Mazes (video)
      - Part Words (video)
    - Parenthetical Remarks
    - Bound Morphemes
      - Plurality & Possessions (video)
      - Verb Inflections (video)
      - Contractions (video)
    - Omissions
      - Word omissions (video)
      - Omitted Bound Morphemes (video)
    - Unintelligible Segments (video)
    - Idiosyncratic Forms (video)
    - Spelling Conventions
    - Root Identification
    - Word Linking
    - Special codes
      - Word codes (video)
      - Utterance codes (video)

- Transcriber comments
- Sample transcript
- Check for errors

## 2. Transcription practice (approx. 1 hour)

Complete Lesson 2: Entering a Transcript (found on pp. 38-43 in the blue SALT manual). Please print out the completed transcript to be saved as a record of your training.

## 3. Establishing inter-rater reliability

In order to be a reliable coder, you will need to achieve 90% reliability across 5 transcripts. Accuracy will be measured at the word level (i.e., omitted, substituted, and extra words/codes will be counted as errors).

The sound files for the transcripts to be coded for reliability can be found in the following directory on the z drive (in My Computer): Z:\SALT reliability audio files. Please print out and turn in all 5 of your transcripts after you feel you have transcribed and coded to the best of your ability.

For reliability coding, please refer to the SALT Transcription Conventions and code the following:

- Ending punctuation (. ! or ?)
- Mazes ( )
- Part words \*
- Bound morphemes
  - Plurality /s
  - Possession /z
  - Verb inflections
    - Third person singular /3s
    - Present progressive /ing
    - Regular past tense /ed
  - Contractions (e.g., /'s, /'nt, /'ll)
- Unintelligible words and segments xxx
- Transcriber comments = (note: these comments are extremely useful, but will obviously not have to match for the purposes of reliability)
- Sounds (e.g., ah, ooh) are put in brackets like this {ooh}
- Abandoned utterances end in > and do not take ending punctuation

When segmenting at the utterance level using **phonological units**, please keep the following in mind:

- 1) Consider **thought completion** first and foremost when deciding where to segment utterances. End an utterance only when the speaker has completed his or her thought. For example, if a child is listing his or her favorite pastimes, wait until the list is complete before ending the utterance, even if the child pauses and/or changes intonation before completing the thought.
- 2) Consider pauses and intonation next. Generally speaking, pauses and intonation changes are marks of complete thoughts, but they may not always coincide with complete thoughts. When segmenting, base your judgment on whether or not the thought is complete and use pauses and intonation as secondary acoustic cues.
- 3) In the case of run-on sentences, end utterance after second independent clause. See SALT manual (Appendix B, p. 112) for more information on how utterances should be segmented using independent and dependent clauses.

## Summary of SALT Transcription Conventions

1. **Transcript Format.** Each entry begins with one of the following symbols. If an entry is longer than one line, just continue it on the next line. Identifies the speakers in the transcript; generally the first line of the transcript. Example: \$ Child, Examiner
- C Child/Client utterance. Note that the actual character used depends on the \$ speaker line.

- E           Examiner utterance. Note that the actual character used depends on the \$ speaker line.
- Typically used for identifying information such as name, age, and context.
  - Example of current age information: + CA: 5;7
  - Time marker. Example of two-minute marker: - 2:00  
Pause between utterances of different speakers. Example of five-second pause: : :05  
Pause between utterances of same speaker. Example of three-second pause: ; :03  
Comment line. This information is not analyzed in any way, but is used for transcriber comments.
- 2. End of Utterance Punctuation.** Every utterance must end with one of these six punctuation symbols. Statement, comment. Note that you should not use a period for an abbreviation.  
Surprise, exclamation.  
Question.  
Intonation prompt. Example: E And then you have to "-
- A           Interrupted utterance. The speaker is interrupted and does not complete his/her thought/utterance.
- Abandoned utterance. The speaker does not complete his/her thought/utterance but has not been interrupted.
- 3. Mazes.** Filled pauses, false starts, repetitions, reformulations, and interjections. ( )  
Surrounds the words/part-words that fall into these categories. Example: C  
And (then urn) then (h<sup>e</sup>) he left.
- 4. Overlapping Speech.** When both speakers are speaking at the same time, the words or silences that occur at the same time are surrounded by angle brackets < >.       Example: C I want you to do it < > for me.  
E <Ok>.  
C Can I have that <one>?  
E <Uhhuh>.
- 5. Bound Morphemes.** Words that contain a slash "/" indicate that the word is contracted, conjugated, inflected, or pluralized in a regular manner. The root word is entered in its conventional spelling followed by a slash "/" and then the bound morpheme.
- /S           Pluralization. Words that end in "s" but represent one entity are not slashed.  
Examples: kitten/s, baby/s, pants
- /Z           Possessive inflection. Examples: dad/z, Mary/z, ours
- /S/Z       Plural and Possessive. Example: baby/s/z
- /ED       Past tense. Predicate adjectives are not slashed. Examples: love/ed, die/ed, was tired, is bored
- /3S       3rd Person Singular verb form. Irregular forms are not slashed. Examples: go/3s, tell/3s, does
- /ING       Verb inflection. The gerund use of the verb form is not slashed. Examples:  
go/ing, run/ing, went swimming /N'T, PT Negative contractions. Irregular  
forms are not slashed. Examples: can/'t, does/n't, won't
- /LL, /M, PD, PRE, PS, /VE Contractible verb forms. Examples: we/'re, he/'s, we/'ve
- 6. Omissions.** Partial words, omitted words, and omitted bound morphemes are denoted by an asterisk (\*).  
Following one or more letters this indicates that a word was started but left unfinished.  
Example: C I (w\* w\*) want it.
- Preceding a word indicates that an obligatory word was omitted. Example: C Give it \*to me.
- /\*       Following a slash the \* is then followed by the bound morpheme that was omitted, indicating the omission of an obligatory bound morpheme. Example: C The car go/<sup>4</sup>3s fast.
- 7. Unintelligible Segments.** X is used to mark unintelligible sections of an utterance. Use X for an unintelligible syllable or word, XX for an unintelligible segment of unspecified length, and XXX for an unintelligible utterance. Example 1: C He XX today. Example 2: C XXX.
- 8. { } Comments within an utterance.** Example: C  
Look it (C points to box). Nonverbal utterances of communicative intent are placed in braces. Example: C  
{ nods).

**9. Codes.** Codes are used to mark words or utterances. Codes are placed in brackets [ ] and should not contain blank spaces. Codes used to mark words are usually inserted at the end of words with no intervening spaces between the code and the word it is marking.

Example of the [EW] code used to mark a word-level error: C He were [EW:was] with me.

Example of the [EU] code used to mark an utterance-level error: C We had to then math class [EU].

**10. Root identification and word errors.** The vertical bar "I" is used to identify the root word. To simplify transcription, identifying the root words is only recommended when the word used is not a real word.

Example 1: C He goed/go [EW:went] by hissself/himself [EW:himself].

**11. Spelling Conventions.** Always type BECAUSE for "cuz" or "cause". Titles of movies and books, compound words, and two-word names are typed as one word (*or linked with an underscore*) because they are considered to be one word.

Example: C I have Mrs\_Smith for math class.

AIN'T	GONNA	HUH	NOONE	OOP. OOPS.	PSST	UHUH ( <i>no</i> )
ATTA	GOTTA ( <i>got</i> )	LET'S	NOPE	OURS	SPOSTA	WANNA
BETCHA	HMM	LIKETA	MRS	OH. OOH	TRYNTA	WHATCHA
DOCTOR or	HAFTA	LOOKIT	MS	OK	USETA	YEAH.
DON'T	HI	MHM ( <i>yes</i> )	MR or MISTER	OUGHTA	UHHUH ( <i>yes</i> )	YOURS

## APPENDIX E

### *LLF Training Evaluation Protocol*

(Exercises adapted from The Syntax Handbook, Justice & Ezell, 2002)

**Directions:** Fill out your name and the date. After you finish and score your test, enter your total score in the space below. If you have > 4 errors, reread flagged sections of The Syntax Handbook, and re-take LLF Training Test (B).

**Coder:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Total Score:** \_\_\_\_/40

1. ADVERBS modify verbs and increase the explicitness of action and event descriptions. They provide additional information about:

- Time: *suddenly, again, now*
- Manner: *somehow, well, slowly*
- Degree: *almost, barely, much*
- Place: *here, outside, above*
- Reason: *therefore, since, so*
- Affirmation/negation: *definitely, really, never*

Underline the adverbs in the sentences below. Check your answers on p. 109:

1. That's his house there.
2. They had a doggie too.
3. Then the dog fell down.
4. He's crying.
5. He very angry.
6. Now he go outside.
7. The dog left now.
8. The dog can't get out.
9. He's pulling fast.
10. Now he's pulling hard.

Enter score: \_\_\_\_/10

2. CONJUNCTIONS organize information and clarify relationships among elements.

They can be coordinating or subordinating.

- Coordinating: *and, for, or, yet, but, nor, so*
- Subordinating: *after, although, as, because, for, if, how, since, still, that, though, unless, when, where, while, why*

Underline the conjunctions in the sentences below. Check your answers on p. 135-136:

1. The child made a mess with the blocks and refused to clean them up.
2. Evolution is somewhat controversial, although it is still taught in many schools.
3. She received her certification; then, she began to pursue her PhD.
4. Autism has long been considered a functional disorder, but it likely has an organic cause.
5. He was told to prepare dinner while she finished the floral arrangements.
6. Jason was subtle, but it was clear to everyone why he was visiting.
7. Why he declined the invitation, Chad did not say.
8. The plan was to meet for dessert after the play was over.
9. Judy did not win first place, yet she still felt the victor.
10. The clinician did not complete the evaluation; however, she felt it was imperative that treatment commence immediately.

Enter score: \_\_\_\_/10

3. ELABORATED NOUN PHRASES (ENPs) are groups of words with a noun at the head and one or more modifiers giving information about the noun. Modifiers include:

- Articles: *an, a, the*
- Possessives: *my, his, their*
- Demonstratives: *this, that, those*
- Quantifiers: *every, each, some*
- Wh-words: *what, which, whichever*
- True adjectives: *tall, long, ugly*

▪ Simple elaborated noun phrases (SENPs) consist of a single modifier and a noun.

Underline the SENPs in the sentences below. Check your answers on p. 260:

1. I love big dogs.
2. That girl is nice.
3. I want to have those ones.
4. I think that's his house.
5. I know every kid in school.

▪ Complex elaborated noun phrases (CENPs) consist of two or more modifiers and a noun.

Underline the CENPs in the sentences below. Check your answers on p. 260:

6. I like the big red house.
7. He is a tall boy.
8. There are some mean girls at school
9. Which blue crayon do you like the best?
10. Some furry animals make me sneeze.

Enter score: \_\_\_/10

4. MENTAL/LINGUISTIC VERBS refer to acts of thinking and speaking.

Underline the mental and linguistic verbs in the sentences below. Check your answers on p. 71:

1. I think that's his house there.
2. They know a doggie.
3. I believe the dog fell down.
4. He feels like crying.
5. I imagine he's very angry.
6. He says he's going outside.
7. Tell me the dog left.
8. The dog can't speak.
9. He's shouting very loud.
10. Now he's calling my name.

Enter score: \_\_\_/10

## APPENDIX F

### *Videotape Fidelity Checklist*

#### *Parent-Child Videotape Data Sheet*

**Tape ID:** \_\_\_\_\_ (1-30)

**Fidelity Coder:** \_\_\_\_\_ (1 or 2)

1. Duration of session:

(a) play session: between 5 and 15 minutes (1 point)

(b) story session: between 2 and 6 minutes (1 point)

2. Number of child utterances: at least 50 utterances (1 point)

3. Interaction of personnel for consistency of:

(a) Instructions (1 point)

(b) Feedback: none (1 point)

(c) Sequencing of materials: play materials followed by storybook (1 point)

Total number of points: \_\_\_\_/6 = \_\_\_\_% (procedural fidelity score for each videotape)



## APPENDIX G

### *Description and Examples of Speech Acts*

(Modified from Conti-Ramsden & Friel-Patti, 1983, and Sutton et al., in press)

<i>Speech Act Type</i>	<i>Description/Example</i>
<b>Requestive</b>	Mother demands a response from child.
Choice Question (RQC)	Do you want to play with this? Yes/No questions
Product Question (RQPD)	What is that? Who/what/where/which questions?
Process Question (RQPC)	Why did it do that? Why/how questions
<b>Assertive</b>	Mother describes observable aspects of environment.
Identification (ASI)	That's the oven.
Description (ASD)	The oven is broken.
Explanation (ASE)	It won't work because it's broken.
Expansion (AXE)	[Child: It's a bear.] It's a brown bear.
<b>Directive</b>	Mother attempts to get child to do something.
Direct Request (DRD)	Pick that up.
Indirect Request (DRI)	We need to clean up.
Directive Question (DRQ)	Don't you think you should pick that up?
<b>Responsive</b>	Mother responds to child's imitation.
Product answer (RSPO)	[Child: What's that?] That's a cowboy.
Process answer (RSPC)	[Child: Why won't it go?] Because it's broken.
Acknowledgement (RSA)	[Child: I like that.] I know you do.
Clarification Question (RSCQ)	[Child: I like the car.] You like the car?
Expansion Question (RSEQ)	[Child: I like the car.] You like the big green car?
<b>Regulative</b>	Mother maintains conversational flow.
Attention Getter (RGA)	Look at it go!
Repetition (RGR)	[Child: It's a bear.] It's a bear.
Regulative Maintenance (RGM)	Okay.
Regulative Question (RGQ)	Shall we move on/you know what?
Regulative Clarification (RGC)	[Child: XXX] Oh we are going.

## APPENDIX H

### *Power and Effect Size Calculations*

---

Power of a two-sample dependent t-test by sample size and effect size

---

N	Effect Size		
	0.20	0.50	0.80
10	0.08	0.29	0.62
11	0.09	0.32	0.67
12	0.09	0.35	0.71
13	0.10	0.38	0.75
14	0.10	0.41	0.79
15	0.11	0.44	0.82
16	0.11	0.46	0.85
17	0.12	0.49	0.87
18	0.12	0.52	0.89
19	0.13	0.54	0.91
20	0.13	0.56	0.92
21	0.14	0.59	0.94
22	0.14	0.61	0.95
23	0.15	0.63	0.96
24	0.15	0.65	0.96
25	0.16	0.67	0.97
26	0.16	0.69	0.97
27	0.17	0.71	0.98
28	0.17	0.72	0.98
29	0.18	0.74	0.99
30	0.18	0.75	0.99
31	0.19	0.77	0.99
32	0.19	0.78	0.99
33	0.20	0.80	0.99
34	0.20	0.81	0.99
35	0.21	0.82	1.00

---

Note.  $p = .05$

---

Power of a two-sample independent t-test per group by sample size (N) for three different effect sizes

---

N	Effect Size		
	0.20	0.50	0.80
10	0.07	0.19	0.40
11	0.07	0.20	0.43
12	0.08	0.22	0.47
13	0.08	0.23	0.50
14	0.08	0.25	0.53
15	0.08	0.26	0.56
16	0.09	0.28	0.59
17	0.09	0.29	0.62
18	0.09	0.31	0.65
19	0.09	0.32	0.67
20	0.09	0.34	0.69
21	0.10	0.35	0.72
22	0.10	0.37	0.74
23	0.10	0.38	0.76
24	0.10	0.40	0.78
25	0.11	0.41	0.79
26	0.11	0.42	0.81
27	0.11	0.44	0.82
28	0.11	0.45	0.84
29	0.12	0.47	0.85
30	0.12	0.48	0.86
31	0.12	0.49	0.87
32	0.12	0.50	0.88
33	0.13	0.52	0.89
34	0.13	0.53	0.90
35	0.13	0.54	0.91
36	0.13	0.55	0.92
37	0.14	0.56	0.92
38	0.14	0.58	0.93
39	0.14	0.59	0.94
40	0.14	0.60	0.94
41	0.15	0.61	0.95
42	0.15	0.62	0.95
43	0.15	0.63	0.96
44	0.15	0.64	0.96
45	0.16	0.65	0.96
46	0.16	0.66	0.97
47	0.16	0.67	0.97
48	0.16	0.68	0.97
49	0.17	0.69	0.98
50	0.17	0.70	0.98

---

Note.  $p = .05$

APPENDIX I

*Correlations between LLF variables for children with SLI and TDL*

---

Correlations between LLF variables for children with SLI and TDL

---

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. LLF play	1												
2. LLF story	.226	1											
3. LLF total	.972**	.409*	1										
4. SENP play	.657**	.167	.633**	1									
5. CENP play	.566**	.185	.582**	.210	1								
6. ADV play	.671**	.107	.664**	.020	.406*	1							
7. CONJ play	.834**	.167	.793**	.499**	.314	.444*	1						
8. MLV play	.456*	.148	.430*	.072	.283	.175	.473**	1					
9. SENP story	.123	.851**	.279	.198	.094	-.046	.080	.088	1				
10. CENP story	.316	.362*	.361*	.137	.472**	.231	.213	.109	.061	1			
11. ADV story	.292	.434*	.347	.122	.078	.325	.249	.052	.199	-.027	1		
12. CONJ story	-.01	.692**	.127	.075	.031	-.165	.000	.121	.532**	.319	-.103	1	
13. MLV story	-.15	-.155	-.125	-.326	-.045	.091	-.135	.045	-.379*	.189	-.305	-.033	1

---

Note: \*  $P < 0.05$ , \*\*  $P < 0.01$

---

Correlations between LLF variables for children with SLI

---

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. LLF play	1												
2. LLF story	.112	1											
3. LLF total	.898**	.481	1										
4. SENP play	.526*	-.003	.376	1									
5. CENP play	.456	.370	.594*	-.055	1								
6. ADV play	.349	.001	.410	-.460	.296	1							
7. CONJ play	.588*	-.031	.400	.305	.115	-.073	1						
8. MLV play	.388	.159	.373	-.011	.200	-.027	.354	1					
9. SENP story	.001	.875**	.319	.097	.304	-.217	-.183	.209	1				
10. CENP story	.353	.397	.442	-.191	.389	.562*	.260	-.12	.209	1			
11. ADV story	-.05	.380	.092	.005	.065	-.062	.021	-.13	-.115	.021	1		
12. CONJ story	.230	.816**	.524*	.070	.342	.034	.064	.233	-.127	.343	-.073	1	
13. MLV story	.062	-.188	.059	-.453	-.091	.555*	.160	.044	.233	.303	-.273	.048	1

---

Note: \*  $P < 0.05$ , \*\*  $P < 0.01$

---

Correlations between LLF variables for children with TDL

---

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. LLF play	1												
2. LLF story	.382	1											
3. LLF total	.985**	.505	1										
4. SENP play	.784**	.402	.823**	1									
5. CENP play	.458	-.063	.420	.307	1								
6. ADV play	.727**	.223	.674**	.303	.255	1							
7. CONJ play	.817**	.361	.814**	.572*	.124	.488	1						
8. MLV play	.277	.099	.246	-.044	.130	.040	.354	1					
9. SENP story	.182	.808**	.289	.308	-.207	.074	.237	-.15	1				
10. CENP story	.244	.377	.288	.303	.496	-.072	.098	.172	-.035	1			
11. ADV story	.631*	.517*	.623*	.245	.060	.837**	.472	.239	.313	-.078	1		
12. CONJ story	.043	.505	.124	.245	-.223	-.320	.243	.167	.266	.471	-.141	1	
13. MLV story	-.43	-.143	-.356	-.289	-.081	-.385	-.443	-.01	-.344	.119	-.354	-.107	1

---

Note: \*  $P < 0.05$ , \*\*  $P < 0.01$

## REFERENCES

- Alpert, C., & Kaiser, A. (1992). Training parents as milieu language teachers. *Journal of Early Intervention, 16*, 31-52.
- Applebee, A. (1978). *The child's concept of story*. Chicago: University of Chicago Press.
- Arnold, D., & Whitehurst, G. (1994). Accelerating language development through picture book reading: A summary of dialogic reading and its effect. In D. Dickinson (Ed.), *Bridges to literacy: Children, families, and schools* (pp. 215-260). Cambridge, MA: Blackwell Publishing.
- Becker, J. (1990). Processes in the acquisition of pragmatic competence. In G. Conti-Ramsden & C. Snow (Eds.), *Children's language: Vol. 7* (pp.7-24). Hillsdale, NJ: Erlbaum.
- Bellon, M., Ogletree, B., & Harn, W. (2000). Repeated storybook reading as a language intervention for children with Autism: A case study on the application of scaffolding. *Focus on Autism and Other Developmental Disabilities, 15*, 52-59.
- Benjamin, A. (1993). Parents' literacy and their children's success in school: Recent research, promising practices, and research implications. Education Research Report. Office of Educational Research and Improvement. (ED363441)
- Bishop, D., & Adams, C. (1991). *What do referential communication tasks measure? A study of children with specific language impairment. Applied Psycholinguistics, 12*, 199-215.
- Bishop, D., & Edmundson, A. (1987). Language impaired four-year-olds: Distinguishing transient from persistent impairment. *Journal of Speech and Hearing Disorders, 52*, 156-173.

- Boehm A. (2001). *Boehm Test of Basic Concepts (3rd Ed.) Preschool*. San Antonio, TX: The Psychological Corporation.
- Bowey, J. (1995). Socioeconomic status differences in preschool phonological sensitivity and first-grade reading achievement. *Journal of Educational Psychology, 87*, 476-487.
- Boynton-Hauerwas, L., & Stone, C. (2000). Are parents of school-age children with specific language impairments accurate estimators of their child's language skills? *Child Language Teaching and Therapy, 16*, 73-86.
- Botting, N. (2002). Narrative as a tool for the assessment of linguistic and pragmatic impairments. *Child Language Teaching and Therapy, 18*, 1-22.
- Bradshaw, M., Hoffman, P., & Norris, J. (1998). Efficacy of expansions and cloze procedures in the development of interpretations by preschool children exhibiting delayed language development. *Language, Speech, and Hearing Services in Schools, 29*, 85-95.
- Bredenkamp, S., & Copple, C. (1997). *Developmentally appropriate practice in early childhood programs*. National Association for the Education of Young Children: Washington, DC.
- Brown, R. (1973). *A first language: The early stages*. Cambridge: Harvard University Press.
- Camarata, S., Nelson, K., & Camarata, M. (1994). Comparison of conversational-recasting and imitative procedures for training grammatical structures in children with specific language impairment. *Journal of Speech and Hearing Research, 37*, 1414-1423.



- Catts, H., Fey, M., Zhang, X., & Tomblin, J. (2001). Estimating the risk of future reading difficulties in kindergarten children: A research-based model and its clinical instrumentation. *Language, Speech, and Hearing Services in Schools, 32*, 38-50.
- Chaney, C. (1992). Language development, metalinguistic skills, and print awareness in 3-year-old children. *Applied Psycholinguistics, 13*, 485-514.
- Chapman, R. (2000). Children's language learning: An interactionist perspective. *Journal of Child Psychology and Psychiatry, 41*, 33-54.
- Charity, A., Scarborough, H., & Griffin, D. (2004). Familiarity with school English in African-American children and its relation to early reading achievement. *Child Development, 75*, 1340-1356.
- Chiat, S. (2001). Mapping theories of developmental language impairment: Premises, predictions, and evidence. In D. Bishop (Ed.), *Language and cognitive processes in developmental disorders* (pp. 113-142). Philadelphia: Psychology Press.
- Clark-Stewart, K. (1973). Interactions between mothers and their young children: Characteristics and consequences. *Monographs of the Society for Research in Child Development, 38*, 1-109. (EJ094982)
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cole, K., & Dale, P. (1986). Direct language instruction and interactive language instruction with language delayed preschool children: A comparison study. *Journal of Speech and Hearing Research, 29*, 206-217.
- Conti-Ramsden, G. (2003). Processing and linguistic markers in young children with specific language impairment (SLI). *Journal of Speech, Language, and Hearing*

*Research, 46*, 1029-1037.

Conti-Ramsden, G., & Friel-Patti, S. (1983). Mothers' discourse adjustments to language-impaired and non language-impaired children. *Journal of Speech and Hearing Disorders, 48*, 360-367.

Conti-Ramsden, G., & Hutcheson, G. (1995). Contingency and breakdown: Children with SLI and their conversations with mothers and fathers. *Journal of Speech and Hearing Research, 38*, 1290-1303.

Crain-Thoreson, C. (1999). Enhancing linguistic performance: Parents and teachers as book reading partners for children with language delays. *Topics in Early Childhood Special Education, 41*, 452-472.

Cross, T. (1976). Motherese: Its association with rate of syntactic acquisition in young children. In N. Waterson & C. Snow (Eds.), *The development of communication: Social and pragmatic factors in language acquisition* (pp. 438-490). New York: Wiley.

Culatta, B. (1994). Representational play and story enactments: Formats for language intervention. In J. Duchan, L. Hewitt, & R. Sonnenmeier (Eds.), *Pragmatics: From theory to practice* (pp. 105-119). Englewood Cliffs, NJ: Prentice-Hall.

Curenton, S., & Justice, L. (2004). Low-income preschoolers' use of decontextualized discourse: Literate language features in oral narratives. *Language, Speech, and Hearing Services in Schools, 35*, 240-253.

Dale, P., & Crain-Thoreson, C. (1996). Parent-child book reading as an intervention technique for young children with language delays. *Topics in Early Childhood Special Education, 16*, 213-236.

- Damico, J.S., & Simon, C.S. (1993). Assessment of disabilities in school-aged children. In A. Gerber (Ed.), *Language-related learning disabilities: Their nature and treatment* (pp. 321-342). Baltimore: Brookes.
- De Villiers, J., & de Villiers, P. (1973). A cross-sectional study of the acquisition of grammatical morphemes in child speech. *Journal of Psycholinguistic Research*, 2, 267-278.
- Dickinson, D., & McCabe, A. (1991). The acquisition and development of language: A social-interactionist account of language and literacy development. In J. Kavanaugh (Ed.), *The Language Continuum: from infancy to literacy* (pp. 1-40). Parkton, MD: York Press.
- Dickinson, D., & McCabe, A. (2001). Bringing it all together: the multiple origins, skills, and environmental supports of early literacy. *Learning Disabilities Research & Practice*, 16, 186-202.
- Dickinson, D., & Snow, C. (1987). Interrelationships among prereading and oral language skills in kindergarteners from two social classes. *Early Childhood Research Quarterly*, 2, 1-25.
- Dillon, W. R., & Goldstein, M. (1984). *Multivariate Analysis: Methods and Applications*. John Wiley and Sons: New York, NY.
- D'Odorico, L., & Franco, F. (1985). The determinants of baby talk: Relationship to context. *Journal of Child Language*, 12, 567-586.
- Donohue, M., & Pearl, R. (1995). Conversational interactions of mothers and their preschool children who had been born preterm. *Journal of Speech and Hearing Research*, 38, 1117-1126.

- Draper, N., & Smith, H. (1981). *Applied regression analysis*. New York: Wiley and Sons.
- Duncan, L., & Seymour, P. (2000). Socio-economic differences in foundation-level literacy. *British Journal of Psychology*, *91*, 145-166.
- Dunn, L., & Dunn, L.A. (1989). *Peabody Picture Vocabulary Test—Third Edition* (PPVT-III). Circle Pines, MN: AGS Publishing.
- Feagans, L. (1982). The development and importance of narratives for school adaptation. In L. Feagans & D. Farran (Eds.), *The language of children reared in poverty* (pp. 95-116). New York: Academic Press.
- Fey, M., Cleave, P., Long, S., & Hughes, D. (1993). Two approaches to the facilitation of grammar in children with language impairment: An experimental evaluation. *Journal of Speech and Hearing Research*, *36*, 141-157.
- Fey, M., Long, S., & Cleave, P. (1994). Reconsideration of IQ criteria in the definition of specific language impairment. In R. Watkins & M. Rice (Eds.), *Communication and language intervention series: Vol. 4. Specific language impairments in children* (pp. 161-178). Baltimore: Brookes.
- French, L., Luciarello, J., Seidman, S., & Nelson, K. (1985). The influence of discourse content and context on preschoolers' use of language. In L. Galda & A. Pellegrini (Eds.), *Play, language and stories: The development of children's literate behavior* (pp. 1-28). Norwood, NJ: Albex.
- Frijters, J.C., Barron, R.W., & Brunello, M. (2000). Direct and mediated influences of home literacy and literacy interest on prereaders' oral vocabulary and early written language skill. *Journal of Educational Psychology*, *92*, 466-477.

- Gillam, R., & Johnston, J. (1992). Spoken and written language relationships in language/learning-impaired and normally achieving school-age children. *Journal of Speech and Hearing Research, 35*, 1303-1315.
- Gillam, R., McFadden, T., & van Kleeck, A. (1995). Improving narrative abilities: Whole language and language skills approaches. In M. Fey, J. Windsor, & S. Warren (Eds.), *Language intervention: Preschool through the elementary years* (pp. 145-182). Baltimore: Brookes.
- Girolametto, L. (2002). Responsiveness of childcare providers in interactions with toddlers and preschoolers. *Language, Speech, and Hearing Services in Schools, 33*, 268-281.
- Girolametto, L., Verbey, M., & Tannock, R. (1994). Improving joint engagement in parent-child interaction: An intervention study. *Journal of Early Intervention, 18*, 117-126.
- Goldman, R., & Fristoe, M. (2000). Goldman-Fristoe Test of Articulation (2<sup>nd</sup> Ed.). American Guidance Service, Inc: Circle Pines, MN.
- Graybeal, C. (1981). Memory for stories in language-impaired children. *Applied Psycholinguistics, 2*, 269-283.
- Greenhalgh, K. (1999). Expressive vocabulary in the spoken narratives of children with normal language and with language impairments. *Unpublished Master's Thesis*. Utah State University, Department of Communication Sciences and Disorders.
- Greenhalgh, K., & Strong, C. (2001). Literate language features in spoken narratives of children with typical language and children with language impairments. *Language, Speech, and Hearing Services in Schools, 32*, 114-125.

- Guralnick, M., Conner, R., Neville, B., & Hammond, M. (2002). Mothers' perspectives of the peer-related social development of young children with developmental delays and communication disorders. *Early Education and Development, 13*, 59-80.
- Guralnick, M., & Neville, B. (1997). Designing early intervention programs to promote children's social competence. In M. Guralnick (Ed.). *The effectiveness of early intervention*. (pp. 579-610). Baltimore: Brookes.
- Halliday, M. (1990a). Linguistic perspectives on literacy: A systemic-functional approach. Paper presented at the Inaugural Australian Systemics Network Conference on Literacy in Social Processes, Geelong, AUS. (ED329135)
- Halliday, M. (1990b). The place of dialogue in children's construction of meaning. Paper presented at the Third International Conference on Analysis of Dialogue, Bologna, IT. (ED329110)
- Halliday, M., & Hasan, R. (1976). *Cohesion in English*. London: Longman.
- Hart, B., & Risley, T. R. (1992). American parenting of language-learning children: Persisting differences in family-child interactions observed in natural home environments. *Developmental Psychology, 28*, 1096-1105.
- Heath, S. (1982). What no bedtime story means: Narrative skills at home and at school. *Language in Society, 11*, 49-76.
- Heath, S. (1983). *Ways with words: Language, life and work in communities and classrooms*. Cambridge, UK: Cambridge University Press.
- Hedberg, N., & Stoel-Gammon, C. (1986). Narrative analysis: Clinical procedures. *Topics in Language Disorders, 7*, 58-69.

- Hick, R., Joesph, K., Conti-Ramsden, G., Serratrice, L., & Faragher, B. (2002). Vocabulary profiles of children with specific language impairment. *Child Language Teaching and Therapy, 18*, 165-180.
- Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development, 74*, 1368-1378.
- Hoff, E., & Naigles, L. (2002). How children use input to acquire a lexicon. *Child Development, 73*, 418-433.
- Hunt, K. (1970). Syntactic maturity in school children and adults. *Monographs of the Society for Research in Child Development, 35* (Serial no. 134).
- Huttenlocher, J., Vasilyeva, M., Cymerman, E., & Levine, S. (2002). Language input and child syntax. *Cognitive Psychology, 45*, 337-374.
- Idoll, L., & Croll, V. (1987). Story mapping training as a means of improving reading comprehension. *Learning Disability Quarterly, 10*, 214-229.
- Johnson, J., & Slobin, D. (1977). The development of locative expressions in English, Italian, Serbo-Croatian, and Turkish. *Papers and Reports on Child Language Development, 13*. ( ED166934)
- Johnston, J., & Kamhi, A. (1984). Syntactic and semantic aspects of the utterances of language-impaired children: The same can be less. *Merrill-Palmer Quarterly, 30*, 65-86.
- Johnston, J., & Schery, T. (1976). The use of grammatical morphemes by children with communication disorders. In D. Morehead & A. Morehead (Eds.), *Normal and deficient child language* (pp. 239-258). Baltimore: University Park Press.

- Jones, I. (2003). Collaborative writing and children's use of literate language: A sequential analysis of social interaction. *Journal of Early Childhood Literacy, 3*, 165-178.
- Justice, L. (2004). Creating language-rich preschool classroom environments. *Teaching Exceptional Children, 37*, 36-44.
- Justice, L., & Ezell, H. (2001). Word and print awareness in 4-year-old children. *Child Language Teaching and Therapy, 17*, 207-226.
- Justice, L., & Ezell, H. (2002). Use of storybook reading to increase print awareness in at-risk children. *American Journal of Speech-Language Pathology, 11*, 17-29.
- Justice, L., Invernizzi, M., & Meier, J. (2002). Designing and implementing an early literacy screening protocol: Suggestions for the speech-language pathologist. *Language, Speech, and Hearing Services in Schools, 33*, 84-101.
- Justice, L., & Kaderavek, J. (2002). Using shared storybook reading to promote emergent literacy. *Teaching Exceptional Children, 34*, 8-13.
- Justice, L., & Kaderavek, J. (2004). Embedded-explicit emergent literacy intervention I: Background and description of approach. *Language, Speech, and Hearing Services in Schools, 35*, 201-211.
- Juel, C., Griffith, P., & Gough, P. (1986). Acquisition of literacy: A longitudinal study of children in first and second grade. *Journal of Educational Psychology, 78*, 243-255.
- Kaderavek, J., & Justice, L. (2002). Shared storybook reading as an intervention context: Promises and potential pitfalls. *American Journal of Speech-Language Pathology, 11*, 395-406.



- Kaderavek, J., & Justice, L. (2004). Embedded-explicit emergent literacy intervention II: Goal selection and implementation in the early childhood classroom. *Language, Speech, and Hearing Services in Schools, 35*, 212-228.
- Kaderavek, J., & Sulzby, E. (2000a). Issues in emergent literacy for children with language impairment. In L. Watson, E. Crais, & T. Layton (Eds.), *Handbook of early language impairment in children: Assessment and treatment* (pp. 199-244). Albany, NY: Delmar.
- Kaderavek, J., & Sulzby, E. (2000b). Narrative production by children with and without specific language impairment: Oral narratives and emergent readings. *Journal of Speech, Language, and Hearing Research, 43*, 34-50.
- Kamhi, A., & Catts, H. (1986). Toward an understanding of developmental language and reading disorders. *Journal of Speech and Hearing Disorders, 51*, 337-347.
- Kaufman, A., & Kaufman, N. (1983). *Kaufman Assessment Battery for Children (KABC)*. Circle Pines, MN: American Guidance Service.
- Kavanaugh, J. (1991). (Ed.). *The language continuum: From infancy to literacy* (pp. v-viii). Parkton, MD: York Press.
- Klee, T. (1992). Developmental and diagnostic characteristics of quantitative measures of children's language production. *Topics in Language Disorders, 12*, 28-41.
- Koppenhaver, D., Erickson, K., & Skotko, B. (2001). Supporting communication of girls with Rett Syndrome and their mothers in storybook reading. *International Journal of Disability, Development, and Education, 48*, 395-410.

- Labov, W., & Waletzky, J. (1967). Narrative analysis: Oral versions of personal experience. In J. Helm (Ed.), *Essays on the verbal and visual arts* (pp. 12-44). Seattle: University of Washington Press.
- Lee, L. (1974). Developmental sentence analysis: A grammatical assessment procedure for speech and language clinicians (pp. 132-175). Evanston, IL: Northwestern University Press. Available online at <http://aslp.byu.edu/rc/dss/dss/html>.
- Levene, H. (1960). Robust tests for equality of variances. In I. Olkins (Ed.), *Contributions to probability and statistics* (pp. 278-292). Stanford, CA: Stanford University Press.
- Liles, B. (1985a). Cohesion in the narratives of normal and language-disordered children. *Journal of Speech and Hearing Research*, 28, 123-133.
- Liles, B. (1985b). Production and comprehension of narrative discourse in normal and language disordered children. *Journal of Communication Disorders*, 18, 409-427.
- Liles, B. (1987). Episodic organization and cohesive conjunctives in narratives of children with and without language disorder. *Journal of Speech and Hearing Research*, 30, 185-196.
- Liles, B. (1993). Narrative discourse in children with language disorders and children with normal language: A critical review of the literature. *Journal of Speech and Hearing Research*, 36, 868-882.
- Liles, B., Duffy, R., Merritt, D., & Purcell, S. (1995). Measurement of narrative discourse ability in children with language disorders. *Journal of Speech and Hearing Research*, 38, 415-425.

- Loban, W. (1976). *Language development: Kindergarten through grade twelve*. (Research Report No. 18.) Champaign, IL: National Council of Teachers of English.
- Logan, K.J. (2003). Language and fluency characteristics of preschoolers' multiple-utterance conversational turns. *Journal of Speech, Language and Hearing Research, 46*, 1092-4388.
- Luciarello, J., & Nelson, J. (1987). Remembering and planning: Talk between mothers and children. *Discourse Processes, 10*, 219-235. (EJ360623)
- Lund, N., & Duchan, J. (1993). *Assessing children's language in naturalistic contexts (3<sup>rd</sup> Ed.)*. Englewood Cliffs, NJ: Prentice-Hall.
- McCabe, A., & Rollins, P. (1995). Assessment of preschool narrative skills. *American Journal of Speech-Language Pathology, 3*, 45-56.
- McCormick, C., & Mason, J. (1986). Intervention procedures for increasing preschool children's interest in and knowledge about reading. In W. Teale & E. Sulzby (Eds.), *Emergent literacy: Reading and writing* (pp. 90-115). Norwood, NJ: Albex.
- McFadden, T., & Gillam, R. (1996). An examination of the quality of narratives produced by children with language disorders. *Language, Speech, and Hearing Services in Schools, 27*, 48-56.
- McKeough, A. (1984). Developmental stages in children's narrative composition. Paper presented at the 68<sup>th</sup> Annual Meeting of the American Educational Research Association, New Orleans, LA. (ED249461).

- McLachlan, B., & Chapman, R. (1988). Communication breakdowns in normal and language learning disabled children's conversation and narration. *Journal of Speech and Hearing Disorders, 53*, 2-7.
- McLean, L., & Cripe, J. (1997). The effectiveness of early intervention for children with communication disorders. In M. Guralnick (Ed.). *The effectiveness of early intervention*. (pp. 349-428). Baltimore: Brookes.
- Merritt, D., & Liles, B. (1987). Story grammar ability in children with and without language disorder: story generation, story retelling, and story comprehension. *Journal of Speech and Hearing Research, 30*, 539-552.
- Miller, J. (1981). *Assessing language production in children: Experimental procedures*. Baltimore: University Park Press.
- Miller, J., & Chapman, R. (1981). The relation between age and mean length of utterance in morphemes. *Journal of Speech and Hearing Research, 24*, 154-161.
- Miller, J., & Chapman, R. (1996). *Systemic Analysis of Language Transcripts-Research version* [Computer software] Madison, WI: Language Analysis Laboratory, Waisman Center, University of Wisconsin.
- Morgan, L., & Goldstein, H. (2004). Teaching mothers of low socioeconomic status to use decontextualized language during storybook reading. *Journal of Early Intervention, 26*, 235-254.
- Nathan, L. (2002). Functional communication skills of children with speech difficulties: Performance on Bishop's Children's Communication Checklist. *Child Language Teaching and Therapy, 18*, 213-232.
- Nelson, K. (1989). Strategies for first language teaching. In M. Rice & R. Schiefelbusch

- (Eds.), *The teachability of language* (pp. 379-445). Baltimore: Brookes.
- Nelson, K. (1991). Event knowledge and the development of language functions. In J. Miller (Ed.), *Research on child language disorders: A decade of progress* (pp. 125-141). Austin, TX: Pro-Ed.
- Newcomer, P., & Hammill, D. (1987). *Test of Oral Language Development-Primary (TOLDP; 3<sup>rd</sup> Ed.)*. New York: Psychological Corporation.
- Ninio, A. (1983). Joint book-reading as a multiple vocabulary acquisition device. *Developmental Psychology, 19*, 445-451.
- Ninio, A., & Bruner, J. (1978). The achievement and antecedents of labeling. *Journal of Child Language, 5*, 1-14.
- Ninio, A., & Snow, C. (1988). Language acquisition through language use: The functional sources of children's early utterances. In Y. Levi, I. Schlesinger, & M. Braine (Eds.), *Perspectives on a theory of language acquisition* (pp.152-180). Hillsdale, NJ: Erlbaum.
- Norris, J., & Hoffman, P. (1990). Language intervention within naturalistic environments. *Language, Speech, and Hearing Services in Schools, 21*, 72-84.
- Oppenheim, D., Nir, A., & Warren, S. (1997). Emotion regulation in mother-child narrative co-construction: Associations with children's narratives and adaptation. *Developmental Psychology, 33*, 284-294.
- Parten, M. (1932). Social participation among preschool children. *Journal of Abnormal and Social Psychology, 27*, 243-269.
- Paul, R., & Hernandez, R. (1996). Narrative development in late talkers: Early school age. *Journal of Speech and Hearing Research, 39*, 1295-1304.

- Paul, R. (2002). *Language disorders from infancy through adolescence: Assessment and intervention*. St. Louis, MO: Mosby.
- Paul, R., & Jennings, P. (1992). Phonological behavior in toddlers with slow expressive language development. *Journal of Speech and Hearing Research, 35*, 99-107.
- Paul, R., & Smith, R. (1993). Narrative skills in 4-year-olds with normal, impaired, and late-developing language. *Journal of Speech and Hearing Research, 36*, 592-598.
- Pellegrini, A. (1985). Relations between preschool children's symbolic play and literate behaviors. In L. Galda & A. Pellegrini (Eds.), *Play, language and stories: The development of children's literate behavior* (pp. 79-97). Norwood, NJ: Ablex.
- Pellegrini, A. (2001). Some theoretical and methodological considerations in studying literacy in social context. In S. Neuman & D. Dickinson (Eds.), *Handbook of early literacy research* (pp. 54-65). New York: Guilford Press.
- Pellegrini, A., & Galda, L. (1998). Peer interaction, play, and literate language: naturalistic and experimental evidence from preschool and primary classrooms. In A. Pellegrini & L. Galda (Eds.), *The development of school-based literacy: A social-ecological perspective* (pp. 60-88). New York, NY: Routledge.
- Pellegrini, A., Galda, L., Bartini, M., & Charak, D. (1998). Oral language and literacy learning in context: The role of social relationships. *Merrill-Palmer Quarterly, 44*, 38-54.
- Peters, A. (1983). *The units of language acquisition*. Cambridge, UK: Cambridge University Press.
- Peterson, C., & McCabe, A. (1983). *Developmental psycholinguistics: Three ways of looking at a child's narrative*. New York: Plenum.

- Peterson, C., & McCabe, A. (1987). The connective “and”: Do older children use it less as they learn other connectives? *Journal of Child Language, 14*, 375-381.
- Peterson, C., & McCabe, A. (1994). A social interactionist account of developing decontextualized narrative skill. *Developmental Psychology, 30*, 1612-1649.
- Piaget, J. (1926). *The language and thought of the child*. New York: Harcourt Brace.
- Piaget, J. (1963). *The origins of intelligence in children (2<sup>nd</sup> Ed.)*. New York: Norton.
- Preece, A. (1987). The range of narrative forms conversationally produced by young children. *Journal of Child Language, 14*, 353-373.
- Purcell, S., & Liles, B. (1992). Cohesion repairs in the narratives of normal-language and language-disordered school-age children. *Journal of Speech and Hearing Research, 35*, 354-362.
- Raab, M., & Carl, J. (2004). Early Intervention Practitioner Approaches to Natural Environment Interventions. *Journal of Early Intervention, 27*, 15-26.
- Rescorla, & Lee, L. (2000). Language impairment in young children. In L. Watson, E. Crais, & T. Layton (Eds.), *Handbook of early language impairment in children: Nature* (pp. 1-38). Albany, NY: Delmar.
- Rice, M. (2000). A unified model of specific and general language delay: Grammatical tense as a clinical marker. In Y. Levy & J. Schaeffer (Eds.), *Language competence across populations: Toward a definition of specific language impairment*. (pp. 63-95). Mahwah, NJ: Erlbaum.
- Roth, F., & Speckman, N. (1986). Narrative discourse: Spontaneously generated stories of learning-disabled and normally achieving students. *Journal of Speech and Hearing Disorders, 51*, 8-23.

- Roth, F., Cooper, D., & Speece, D. (2002). A longitudinal analysis of the connection between oral language and early reading. *Journal of Educational Research, 95*, 259-272.
- Rubin, K., Fein, G., & Vandenberg, B. (1983). Play. In E. Hetherington (Ed.), *Handbook of child psychology, vol. 4: Socialization, personality, and social development* (pp. 693-774). New York: Wiley.
- Sachs, J., Goldman, J., & Chaille, C. (1985). Narratives in preschoolers' sociodramatic play: The role of knowledge and communicative competence. In L. Galda & A. Pellegrini (Eds.), *Play, language and stories: The development of children's literate behavior* (pp. 45-62), Norwood, NJ: Ablex.
- Scarborough, H. (1998). Early identification of children at risk for reading difficulties: Phonological awareness and some other promising predictors. In B. Shapiro, P. Accardo, & A. Capute (Eds.), *Specific reading disability: A view of the spectrum* (pp. 75-199). Timonium, MD: York Press.
- Schank, R., & Abelson, R. (1977). *Scripts, plans, goals, and understanding*. Hillsdale, NJ: Erlbaum.
- Scott, C. (1994). A discourse continuum for school-age students. In G. Wallach & K. Butler (Eds.), *Language learning disabilities in school-age children and adolescents: Some principles and applications* (pp. 219-252). New York: Macmillan.
- Scott, C. (1995). Syntax for school age children: A discourse perspective. In M. Fey, J. Windsor, & S. Warren (Eds.), *Language intervention: Preschool through the elementary years* (pp. 107-143). Baltimore: Brookes.



- Scott, C. (2004). Syntactic contributions to literacy learning. In C. Stone, E. Silliman, B. Ehren, & K. Apel (Eds.), *Handbook of language and literacy: Development and disorders* (pp. 340-362). New York: Guilford Press.
- Segal, E., & Duchan, J. (1997). Interclausal connectives as indicators of structuring in narrative. In J. Costermans & M. Gogol (Eds.), *Processing interclausal relationships* (pp. 95-119). Mahway, NJ: Lawrence Erlbaum.
- Seifert, H., & Schwartz, I. (1991). Treatment effectiveness of large group basic concept instruction with Head Start students. *Language, Speech, and Hearing Services in Schools, 22*, 60-64.
- Semel, E., & Wiig, E. (1980). *Clinical Evaluation of Language Function (CELF)*. Columbus, OH: Merrill.
- Senechal, M. (1997). The differential effect of storybook reading on preschooler's acquisition of expressive and receptive vocabulary. *Journal of Child Language, 24*, 123-138.
- Senechal, M., Thomas, E., & Monker, J. (1995). Individual differences in 4-year-old children's acquisition of vocabulary during storybook reading. *Journal of Educational Psychology, 87*, 218-229.
- Shapiro, L., & Hudson, J. (1991). Tell me a make-believe story: Coherence and cohesion in young children's picture-elicited narratives. *Developmental Psychology, 27*, 960-974.
- Shriberg, L., & Kwiatkowski, J. (1982). Phonological disorders III: A procedure for assessing severity of involvement. *Journal of Speech and Hearing Disorders, 47*, 256-270.

- Silva, M. (1984). Developmental issues in the acquisition of conjunction. *Papers and Reports on Child Language Development*, 23, 106-114. (ED249779)
- Slobin, D. (1969). *Universals of grammatical development in children*. Paper presented at Conference with International Participation on Psychology of Human Learning, Prague. (ED032543)
- Slobin, D. (1988). Confessions of a wayward Chomskyan. *Papers and Reports on Child Language Development*, 27, 321-328. (ED302074)
- Smilansky, S. (1968). *The effects of sociodramatic play on disadvantaged preschool children*. New York: Wiley.
- Smith, J., Warren, S., Yoder, P., & Feurer, I. (2004). Teachers' use of naturalistic communication intervention practices. *Journal of Early Intervention*, 27, 1-14.
- Snedecor, G., & Cochran, W.G. (1967). *Statistical methods, 6<sup>th</sup> Edition*. Ames, IA: Iowa State University Press.
- Snow, C. (1977). The development of conversation between mothers and babies. *Journal of Child Language*, 4, 1-22.
- Snow, C. (1983). Literacy and language: relationships during the preschool years. *Harvard Educational Review*, 53, 165-189.
- Snow, C. (1989). Imitativeness: trait or skill? In G. Speidel & K. Nelson (Eds.), *The many faces of imitation in language learning* (pp. 235-260). New York: Springer.
- Snow, C. (1991a). The theoretical basis for relationships between language and literacy development. *Journal of Research in Childhood Education*, 6, 5-10.

- Snow, C. (1991b). Diverse conversational contexts for the acquisition of various language skills. In J. Miller (Ed.), *Research on Child Language Disorders: A decade of progress* (pp. 105-124). Austin, TX: Pro-Ed.
- Snow, C., & Ninio, A. (1986). The contracts of literacy: What children learn from learning to read books. In W. Teale & E. Sulzby (Eds.), *Emergent literacy: Writing and reading* (pp. 116-137). Norwood, NJ: Albex.
- Snow, C., & Imbens-Bailey, A. (1997). Beyond Labov and Waletzky: The antecedents of narrative discourse. *Journal of Narrative and Life History*, 7, 197-205.
- Snow, C., Burns, M., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.
- Stein, N., & Glenn, C. (1979). An analysis of story comprehension in elementary school children. In R. O. Freedie (Ed.), *New directions in discourse processing*. Norwood, N J: Ablex.
- Stein, N., & Glenn, C. (1982). Children's concept of time: the development of a story schema. In W. Friedman (Ed.), *The developmental psychology of time* (pp. 255-282). New York: Academic Press.
- Strong, C. (1998). *The Strong Narrative Assessment Procedure (SNAP)*. Eau Claire, WI: Thinking Publications.
- Sulzby, E. (1983). *Children's emergent abilities to read favorite storybooks*. Final report to the Spencer Foundation. Evanston, IL: Northwestern University.
- Sulzby, E. (1985). Children's emergent reading of favorite storybooks: A developmental study. *Reading Research Quarterly*, 20, 458-481.

- Sulzby, E. (1986). Writing and reading: Signs of oral and written language organization in the young child. In W. Teale & E. Sulzby (Eds.), *Emergent literacy: Writing and reading* (pp. 50-89). Norwood, NJ: Albex.
- Sutton, M., Justice, L., Streppa, C., & Skibbe, L. (in press). Communicative interactions with literacy versus manipulative toys: A study of mothers and their preschoolers with language impairment.
- Tallal, P., & Piercy, M. (1978). Defects of auditory perception in children with developmental dysphasia. In M. Wyke (Ed.), *Developmental dysphasia* (pp. 63-84). London: Academic Press.
- Tallal, P., Stark, K., & Mellits, D. (1985). The relationship between auditory temporal analysis & receptive language development: Evidence from studies of developmental language disorder. *Neuropsychologia*, 23, 527-534.
- Teale, W. (1986). Home background and young children's literacy development. In W. Teale & E. Sulzby (Eds.), *Emergent literacy: Writing and reading* (pp. 173-206). Norwood, NJ: Albex.
- Tomblin, J., & Records, N. (1997). Etiology of specific language impairment in children. *Journal of Speech and Hearing Research*, 41, 879-891.
- Thalheimer, W., & Cook, S. (2002). *How to calculate effect sizes from published research articles: A simplified methodology*. Retrieved February 25, 2006 from [http://work-learning.com/effect\\_sizes.htm](http://work-learning.com/effect_sizes.htm).
- Ukrainetz, A. (1998). The immediate effects of pictographic representation on children's narratives. *Child Language Teaching and Therapy*, 36, 51-67.

- Van der Lely, H., & Howard, D. (1993). Semantic diversity in young children with and without SLI. *Journal of Speech and Hearing Research*, 36, 1193-1206.
- Van Kleeck, A. (2004). Fostering preliteracy development via storybook-sharing interactions. In C. Stone, E. Silliman, B. Ehren, & K. Apel (Eds.), *Handbook of language and literacy: Development and disorders* (pp. 175-208). New York: Guilford Press.
- Van Oers, B. (1998). Mathematics learning in sociocultural contexts. *Learning and Instruction*, 8, 469-572. (EJ582925)
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, [Eds.]). Cambridge, MA: Harvard University Press.
- Wallach, G., & Butler, K. (1994). Creating communication, literacy, and academic success. In G. Wallach & K. Butler (Eds.), *Language learning disabilities in school-age children and adolescents* (pp. 2-26). New York: Macmillan.
- Warren, S., & Kaiser, A. (1986). Generalization of treatment effects by young language-delayed children: A longitudinal analysis. *Journal of Speech and Hearing Disorders*, 51, 291-299.
- Warren, S., & Yoder, P. (2002). Effects of prelinguistic milieu teaching and parent responsivity education on dyads involving children with intellectual disabilities. *Journal of Speech, Language, and Hearing Research*, 45, 1158-1175.
- Watkins, R., Kelly, D., Harkers, H., & Hollis, W. (1995). Measuring children's lexical diversity: Differentiating typical and impaired language learners. *Journal of Speech and Hearing Research*, 38, 1349-1355.

- Weismer, S. (2000). Language intervention for young children with language impairment. In L. Watson, E. Crais, & T. Layton (Eds.), *Handbook of early language impairment in children: Assessment and treatment* (pp. 173-198). Albany, NY: Delmar.
- Weismer, S., & Murray-Branch, J. (1993). Comparison of two methods for promoting productive vocabulary in late talkers. *Journal of Speech and Hearing Research*, 36, 1037-1051.
- Weistuch, L., Lewis, M., & Sullivan, M. (1991). Project Profile: Use of a language interaction intervention in the preschools. *Journal of Early Intervention*, 15, 278-287.
- Wells, G. (1985). Preschool literacy-related activities and success in school. In D. Olson, N. Torrance, & A. Hildyard (Eds.), *Literacy, language, and learning: The nature and consequences of reading and writing* (pp. 229- 253). Cambridge, UK: Cambridge University Press.
- Westby, C. (1985). Learning to talk, talking to learn: Oral-literate language differences. In C. Simon (Ed.), *Communication skills and classroom success: Assessment and therapy methodologies for language and learning disabled students* (pp. 334-357). San Diego, CA: College-Hill.
- Westby, C. (1994). The effects of culture on genre, structure, and style of oral and written texts. In G. Wallach & K. Butler (Eds.), *Language learning disabilities in school-age children and adolescents* (pp. 180-218). New York: Macmillan.

- Whitehurst, G., & Lonigan, C. (1998). *Getting ready to read: Emergent literacy and family literacy*. National Institute of Child Health and Human Development. (ED450418)
- Whitehurst, G., Arnold, D., Epstein, J., Angell, A., Smith, M., & Fischel, J. (1994a). A picture book reading intervention in day care and home for children from low-income families. *Developmental Psychology, 30*, 679-689.
- Whitehurst, G., Epstein, J., Angell, A., Payne, A., Crone, D., & Fischel, J. (1994b). Outcomes of an Emergent Literacy Intervention in Head Start. *Journal of Educational Psychology, 86*, 542-555.
- Whitehurst, G., Falco, F., Lonigan, L., Fischel, C., DeBarsyshe, B., Valdez-Menchaca, M., & Caufield, M. (1994c). Accelerating language development through picture book reading. *Developmental Psychology, 24*, 552-559.
- Wiig, E., & Semel, E. (1976). *Language disabilities in children and adolescents*. Columbus, OH: Merrill.
- Wiig, E., Secord, W., & Semel, E. (1992). *Clinical Evaluation of Language Fundamentals-Preschool (CELF-P)*. New York: Psychological Corporation.
- Zimmerman, I., Steiner, V., & Pond, R. (1992). *Preschool Language Scale (PLS)*. San Antonio, TX: The Psychological Corporation.