COMPLEXITY AND COHERENCE IN THE NARRATIVES OF KINDERGARTEN CHILDREN WITH AND WITHOUT LANGUAGE IMPAIRMENTS

by

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Abstract

The telling of a fictional narrative involves the integration of cognitive, linguistic, social, and cultural knowledge. The integration of these skills, and narrative ability in general, is a prerequisite for literacy acquisition. There is abundant evidence that children with language impairments have difficulty with the narrative task and, consequently, are at risk for developing deficits in literacy skills, but the existing research fails to pinpoint the source of the difficulty. This thesis reports an investigation of narratives told by kindergarten-age children with and without language impairments using a variety of complexity and coherence measures.

A goal plan analysis was used to examine the complexity and coherence of the narratives produced by 11 normal-language and 7 language-impaired kindergarten students. Data from 10 normal-language 4-year-olds, collected for an earlier study (Gibney, 1995), were also included in the current study. All of the participants were asked to examine a wordless picture book, *Frog, Where Are You?* (Mayer, 1969), then tell the story. The analysis comprised one complexity measure and seven coherence measures. It was predicted that the normal-language kindergarten students would produce more complex and coherent narratives than both the language-impaired and 4-year-old children. It was also predicted that the narratives of the language-impaired group would be developmentally immature and, therefore, more closely resemble the narratives of the 4-year-old children.

Recent research has shown evidence for a working memory deficit in children with specific language impairment. The narration of a story that includes both local and global goal plans, like *Frog, Where Are You?*, involves working memory. A correlation
of working memory with the plot measures was conducted to determine the relation of a measure of working memory and real-time language processing.

The normal-language kindergarten students performed significantly better than the language-impaired group on five of the coherence measures. The results of the 4-year-olds were inconsistent: their narratives resembled those of the normal-language kindergarten students on some measures, and those of the language-impaired students on others. The working memory correlation failed to reach significance; however, working memory was observed to correlate more strongly with two of the plot measures: complexity (positive) and proportion of nongoal units (negative).

It was concluded that the language-impaired children had significantly more difficulty narrating a coherent story than their same-age peers. Consequently, they may be at risk for deficits in literacy ability and academic achievement. The most discriminating measures were the proportion of nongoal units and the proportion of narrators who told a complete nonfrog episode. More research needs to be done in this area in order to develop effective narrative assessment and therapy tools for the preschool population in order to prepare them for school entry and literacy acquisition.
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CHAPTER ONE

REVIEW OF THE LITERATURE

The development of narrative competence has been of interest to child language researchers since the mid-1970s. The study of narratives is one method of examining language development at the discourse level. The telling of a coherent story involves the integration of linguistic, cognitive, psychological, and social abilities. Speech language pathologists often use narrative analysis to assess children with language impairments. Because language is used at the conversation or discourse level, analyzing language at this level, in addition to the word or sentence level, can provide valuable insight into a child’s overall ability to communicate.

Story telling is a primary way of relating events and experiences, and an important part of cultures in the world. Narrative ability is a foundation for literacy skills, which are crucial for academic success. There is evidence that preschool children who have weak narrative skills are at risk for developing literacy problems (Gee, 1989; Kamhi & Catts, 1989; Klecan-Aker & Caraway, 1997; Paul, 1995). For this reason, it is important to study the development of narrative ability of young children, particularly children with language impairments.

Many different skills are involved in narration. Consequently, there are many different aspects of a narrative that can be examined including: coherence (e.g., event knowledge, and story grammars), complexity, cohesion (e.g. the use of morpho-syntactic
devices), and the narrator's ability to tell a good story by being sensitive to the listener's needs. The current study focuses on narrative coherence and complexity.

This chapter reviews the literature on the following: the relevance of narrative ability to the development of literacy skills; the narrative task; the ways in which the development of narrative coherence and complexity have been examined; and the linguistic and cognitive deficits of children with language impairments and how they relate to narrative production. Finally the research hypotheses of the current study are presented. Chapter two presents research procedures and the method of analysis of the data. The results of this study are presented in chapter three. This is followed by a summary and discussion of the results in chapter four.

**Narratives as a Basis for Literacy**

Narrative development becomes increasingly important and relevant as children enter the school system. Narrative skills play an important role in the acquisition of literacy skills,\(^1\) which in turn form the basis for academic achievement (Dickinson, 1991; Gee, 1989; Kamhi & Catts, 1989; Klecan-Aker & Caraway, 1997; Paul, 1995; Westby, 1984). While language ability, in general, is a prerequisite for literacy skills, narrative ability appears to "have a considerable effect on the school performance and success of children, especially when school success is measured by reading achievement (Klecan-Aker & Caraway, 1997, p. 110). The narrative skills of the 5-year-old are all important for acquiring literacy skills. These include: the ability to organize a text around a specific focus, sequence and chronologically relate events, use connectives to link clauses,

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\(^1\) Narrative ability is only one of many prerequisites for literacy skills. Some other prerequisites are: phonological awareness and familiarity with the format of books.
distinguish foreground from background information, and infer and express causal
relations. Kamhi and Catts (1989) state:

By five years of age, children can express abstract conceptual notions involving
temporal, spatial, and causal relations. These notions are often expressed in
complex sentence structures that include multiple embeddings of subordinate,
relative, and infinitive clauses. By five years of age, children also have
considerable knowledge of familiar scripts and story structure. As discussed
earlier in this chapter, knowledge of syntactic, semantic, and discourse-level
structures contributes to reading performance. (pp. 27–28)

When children enter kindergarten, teachers nurture and build upon narrative
knowledge in order to begin the process of teaching them to read and write. Teachers
make use of activities such as sharing time, dictation, and dramatization of stories to
foster literacy skills (Toolan, 1988). In “dictation” children dictate a story to the teacher-
scribe, who records it for them and reads it back to them. According to Toolan, (1988),
“this gives the child a particularly immediate sense of how marvelous a knack it is to be
able to record one’s own story productions with fixed graphic symbol” (p. 187). In the
dramatization of stories, children learn the importance of coherence and the close
relationship between words and the events that they represent (p. 187).

Because narrative and language ability in general are so closely tied to the
development of literacy skills, it seems obvious that a child entering the school system
with a language impairment would be at risk for developing difficulties in this area.
Indeed, the literacy difficulties of children with language impairment have been well

Once children enter the public institutions outside the original community – whether preschool, Head Start, kindergarten, or a clinic – the ways in which their narrative skills match or depart from the public institution’s expected patterns of discourse will play a significant role in the perception of them as “healthy,” “well-adjusted,” “ready for school,” or “at risk.” (p. 289)

Hoffman (1990) reviewed the results of studies conducted by Strominger and Bashir (1977) and Maxwell and Wallach (1984), concluding that early language difficulties are correlated with later academic difficulties and consequently young children with language disorders are at risk for deficits in literacy skills (p. 82).

The reciprocal relationship between language and learning puts children with language impairment at a further disadvantage. In the school system, young children use oral language skills to learn to read while older children use their reading ability to further their language learning (Kamhi & Catts, 1989; Westby, 1989). Literacy skills appear to be crucial for learning and academic success in the school system. Preschool-aged children who have language disorders, including those who have difficulty with narrative structure, are at risk for poor academic performance. Therefore, it is particularly important to study the development of narrative abilities of both young typical children and language-impaired children. The following section describes the narrative task in more detail and the skills involved in producing a coherent narrative.
The Narrative Task

There are different types of narrative, including: scripts, personal narratives, and fictional stories. The narrative task and its discourse function vary depending on its type. Scripts, the most basic and earliest narrative type to be acquired, are based on prior experience and are used to impose order on new experiences in order to categorize them into various general types (Johnston, 1982). Hudson and Shapiro (1991) explain, "Narrating a script is similar to giving directions or a recipe in that only the most important information is presented without embellishment, and actions are reported in the correct chronological sequence" (p. 94). Similar to scripts, personal narratives also have their basis in personal experience. However, a personal narrative differs from a script in that it depicts the unfolding of a particular episode and is generally centered around a "high-point" that is the overall point of the story (Hudson & Shapiro, 1991). Fictional stories, which are the focus of the current study, are more complex and are the latest of the narrative types to develop. Because of the increased complexity of the fictional narrative task, global coherence is more difficult to achieve. It is in the production of fictional narratives that the narrative deficits of language-impaired children are most obvious.

Crossculturally, narrative ability is an important part of communication because it is the most common method of relating events and personal experiences to one another (Wolf, Moreton, & Camp, 1994). However, the narrative task is not a simple one but involves the integration of linguistic, cognitive, social, pragmatic, and cultural knowledge (Hudson & Shapiro, 1991). The competent narrator is able to express elaborated units of
text, use linguistic devices to conjoin meanings across sentences, and organize content coherently (Merritt & Liles, 1989; Roth & Spekman, 1986). In addition, a mainstream narrative in North America is “expected to include introductory and closing statements (i.e. story markers) and an orderly presentation of events that lead to a logical resolution” (Roth & Spekman, 1986, p. 8).

In terms of syntactic and semantic abilities, a number of linguistic skills are required to produce a well-formed narrative. This includes mastery of verb tense and aspect, and other expressions that distinguish foreground and background information (such as “usually” and sometimes”), the use of reference devices, and the use of temporal and causal connectives (Hudson & Shapiro, 1989). It is important to examine the use of these linguistic structures and their function in creating a narrative that is both coherent and cohesive. However, researchers of language impairment have recognized the importance of studying language at the discourse level since the mid-1970s. Westby (1984) discussed the relevance of going beyond the study of single utterances to the study of entire texts: “Transformational grammar approaches have dissected sentences removed from context and communicative intent and have ignored the fact that the meaning of a total discourse is more than can be explained from the sum of the meanings in the individual words and sentences” (Westby, 1984, p. 103).

Cognitive development plays an important role in the understanding of events and event structure, and therefore, in the production of narratives. In order to produce a coherent story the narrator must have a mental representation of story structure. Several researchers have described this mental representation in terms of having knowledge of a story grammar (Mandler, 1984; Stein & Glenn, 1979). Trabasso and Nickels (1992)
suggest that narrative coherence is achieved when children apply theories about intentional action and can infer and encode goal plans of action into speech (p. 250).

The study of pragmatics, in other words the rules that govern the social use of language, allows us to make inferences about a narrator's overall communicative competence (Wolf, Moreton & Camp, 1994). The narrative task requires a speaker to be able to do the following: a) integrate a variety of themes with characters' motives and internal responses, b) interweave that content with socially appropriate and logical arguments for plans and outcomes, c) mold that content into a language form that coherently realizes the narrative's communicative function, and d) monitor all of the above in order to produce the desired effect on the intended recipient (Liles 1993, p. 871).

The study of narratives allows us to examine the complex integration of the linguistic, cognitive, and pragmatic abilities involved in the comprehension and use of language at the discourse level. It is important to understand, however, that narrative production is greatly influenced by social and environmental factors. Because narratives are accounts of events and personal experiences, they reflect a person's social and cultural background. It is necessary to keep this in mind when studying the narratives of children from diverse cultural and linguistic backgrounds (Klecan-Aker & Caraway, 1997).

A main focus of the literature on narrative development has been on text coherence and complexity. The most common way of examining coherence and complexity has been through the use of story grammars. However, their value in describing the deficits of language-impaired children has limitations. The following section provides a more detailed definition of narrative complexity and coherence and the
ways in which they have been examined in the narratives of normal-language and language-impaired children.

The Development of Narrative Complexity and Coherence

Researchers on narrative structure and development have developed several methods of examining complexity and coherence. Some of these will be described in this section. In general, there is agreement in the literature on narrative development that complexity and coherence increase with age and that large gains are made between the ages of 3 and 5 years (Applebee, 1978; Berman & Slobin, 1994; Botvin & Sutton-Smith, 1977; Trabasso & Nickels, 1992; Trabasso & Rodkin, 1994; Trabasso et al., 1992; Umiker-Sebeok, 1977).

Narrative Complexity

Stories that are more complex both in content and form are perceived as being better stories. Narrative complexity has been defined as the number of elements that must be controlled or coordinated in a story, including: number of words, number of T-units (clauses), number of characters, number of incidents, and the average number of words per T-unit (Applebee, 1978, p. 56). Applebee states, “we would expect that the elements which go into a story would grow more complex with age on virtually any measure of complexity we chose to use” (p. 56). It is well documented that complexity increases with age (Applebee, 1978; Berman & Slobin, 1994; Botvin & Sutton-Smith, 1977; Trabasso & Nickels, 1992; Trabasso & Rodkin, 1994; Trabasso et al., 1992; Umiker-Sebeok, 1977). As language ability increases, so does the ability to produce more
complex narratives. Consequently one would expect the narratives of language-impaired children to be less complex than those of their age-matched peers.

Umiker-Sebeok (1977) studied the development of complexity in the personal narratives of 3-, 4-, and 5-year-olds. An analysis was conducted on narratives that were produced in a natural conversation setting and were typically accounts of events that occurred at school. Overall, Umiker-Sebeok found that there were age-related increases in the complexity of the narratives. Specifically, she observed that 3-year-olds produced stories that were no longer than two clauses and were completed in a single turn. They generally consisted of a complication section and one other unit, most commonly an introduction. Umiker-Sebeok found that the average story at age 4 was three clauses long and completed in one-and-a-half turns. These stories were likely to include an introduction and orientation in addition to the complication. At age 5, the length of the stories continued to increase but at a slower pace. Also, evaluations and results were more likely to be included, suggesting that there is more emphasis placed on the meanings of certain elements.

Complex narratives are generally perceived as being "better" stories. Another important property of a "good" story is coherence, both at a micro and macro level. The following section describes several different aspects of narrative coherence.

Narrative Coherence

The quality of a narrative can be judged by assessing its coherence. A coherent story is one that relieves the listener of the burden of interpretation. Many factors
contribute to the coherence of a narrative. This section addresses some of the elements that have been examined in the literature.

Bennett-Kastor (1983) defines coherence as “that quality which makes the discourse stand as a whole text; that is, which makes the utterances of the text related to one another in some salient way, and not just random strings” (p. 136). Coherence in a text can be examined both at a global (macro) and local (micro) level. Local coherence, generally referred to as cohesion, refers to the linguistic relationship between clauses in a text and how they are linked in order to form a cohesive whole (Halliday & Hasan, 1985; Peterson & McCabe, 1991). Global coherence refers to the coherent organization of a text as a whole. Westby (1984) claims that a theory of text coherence/cohesion should include the following components:

1. A theory of semantic representations for propositions, sentences, and sequences of sentences, and sequences of sentences that comprise the microstructures of the discourse.

2. A theory of semantic representations for global discourse structures, the text macrostructures that are organized into an overall superstructure, which is the theme of the text. Each text genre has a particular macrostructure organization.

3. A theory of cohesion that relates the microstructures to each other and to the macrostructure. (p. 109)

Narrative coherence is a quality both attributed to a narrative by the hearer and created by the narrator through the use of specific devices (Bennett-Kastor, 1983). Researchers concerned with the narrator’s ability to create a coherent text have examined
several types of local coherence, including the use of reference, tense/aspect, and causal and temporal connectors. One of the most common types of local coherence to be studied is Noun phrase (NP) coherence (Bamberg, 1987; Bennett-Kastor, 1983; Gomme, 1994; Ruthven, 1989). This involves examining the use of a particular noun phrase (typically referring to the agent in the story) in a story and how it is reiterated throughout the story to maintain coherence (Bennett-Kastor, 1983).

A number of researchers have examined the global coherence of narratives through the use of story grammars. Story grammars are descriptions of the structural units and their order of occurrence in fictional narratives. They are designed to capture the basic structure common to all stories and the relationships of the various elements to one another. More recently, researchers have begun to move away from the story grammar approach to look at other types of narrative structures, including, event structure (Berman, 1988; Berman & Slobin, 1994) and inclusion of goal plans (Trabasso & Nickels, 1992; Trabasso & Rodkin, 1994; Trabasso et al., 1992).

The following section reviews the most common story grammars and their strengths and weaknesses.

*Story Grammars*

The most common type of analysis is the story grammar analysis developed by researchers such as Labov and Waletzky (1967), Mandler (1984), and Stein & Glenn (1979). In a story grammar approach, the elements are related causally or temporally and are linked in a predictable way (Merritt & Liles, 1989).
Labov and Waletzky's (1997) high-point analysis was developed to describe the structure of personal narratives. It has been called a “high-point analysis” because the overall structure of the narrative is structured around a high-point in the story. According to Labov and Waletzky, the clauses of the narrative are ordered temporally and make up the following general structures: orientation, complication, evaluation, resolution, and coda. The usefulness of the high-point analysis in describing narrative structure is limited. According to Bamberg (1987) criticisms of the high-point analysis focus on Labov and Waletzky’s notion of evaluation as it “does not seem clear as to how exactly evaluative elements in the narrative could be identified (Bamberg, 1987, p. 5). He goes on to say that another weakness of their analysis is that it leaves out the interactive quality of narrative structure (Bamberg, p. 6). In any case, this analysis was not designed for fictional narratives.

Stein and Glenn’s (1979) story grammar comprises a setting (statements that introduce the protagonist and context of the story) and one or more episodes made up of the following components:

- **Initiating events**: occurrences that cause the protagonist to act.
- **Internal responses**: the goals, thoughts, and feelings of the protagonist.
- **Plans**: the intended action of the protagonist.
- **Attempts**: the protagonist’s overt action to obtain the goal.
- **Consequence**: indication of success or failure of the protagonist’s goal.
- **Reactions**: indications of the protagonist’s feelings about the success or failure of the goal.
According to Stein & Glenn (1979), fictional narratives can be analyzed according to the inclusion of these six components. A well-formed narrative is one that includes all of the above components. Mandler's (1984) story grammar includes similar elements but is more comprehensive in that it also includes rules for embedding and coordinating episodes.

Stein (1988) described eight developmental levels of story structure through which children's stories progressed between kindergarten and grade five. The stages progress from having no temporal or causal structure, to having a temporally based action sequence, to finally having a goal-based episode complete with all of the story grammar components. At the highest level, the components are both causally and temporally linked. Stein observed "under certain conditions, with the appropriate topic stem, even 5-year-old children can generate goal-based narratives with obstacles included" (p. 295).

Story grammars are based on the study of folktales, and as a result, may have some limitations crosslinguistically (Black & Bower, 1980, cited in Gibney, 1995). Similarly, because they are based on more complex literary texts, they may not be appropriate for the study of preliterate children’s narratives (Liles, 1985).

It has also been found that story grammars are not adequate to describe the narrative deficits of children with language impairments (Brown & Yule, 1983; McCabe, 1996; Ruthven, 1989). Ruthven (1989) explains that several researchers who adopted the story grammar approach (e.g., Merritt & Liles, 1989; Ripich & Griffith, 1988; Roth & Spekman, 1986) failed to find any significant differences in the story structures of school-aged language-impaired and normal-language children. Stories only varied in length (p. 8). This suggests that story grammars are inadequate for analyzing the narratives of
language-impaired children because, while language-impaired children may include a
similar number of story grammar components, listeners still perceive their stories to be
less coherent than those of their age-matched peers. In other words, story grammar
analyses are not detailed enough to capture the differences that exist in the narratives of
normal-language and language-impaired children.

For example, Merritt and Liles (1987) compared the use of story grammar
components by normal-language and language-impaired children. They found that both
groups were guided by story grammars and had similar story hierarchies. However, the
language-impaired group produced a lower frequency of story grammar components and
complete episodes. While the findings show a difference in the narrative abilities of
language-impaired and normal-language children, their value is limited in that they fail to
explain why this is the case. Merritt and Liles concluded:

The results of this investigation indicate that a story grammar analysis does
characterize some aspects of language disorder. It may be most useful as a means
of assessing the degree to which language-impaired children are able to integrate
causal and temporal relations within the context of stories. The possibility,
however, that these cognitively based organizational deficits are demonstrated in
other verbal or nonverbal communicative abilities should encourage researchers
to pursue this area of inquiry. (p. 30)

Thus, while story grammars appear to have some value in describing the
quantitative differences in the narratives of language-impaired and normal-language
children, their ability to provide a qualitative description of the underlying differences is
limited because they are lacking in detail. McCabe (1996) suggested that while some
researchers have attributed their failure to find differences in the story grammar analysis of narratives produced by language-impaired children to mean narrative ability is not impaired, it is more likely that story grammars are insensitive to the difficulties of the various challenged populations (p. 130). Consequently, other methods of analyzing narrative coherence may be more useful. The following section discusses some alternative approaches to analyzing narrative coherence.

*Event and Goal Plan Analyses*

In the past decade, researchers have begun to develop new approaches to examining the development of narrative structure. For example, Berman (1988) and Berman and Slobin (1994) discuss the structure of events, while Trabasso and his colleagues (Trabasso & Nickels, 1992, Trabasso et al., 1992, Trabasso & Rodkin, 1994) developed an analysis of goal plans in narrative.

Several studies have been conducted in order to determine the stages of narrative development in terms of event knowledge. The earliest attempt, by Applebee (1978), provides stages of development based on Vygotsky’s work on concept development. Upon studying the narratives of children between the ages of two and six, Applebee identified several narrative stages. Applebee (1978) calls the most primitive narrative forms, *heap*, in which, “organization is virtually that of immediate perception, with few links from one sentence to another” (p.59). In the second stage of development, Applebee suggests that children make use of *sequences* (p. 60). The next stage, *the primitive narrative*, has a center around which a set of complimentary attributes is developed, giving the narrative a focus or point. The next stage is the *unfocused chain*, in which each
element is linked with the next but there is no link between the head of the chain and the tail (p. 63). This is followed by the focused chain, in which the chaining process and the centering around concrete attributes come together in one narrative (p. 65). Applebee states that this is the most popular form of narrative at five years.

While story grammar analyses describe story structure in relation to the protagonist’s goals, actions, and reactions, Berman (1988) and Berman and Slobin (1994) conducted an analysis of story events. They discuss the ability to relate events in narrative. Berman (1988) explains that the term “relate” has two meanings in narrative, and both are relevant for the analysis. The first definition, as provided by Berman, is: “to tell, recount, or narrate, that is, to give a verbal account of the contents of an event” (p. 470). The second is “to show or establish a logical or causal connection between events” (p. 470).

To investigate children’s ability to relate events, in both senses of the word, these studies used the story Frog, Where Are You? (Mayer, 1969) to elicit narratives from children of all ages and across five different languages. The frog story was chosen because it is fairly long and the pictures depict a complicated sequence of events in which a boy and a dog search for a missing pet frog (Berman, 1988, p. 470). Berman developed several criteria to characterize the structure of events. These included: overall length of the narrative, reference to an overall plot line and to a sustained search as an organizing framework, and the use of linguistic devices suited to the narrative genre: deictic, sequential, or subordinating markers of relations between events in the ongoing narrative (p. 474).
Berman and Slobin (1994) discuss the relation of events both in terms of local and global structure. They suggest that in order for a narrative to be globally coherent, it must include three core components. These are the onset of the plot, the unfolding of the plot, and the resolution of the plot. At a local level, Berman and Slobin (1994) were concerned with whether the narratives of very young children simply describe the pictures in the story or whether the children actually relate them as showing events. This involves some degree of inferencing ability, because it requires interpreting what is happening in the picture and then, based on the events, inferring the protagonist's reactions and plans of action.

Berman (1988) discussed the narratives of Hebrew children of different ages. The subjects were asked to tell the story of a sequence of pictures depicted in Mercer Mayer's (1969) *Frog, Where Are You?*. Berman found that 3- and 4-year-olds were “unable to sustain a unified story line across their narratives” and tended to “treat each picture as an isolated frame” (p. 487). The 5-year-olds were able to sequence and chronologically relate events but lacked the ability to organize their narratives hierarchically (p. 488).

Subsequently, Berman and Slobin (1994) conducted a large crosslinguistic study on narrative development. Their work compiles the data from five studies conducted in English, German, Spanish, Turkish, and Hebrew. Each of these studies elicited narratives from 3-, 4-, 5- and 9-year-olds as well as adults. Each subject was asked to look at *Frog, Where Are You?*. Berman and Slobin provide detailed developmental profiles of the 3-, 5-, and 9-year-olds. They state that there is a large distinction between the stories of 3-year-olds and 5-year-olds and that 4-year-olds are in transition between these two age groups (p. 56). The following characteristics were described as typical of 3-year-olds:
1) A tendency to personalize and treat the telling of a story as an interactive communication task, resulting in more variable and idiosyncratic narratives.

2) A tendency to focus on the salience of individual pictured scenes rather than provide information that is more relevant to the plot line.

3) A tendency to shift between tenses suggesting an inability to establish an "anchor" tense, which serves to create text cohesion and coherence.

4) A tendency to use utterance-initial connectives that are based on spatial co-presence rather than on temporal sequencing.

(Berman & Slobin, 1994, pp. 60-64).

In general, Berman and Slobin found that "although 3-year-olds have considerable command of the lexico-syntax of their native tongue, they fail to demonstrate knowledge of narrative structure" (p. 58). The 5-year-olds produced more coherent stories in terms of narrative structure. However, they did not form a homogenous group, with some constructing globally structured and thematically motivated narratives and others relating only one or two of the major plot elements (p. 65). The following are characteristics common to the narratives of 5-year-olds:

1) Clear signs of temporal organization with the establishment of an anchor tense.

2) Use of connectives (in advance of those used by 3-year-olds) such as and, then, or and then, for the purpose of chaining clauses.

3) Ability to distinguish background and foreground information through the use of segment-marking connectives (e.g., so, and, then), choice of dynamic versus stative predicates, and explicit temporal expressions (e.g. one morning, that day).

4) General inability to sustain the level of complexity described above throughout the entire narrative.

5) General inability to make causal relationships between events explicit. (Berman & Slobin, 1994, 64-68)
Berman and Slobin claim that the narratives of 9-year-olds are more fully developed. They state that the narratives are well organized and syntactically complex, and make reference to causal and internal states (p. 75). However, they do not generally manifest narrative organization at a level subservient to the overall plot; they fail to consistently characterize backgrounded associated states and circumstances as distinct from foregrounded plot-advancing events; and their perception of the narrative task is stereotypical, rather than constituting a vehicle for individual style and self-expression. (p. 75)

This event-based analysis is useful for studying the narratives of young preschool children because it captures some important developmental differences in children between the ages of three and five years. The current study employs some of the principles of this analysis. Specifically, the coherence of different parts of the plot (opening, unfolding, and resolution) is examined.

Trabasso and Nickels (1992) take a more cognitive approach to narrative coherence. They suggest that narrative coherence is achieved when the narrator applies a theory about intentional action. They state:

Coherence in narration, we argue, is achieved when children use naïve theories about intentional action to infer and encode information about goals and goal plans of action into speech. This use of planning knowledge leads to narrative coherence when the events are interpreted according to and structured into a goal plan. (p. 250)

Trabasso and his colleagues developed a goal plan analysis of narratives (Trabasso & Nickels 1992; Trabasso & Rodkin 1994; Trabasso et al, 1992). Trabasso and
Rodkin (1994) explain that the goal plan analysis adopts the episodic categories of Stein and Glenn (1979) and Mandler (1984) but focuses on the causal inferences that link the states and actions of a story (p. 87). More specifically the analysis of goal plans concerns the ability to narrate events in a story according to goals and goal plans of action (Trabasso & Nickels, 1992).

Trabasso and Rodkin (1994) explain that the narration of the *Frog, Where Are You?* (Mayer, 1969) picture story is a joint process of event comprehension and production (p. 87). Specifically, they suggest the following:

What is narrated depends upon the narrator being able to interpret the characters and their relations in time and space, to understand how the initiating events impact on the main protagonist and lead to the formation of a goal and goal plan, how the protagonist enacts this plan over time, whether the attempts to achieve the plan fail, how the protagonist reacts to the failures, and finally, how the attempts succeed and end the story. In short, knowledge of goal/plans or planning is required. (p. 88)

An important concept in the goal plan analysis is the hierarchical nature of the goal plan. In the frog story there is a superordinate goal, to retrieve the frog, which leads to two subordinate goals, finding the frog and searching for the frog. Trabasso and his colleagues suggest that a coherent narration of this story should include sufficient information for the three goals to be inferred. Based on these notions, they developed a causal network model. The units that constitute the network are the units of Stein’s story grammar: S (setting), E (event), IR (internal response), G (goal), A (attempt), and O
(outcome)” (Trabasso & Rodkin, 1994, p. 89). The network represents the causal relations between each element in the story.

Trabasso and Nickels (1992), Trabasso et al. (1992), and Trabasso & Rodkin (1994), described the development of planning knowledge in children 3 to 9 years of age. Like Berman & Slobin (1994), Trabasso and Nickels used Berman and Slobin’s (1994) *Frog, Where Are You?* data. Trabasso and Nickels suggest that children move from describing isolated states and actions to temporal and causal sequencing of events, and finally, to the organization of narrations into episodes that include goals, actions, and outcomes (p. 250). Consistent with Berman’s (1988) findings, Trabasso and his colleagues found that 3-year-olds produced narratives that were mainly descriptions of isolated events or external actions (Trabasso et al., 1992, p. 135). The 4-year-olds in these studies appeared to show some awareness of goal plans in that they produced a large proportion of clauses that could be interpreted as attempts relevant to the main goal of finding the frog in the story. However, these attempts appeared to be descriptive rather than explanatory (Trabasso & Nickels, 1992, p. 270). The 5-year-olds demonstrated a clear organization of the narrative according to a goal plan of action (Trabasso & Nickels, 1992, p. 271). The findings of Trabasso and his colleagues suggest that there are significant differences in the planning knowledge of 3- and 5-year-olds. While the narratives of 3-year-olds showed virtually no evidence of planning knowledge, those of the 5-year-olds showed it clearly. The planning knowledge of 4-year-olds appears to be in transition between that of the 3- and 5-year-olds.

The current study applies this notion of coherence to the narratives collected. Children’s knowledge of goal plans reflects their knowledge of events and experiences in
general. It is particularly interesting to examine the use of goal plans by children with language disorders because it allows for an examination of their pragmatic discourse as well as their lexico-syntactic ability. The goal plan analysis used in this study is based on the work of Trabasso and his colleagues (Trabasso & Nickels, 1992, Trabasso et al., 1992, Trabasso & Rodkin, 1994) and that of Berman (1988) and Berman & Slobin (1994). Because narrative production involves the integration of cognitive, linguistic, social, and psychological factors, a goal plan analysis was selected as it is able to account for the several factors involved.

This section has reviewed developmental literature on the acquisition of narrative structure. The current study focuses on the differences in the goal plan knowledge of language-impaired and normal-language kindergarten children. The following section reviews the nature of linguistic and cognitive abilities of children with language impairments and the relationship of these abilities to narrative production.

Language and Cognitive Deficits of Children with Specific Language Impairment (SLI)

Language Deficits of Children With SLI

Children with Specific Language Impairment (SLI) are children of average intelligence who show specific deficits in language abilities (Johnston, 1982). While not a homogenous group, these children tend to have specific deficits in a range of language areas (particularly morphology) in the absence of deficits in hearing, nonverbal intelligence, emotional functioning, and motor development (Leonard, 1992). Leonard (1992) states that deficits are:
typically revealed when SLI children are compared to a group of younger children who are matched according to a general measure of language development such as mean length of utterance (MLU). Studies of this type usually report that despite the similar length of sentences in the two groups of children, the SLI children show less use of inflections and function words (p.186).

Cognitive Deficits of Children With SLI

While it may appear that SLI children have difficulty exclusively with language, Johnston (1994) argues that the development of language and cognition are interdependent and, therefore, language deficits in the absence of any cognitive deficits should not exist. Learning language, children must apply the cognitive mechanisms of observation, organization, and analysis to language they hear around them (Johnston, 1994, p. 108). Johnston (1994) states, “The most fundamental relationship between cognition and language, then, is that cognitive mechanisms create and constrain language knowledge” (p. 108). As language and cognition develop, their interdependence becomes more evident. A prerequisite for learning to speak is learning to think about means and ends. Then, once language is learned, cognitive development becomes dependent on language ability. Johnston (1994) suggests that language forms the basis of mental representations crucial for the development of reasoning skills. From this perspective, it is evident that attempting to separate cognition and language in development is an impossible task.

By now there is abundant evidence that cognitive deficits are present in SLI. Although there is a disparity between verbal and nonverbal skills in children with SLI,
and although they often have average intelligence, recent research suggests that these children do have difficulties with perception, memory, attention, spatial cognition, conceptual development, and reasoning (Johnston, 1999). Some studies on this topic are reviewed below to provide a sampling of the evidence for this claim. For a more extensive review of the literature on cognitive deficits in SLI, see Johnston (1997).

Johnston and Ellis Weismer (1983) investigated the representational abilities of language-disordered first- and third-grade students. They employed a visual imagery task to investigate children's ability to form nonlinguistic, "quasipictorial" mental representations. The purpose of the study was to test the hypothesis that language-disordered children have a pervasive representational deficit. The study involved a mental rotation task in which the subjects were required to judge whether two linear arrays of geometric forms were in the same order. In each trial, the two arrays were at different angles in relation to each other. The response time of the subjects was measured and it was observed that the response times of the language-disordered subjects were significantly slower than those of the normal subjects. The results of the study suggest that language-disordered children have difficulties with nonlinguistic representational processes (Johnston & Ellis Weismer, p. 402).

Kamhi, Catts, Koenig, and Lewis (1984) examined the nonlinguistic symbolic abilities of language-impaired children using a haptic (touch) recognition task. The study was conducted to test the claim that language-impaired children "might have a pervasive deficit that affects non-linguistic as well as linguistic symbolic abilities" (p. 49). For this task, the subjects were presented with several different three-dimensional shapes. They were required to blindly feel the shapes and then point to a drawing of the corresponding
shape. The language-impaired subjects performed significantly worse on this task, suggesting that they had difficulty generating, maintaining, and interpreting nonlinguistic symbolic representations.

Ellis Weismer (1991) studied the problem-solving abilities of children with language-disorders by employing the Hypothesis theory to investigate problem-solving skills. According to this theory, "a person generates a set of hypotheses when confronted with a problem, then samples from this set in an attempt to achieve a solution" (p. 1330). The task used to test the problem-solving abilities of kindergarten students with language impairments was an adapted version of a discrimination-learning paradigm (see Ellis Weismer, 1991). The results of this study showed that the language-impaired subjects demonstrated limitations in their hypothesis-testing skills. Ellis Weismer observed that the language-impaired subjects did not differ from the normal subjects in terms of the types of hypotheses they used but rather in their ability to use them consistently and reliably. Therefore, similar to Johnston and Ellis Weismer (1983) where the significant difference was in response time, the difficulties can be attributed to inefficiency in cognitive processing rather than an inability to perform the task or perform it in some qualitatively different way.

The results of the studies described above suggest that SLI children have deficits in some cognitive processes that are not captured on standardized measures of intellect (i.e., IQ tests). To summarize, "the studies of non-verbal cognition in children with SLI point to the existence of information-processing deficits, particularly in the areas of perception, processing rate and attentional capacity" (Johnston, 1997, p. 174).
Recently, researchers have begun to examine the role of working memory in SLI. Several studies have found evidence for a working memory deficit in children with SLI. Some of the literature on this topic is reviewed below.

Working Memory Deficits

A short-term or working-memory deficit has been proposed as being related to the language impairments observed in SLI (Montgomery, 2000). Several researchers have investigated the possible link between memory and language deficiencies in SLI (Kirchner & Klatzky, 1985; Montgomery, 2000; Van der Lely & Howard, 1993). According to Kirchner & Klatzky (1985), short-term memory (or what is referred to here as working memory):

holds actively processed verbal information for a short time, in verbatim form. In addition to this storage function, it also provides capacity for a variety of mental processes. In both of these roles, it contributes critically to the processing of language. (p. 556)

Working memory plays an important role in both the production and comprehension of language. Also, a relationship between the development of working memory and acquisition of language has been observed (Kirchner & Klatzky, 1985, p. 556). Consequently, working memory has become of interest to researchers investigating the nature of deficits in SLI.

Kirchner and Klatzky (1985) were interested in the processes associated with working memory as opposed to storage capacity. Specifically, they were interested in the process of rehearsal in SLI children. They claim, “By studying rehearsal we attempt to
draw broader implications about working memory for verbal items” (p. 556). According to these authors, rehearsal serves two functions: first, “it serves to “maintain” items for a short time,” and second, it serves a “long-term learning function,” where items are rehearsed for the purpose of encoding them into long-term memory (Kirchner & Klatzky, 1985, p. 556). In the task used to examine the process of rehearsal, subjects were shown a series of pictured objects. After each one, they rehearsed the name of the object aloud for 15 seconds. At the end of all of the pictured items, they were asked to remember as many of the items as they could. The authors examined 12 variables that represented the following three underlying factors: short-term memory capacity for order and item information, semantic organization in rehearsal and recall, and the susceptibility to intrusions of nonlist items into rehearsal (p. 562). The results showed that the SLI and normal groups differed on almost every variable suggesting, “a broad deficit in processes related to short-term memory in the language-disordered group” (p. 562).

In a recent investigation, Montgomery (2000) examined the relation of working memory to off-line and real-time sentence processing in children with SLI. Montgomery explains that, in general, performance on working memory tasks (tasks that incorporate both storage and processing components) are much more predictive of language comprehension performance than traditional digit or verbal span tasks (p. 119). Montgomery claims that conventional comprehension tasks are off-line as opposed to on-line or real-time tasks. Consequently, a number of mental operations intervene between the stimulus presentation and the listener’s response, making it difficult to identify the specific psycholinguistic processes involved in comprehension (p. 122). Montgomery employed a working memory task, an off-line sentence processing task, and an on-line
sentence processing task in order to investigate the following: first, the working memory
capacity of SLI children as compared to their age-matched and language-matched peers,
and second, to determine whether a differential relation between working memory and
real-time and off-line sentence processing might exist. In the off-line task, the children
listened to redundant and nonredundant sentences and were presented with an array of
decorated with four pictures. The children were required to choose the picture that corresponded to the
sentence. In the on-line task, the children monitored sentences in a short story for the
occurrence of a target word. The children were required to push a button each time they
heard the target word and their response time was measured. The results of
Montgomery’s study suggest the following: First, SLI children have less functional
working-memory capacity than their age-matched peers and comparable capacity to their
language-matched peers. Second, the SLI group comprehended fewer sentences in the
off-line task as compared to their same-age peers, and a significant correlation between
working-memory capacity and sentence comprehension was found for both the SLI group
and the control groups. No significant correlation was found between working memory
and sentence processing in the on-line task, suggesting that SLI children have difficulty
“managing their working memory resources relative to both age peers and younger
children when performing a conventional off-line sentence comprehension task but not a
real-time sentence processing task” (p. 117).

Montgomery (2000) suggests that future research examine larger language units
to assess the potential relation between working memory and real-time language
processing (p. 145). The current study employs a working memory task, adapted from
Montgomery (2000), to determine if the language-impaired children in the current study
have a lower working-memory capacity than their age-matched peers. Also, the possible correlation between working-memory capacity and measures of plot coherence is examined. Following Montgomery's (2000) suggestions for future research, the current study employs a larger language unit (a narrative sample) to examine the relationship between working memory and on-line language processing. It is conceivable that a correlation of working memory and narrative coherence should exist. It is hypothesized in this study that the narration of a coherent story involves the ability to formulate a hierarchical global goal-plan while narrating other goal-plans at a local level. This would involve working memory because it would require that various planning elements be held in mind while narrating other aspects of the story. Working memory is investigated in the present study as a possible source for the deficiencies observed in the narratives of language-impaired children.

This section has briefly reviewed the nature of language and cognitive deficits in SLI. Due to the deficits described above, it is evident that SLI children would have difficulty producing narratives because of the required integration of cognitive and linguistic abilities.

Narrative Deficits of Children With SLI

A number of authors have described the narrative abilities of children with language disorders (Cain & Oakhill, 1996; Ellis Weismer, 1985; Hoffman, 1990; Johnston, 1982; Liles, 1985; Liles, 1987; McCabe, 1996; Merritt & Liles, 1989; Ripich & Griffith, 1988; Roth & Spekman, 1986; Westby, 1984). This section provides a general overview of this research.
Children with SLI exhibit deficits in the use of linguistic devices in their narratives. The work of Liles (1985), Liles (1987), and Ripich and Griffith (1988) show that SLI children have difficulty with cohesion and the use of cohesive conjunctives. Ripich and Griffith compared the narratives of learning-disabled and non learning-disabled children between the ages of seven and thirteen. They examined the use of cohesive devices such as, reference, conjunction, and ellipsis and found that the learning-disabled children used significantly fewer cohesive devices in their stories compared with the nondisabled group. According to these authors, the absence of these markers made their stories more difficult to follow. Similarly, Liles (1985) examined the use of cohesive devices in children with and without language disorders. The results of the study showed that the subjects with language impairments used fewer Personal Reference ties but more Lexical and Demonstrative Reference ties. Liles concluded that the results suggest poor cohesion and narrative organization (p. 130). However, as described by Ruthven (1989), the results of this study conflict with the results of other studies (Mentis & Prutting, 1987; Rochester & Martin, 1979) that found that language-impaired children use fewer lexical reference ties than typical children. Ruthven (1989) also found that language-impaired children (aged 9 – 11 years) produced fewer lexical reference ties than their same-age normal-language peers. Ruthven suggested that the results of Liles (1985) differ because of how lexical cohesion was analyzed. Liles excluded cohesive elements that did not require the listener to look outside the sentence for additional information. Ruthven argued that the excluded elements play a cohesive role and that Liles' decision to exclude them "led to poor reliability" (Ruthven, 1989, p. 68).
Westby (1984) specifies three patterns of difficulties with narratives exhibited by children with language learning disabilities. First, they may have inefficient processing. Children who have processing inefficiencies exhibit behaviours such as response delays, difficulty changing tasks, and the need for repetitions and cues. Second, they may have difficulty organizing a personal narrative or producing a narrative from a picture stimulus. Westby claims that these children “lack what Anderson (1977) termed the executive system, that is, the ability to plan and monitor behaviours” (p. 122). Finally - children with language learning disabilities may have insufficient schema knowledge. Westby describes this pattern of impairment as the following:

In its most marked form, the student does not recognize that the pictures in the book present a story. They [sic] describe each picture separately and do not link the events in one picture with the preceding and following pictures. In less marked forms, the student recognizes that the book does present a story, but either does not perceive or else misinterprets the cause-effect and motivational relationships within the book. These students lack not only the executive functioning of the second group, but, in addition, they lack representations for world knowledge. (Westby, p. 122).

The narratives of language-impaired children have been examined in several different ways. This section has reviewed some of the deficits that have been observed including: the insufficient use of cohesive devices, inefficient processing, interpreting picture stimuli, and poor schema knowledge.
Summary and Goals of the Current Study

This chapter reviewed the literature on the development of narrative ability by language-impaired and normal-language children. In the first section, the importance of narrative ability for literacy acquisition was discussed. It was shown that it is especially relevant for kindergarten-age children because they are entering the school system where success is based on literacy skills. The importance of studying the narratives of language-impaired children was also highlighted. It is known that language-impaired children have difficulty with narrative production for several reasons. Consequently, they are at risk for developing problems with literacy and academic achievement. The first purpose of the current study is to compare the coherence and complexity of the narratives of language-impaired and typical kindergarten students. A secondary purpose is to compare the narratives of the kindergarten students to the narratives of younger children (aged 4 years) to examine a possible pattern in the acquisition of narratives in typical children, and also to determine if the narratives of language-impaired children appear to be developmentally immature.

This chapter also reviewed some of the ways in which narrative complexity and coherence have been examined. The analysis of story grammars is the most pervasive method reported in the literature. However, it has been shown that this method may not be adequate for describing the deficits of language-impaired children. An analysis of goal plans may be more informative because it takes into account the integration of linguistic and cognitive ability. For this reason, the goal plan analysis is better able to account for the underlying abilities involved in narrative production.
Some of the evidence for working memory deficits in SLI has been reviewed in this chapter. It was hypothesized that working memory may be involved in the ability to formulate and narrate a hierarchical goal plan and, consequently, could be related to the narrative deficits observed in children with SLI. The final purpose of this study is to determine the role of working-memory capacity in narrative production.

Statement of Research Hypotheses

The following are the hypotheses of the current study. These hypotheses will be stated more explicitly in chapter two.

1) Typical kindergarten students (aged 5-6 years) should produce significantly more coherent and complex narratives than 4-year-olds.

2) Kindergarten students with language impairments should produce less coherent/complex narratives in comparison to their age-matched peers.

3) Kindergarten students with language impairments should produce narratives that are developmentally immature and, therefore, more similar to the narratives of 4-year-olds.

4) A significant correlation between working memory capacity and narrative ability should exist.
CHAPTER TWO

METHOD

Overview

The main purpose of this study was to examine the complexity and coherence of narratives told by kindergarten-aged children with and without language impairment. A secondary purpose was to compare the data from the language-impaired group to existing data from typical 4-year-olds. Specifically, the narratives were elicited to determine if there are differences in the narratives of the subjects with specific language impairment (SLI) in terms of presence of goal plans, overall coherence, and complexity. The analysis is based on the work of Berman and Slobin (1994), Trabasso and Nickels (1992), Trabasso and Rodkin (1994), and Trabasso, Stein, Rodkin, Munger, and Baughn (1992). The existing data from the 4-year-old children were collected by Gibney (1995).

The data were collected from eighteen 5- and 6-year olds in two metropolitan Canadian public school districts. Eleven of the subjects were included in the normal language group and seven were included in the SLI group. Each subject participated in three sessions over the course of one week in which three tellings of Mercer Mayer's (1969) *Frog, Where Are You?* were elicited. The story was also modeled twice by the examiner over the week to help familiarize the children with the story. The data were collected at the elementary schools of the participants. The subjects were asked to leave
their classroom with the examiner to participate in the sessions. All data were both audio- and video-recorded. The recorded narratives were transcribed according to the format set out by the CHAT program of the Child Language Data Exchange System (MacWhinney, 1991) and then coded using the procedure outlined in this chapter. This chapter includes a detailed description of the subjects, procedures and analyses used in this study.

Subjects

The subjects of this study were eighteen students between the ages of 5;7 and 6;5 (see table 2.1) recorded in April and May of their kindergarten year. Eleven of the students were assigned to the group of participants with normal language development (referred to as the LN group). Seven of the students were assigned to the group with language impairment (referred to as the IL group). The LN group included six boys and five girls. The IL group included five boys and two girls.

All participants were recruited from two metropolitan Canadian school districts. The LN group was recruited through the kindergarten teachers at several schools in these districts. A consent form and questionnaire were sent home and returned to the examiner by the teachers. The IL group was recruited through the school speech language pathologists (SLPs) in these districts. The SLPs were asked to send consent forms and questionnaires home with any kindergarten SLI students on their caseload.

The same questionnaire was sent out to both participant groups in an attempt to gain more insight into the children's backgrounds and demographics. All of the questionnaires were returned with the exception of one from IL3, whose parents chose
Table 2.1.

Age/Gender of Participants

<table>
<thead>
<tr>
<th>Child</th>
<th>Age (year; months)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>LN1</td>
<td>5;11</td>
<td>F</td>
</tr>
<tr>
<td>LN2</td>
<td>5;9</td>
<td>M</td>
</tr>
<tr>
<td>LN3</td>
<td>5;7</td>
<td>M</td>
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<td>6;0</td>
<td>M</td>
</tr>
<tr>
<td>LN11</td>
<td>5;7</td>
<td>F</td>
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</table>

Normal- Language Kindergarten Children (LN)

<table>
<thead>
<tr>
<th>Child</th>
<th>Age (year; months)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL1</td>
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<td>M</td>
</tr>
<tr>
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<td>6;5</td>
<td>M</td>
</tr>
<tr>
<td>IL6</td>
<td>6;3</td>
<td>F</td>
</tr>
<tr>
<td>IL7</td>
<td>5;7</td>
<td>M</td>
</tr>
</tbody>
</table>

Language-Impaired Kindergarten Children (IL)
not to complete the form. All of the children were from middle-class neighbourhoods and spoke English as their first language. The highest level of education completed by the mothers ranged from completion of grade 10 to completion of a graduate degree. Of the 11 LN children, two had a history of speech-language therapy prior to entrance into the school system. One of the two was seen for articulation, and neither student has any current speech or language deficits. Both performed well on the language tasks in this study. Of the IL group three children had a history of speech-language therapy prior to entrance into the school system. All of the children had at least some exposure to books and most (14/18) claimed to have had “plenty” of exposure to books. None had any prior exposure to *Frog, where are you?*. Nine of the LN students and six of the IL students had attended preschool.

All participants completed standardized assessments of cognitive and language ability. To be included in the LN group, the children had to have at least an average intelligence level as measured by the Columbia Mental Maturity Scale (Burgemeister, Holland, & Lorge, 1972). The mean standard score for this test is 100 with a standard deviation of 16 units. LN participants also had to obtain at least an average standard score on four out of five of the administered subtests of the Test of Language Development-2 Primary (TOLD-II) (Newcomer & Hammill, 1988). The five subtests administered were the Picture Vocabulary, Oral Vocabulary, Grammatic Understanding, Sentence Imitation, and Grammatic Completion subtests. The mean standard score for each subtest is 10 with a standard deviation of 3.
In order to be included in the IL group, the children had to obtain at least an average score on the Columbia Mental Maturity Scale and a score that was one standard deviation or more below the mean on at least two of the five subtests of the TOLD-II (1988).

In addition to cognitive and language testing, a working memory task was administered to all participants (see description below) because it has been suggested that the language deficits observed in SLI children are related to deficiencies in working memory (Montgomery, 2000). This task was included so that the relation of working memory and language could be further investigated.

Normal-Language Participants (LNs)
As described above, all LN children had to have at least an average intelligence level as measured by the Columbia Mental Maturity Scale (mean standard score is 100 +/- 16). The range of scores from the LN group was 96 – 126 with a mean score of 109. The LN group also had to obtain at least an average score on four out of five subtests of the TOLD-II. All of the LN subjects obtained average scores on all language subtests with the exception of LN11, who achieved a below average score on the Sentence Imitation subtest (see table 2.2).

Language-Impaired Participants (ILs)
By definition, having a Specific Language Impairment means that deficits are primarily in the area of language. For a child to be considered SLI, the child should have
Table 2.2.
Scores From Columbia (1972) and TOLD-II (1988)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Columbia Mean = 100 +/- 16</th>
<th>TOLD (PV) Mean = 10 +/- 3</th>
<th>TOLD (OV) Mean = 10 +/- 3</th>
<th>TOLD (GU) Mean = 10 +/- 3</th>
<th>TOLD (SI) Mean = 10 +/- 3</th>
<th>TOLD (GC) Mean = 10 +/- 3</th>
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</thead>
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<td>8</td>
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TOLD: PV= Picture Vocabulary, OV= Oral Vocabulary, GU=Grammatic Understanding, SI= Sentence Imitation, GC= Grammatic Completion
an average non-verbal intelligence. For this study, intelligence was measured using the Columbia Mental Maturity Scale (1972). This test assesses the general reasoning ability of children aged 3 years 6 months through 9 years 11 months (Burgemeister & Lorge, 1972). Depending on the child's age, from 51 – 65 items are presented. Each item contains from three to five drawings on a 6-by-9 inch card. For each item the child is required to choose the one item of the group that is different or unrelated to the other items. All but one of the language-impaired subjects in this study met these criteria. Subject IL3 obtained a score on the Columbia that was one standard deviation below the mean. It was the impression of the examiner that inattention may have been a factor in this case. IL3 showed consistent difficulty in attending to all tasks throughout the sessions.

A child was considered to have impaired language if he or she achieved a score that was one standard deviation or more below the mean on at least two of the subtests of the TOLD-II. All of the IL participants met the criterion. Three of the children had below average scores on two of the subtests, three had below average scores on three of the subtests, and one child had below average scores on all of the subtests. All of the IL participants had below average scores on the Sentence Imitation subtest.

A t-test was conducted for each of the subtests of the TOLD-II (1988) in order to determine if the performance of the LN group was significantly different from the IL group. The scores of the LN group were found to be significantly higher than the scores of the IL group on every subtest (p < .05).
4-year-old Participants

Existing data from typical 4-year-olds were used in this study. These children were participants in an earlier study (Gibney, 1995; Gibney & Johnson, 1996). The narratives analyzed for this study came from ten English-speaking children (six girls and four boys) between the ages of 4;4 and 4;11. All of the 4-year-olds were typically developing children with no history of language impairment. The participant numbers given to the 4-year-olds in Gibney (1995) are preserved in this study.

Procedures

Each child participated in three sessions with the examiner. The first and last session were separated by one week, with an intermediate session occurring on a day in the middle of the week. No two sessions occurred on consecutive days. Due to illness, two of the children (LN2 & LN9) missed their final sessions on the scheduled date. Their final sessions were rescheduled for the following week.

All sessions were held at the schools of the participants. One exception was made for IL5 because the school year ended after his second session. A final session was held at the child’s home. The students accompanied the examiner to a room out of the classroom for testing. They participated individually in the first and last sessions, and the intermediate session was either an individual or group session depending on the availability of students at a given school.

All sessions were audio recorded using a Marantz tape recorder and PZM microphone. The sessions were also videotaped using a Canon digital video camera.
Three of the participants were videotaped using a Panasonic VHS recorder (VW-SHM20).

Session One

The first session was completed in approximately 35 minutes. The session began with an elicitation of the wordless picture story *Frog, Where Are You?* (Mayer, 1969). Each child was told that he or she was going to look at a picture book that told a story. The child was then asked to look at all the pages of the book and, when he or she felt ready, to tell the story to the examiner while looking at the pictures. The purpose of this elicitation was to familiarize the child with the story. For this reason, the examiner would make comments such as: "then what happened?," "good story," and "what's happening here?" if the child needed encouragement to complete the story. In subsequent elicitation of the story the examiner made as few comments as possible.

After the child completed the narration of the story, the Columbia Mental Maturity Scale was administered. This was followed by the administration of subtests one and two of the TOLD-II.

At the end of the session the examiner modeled the story for the child. It was explained that this was a reward for his or her hard work. The examiner told the story while looking at the pictures but did not use a set script in order to avoid giving the impression that there is a set way of telling the story.
Session Two

The purpose of the second session was to increase the participants’ familiarity with the story. This session was either an individual or group session. If there was more than one student at the same school who was on the same testing schedule (between sessions one and three), children were seen in a group. The session lasted approximately 10 minutes. In this session the examiner told the participants the story. Again, the examiner did not use a script; therefore, the story heard in this session was a slightly different version than in the first session. As mentioned for session one, this was to ensure that the children understood that there was no “correct” story and they were not intended to memorize the adult version.

Session Three

The third and final session lasted approximately 30 minutes. At the beginning of this session the examiner told the child that a special guest (Winnie the Pooh puppet) would be coming at the end of the session to hear the Frog story. The child was then asked to tell the examiner the story once as a practice run before the special guest arrived. After the story, a working memory task was administered (see description below). Then the last three subtests of the TOLD-II were administered. Finally, the examiner brought out a puppet and told the child that the puppet really liked stories and would like to hear one. The child was then given the option to tell the story again.

By the end of the sessions the participants had heard the story twice and told the story three times. There were two children (LN4 and IL3) who only told the story twice because they did not want to tell it a third time. The examiner felt that with the modeling
and number of tellings that all of the students felt comfortable with the story. As a result, the examiner was confident that the stories chosen for analysis were true representations of the subjects’ narrative ability.

**Working Memory Task**

A working memory task, developed by Montgomery (2000), was administered in the third session as an additional method of comparing the SLI children and their typical age-matched peers.

The task administered in this study was adapted from Montgomery’s single-load working memory condition. In this task the children were asked to listen to a series of word lists that increased in length from three words up to five words. The word lists were presented over a Marantz PMD430 tape recorder and the child listened to the words over high quality Sennheiser HD 520 II headphones. After each set of words the child was asked to tell the examiner the words that they heard, but they were required to reorder them from the smallest object to the largest. For example, if the words heard were: *truck, nose, chair*, the correct answer would be: *nose, chair, truck*.

There were eight training items before the administration of test items. All of the practice word lists were three words long. For the first two training items the examiner demonstrated the task for the children using simple language and gestures when needed. Occasionally the examiner would point to physical objects in the room for the child to get the idea of the real size of the objects. The first practice items were played over the tape recorder in the sound field. The following practice items were played over the headphones and the examiner helped the children until they obtained the right answer.
The examiner spent as much time on the practice items as required for the participants to understand the task. In all cases, the examiner felt confident that the children understood the task.

The test items began with the 3-word lists. There were three test items at this level. If the children answered two out of three correctly, they went on to the 4-word level. If they answered fewer than two correctly, the task was discontinued. If the subjects answered two out of three correctly at the 4-word level, they moved on to the 5-word level. The task was discontinued after the 5-word level regardless of how many items were answered correctly. Working memory capacity was defined as the highest level at which the student obtained a score of 2 out of 3 correct items.

Development of Test Stimuli

The examiner and an assistant at the University of British Columbia developed the stimuli for this task. The word lists used were the same ones used by Montgomery (2000) and replicated with permission.

All stimulus words were recorded on a Pavilion N5270 laptop computer using the CoolEdit program. The words were recorded in a sound booth using a Parrot translator microphone. All words were recorded at a sampling rate of 44 100 Hz in mono with a 20dB gain. The words were recorded from a master list of all test words. The recorder made three separate recordings of the words on the master list. The words were recorded in a different order each time. What was perceived by both the examiner and the assistant as the best token of each word was then chosen for the test stimuli. These words were
normalized by 50% to ensure that they were all equal in amplitude. Noise was also removed from before and after each word to ensure a clean onset and offset.

The practice and test 3-word, 4-word, and 5-word lists were then constructed within the CoolEdit program according to the lists provided. A tone signal was inserted at the beginning of each list to mark the beginning of the list, and a soft white noise signal was inserted after the last word in each list to mark the ending. One second of silence was inserted between each word in a list. The lists were then transferred from the CoolEdit program onto the audiotapes that were used to administer the task.

_Transcription and Story Selection_

Each narrative sample was transcribed according to the CHAT program of the Child Language Data Exchange System (CHILDES) (MacWhinney, 1991). The narratives were transcribed orthographically with one clause per line. See Appendix for a sample transcript.

In keeping with Berman and Slobin (1994) and many other studies involving _Frog, Where Are You?,_ each line of the transcript included one main clause. The clause is defined as a unit that contains one unified predicate, that is, a finite or nonfinite verb or a predicate adjective (Berman & Slobin, 1994). For example, the following would be considered two clauses and would be transcribed on separate lines:

\[
\begin{align*}
  & \text{he thought} \\
  & \text{he could get the bees} \quad (\text{Berman & Slobin, 1994, p. 660})
\end{align*}
\]

All three narrative samples from each student were transcribed and the “best” one was chosen for analysis. This was done to ensure that the narrative chosen for analysis
was the best representation of each child’s knowledge and ability to tell a story. The criterion for choosing the best story was based on the number of essential story elements included by the student. As outlined by Gibney (1995), there are six essential story elements. These have been adapted from Berman (1998). Each story was examined for the elements described below and assigned a score out of six. The story that had the highest score out of six was chosen for analysis. When two stories had the same score, a naïve reader was asked to choose the story that she felt was the most coherent.

The six essential story elements are:

**Initial Event chain:**
1. The frog escapes from the jar.
2. The boy and/or dog discover that he is missing.

**Search occurs:**
3. The boy and the dog search for the frog.

**Story Ending:**
4. The boy finds the frog.
5. The boy takes the frog.
6. The new frog is the same or a substitute for the frog who escaped.

**Coding**

Once the best story for each participant was chosen, it was then coded using the system outlined below. The first step was to divide each story into the plot units it contained. According to Gibney (1995), a plot unit can be one or more utterances that have an identifiable role within the story. Utterances that were not part of the narrative, such as comments related to non-story events, were not included in the analysis. The following are examples of plot units and their role within the story:

*and the frog was gone.* (functions as an initiating event)
The boy looked down in the hole / to see if froggie was there. (this utterance contains two clauses and two plot units; the first functions as an attempt and the second as a purpose)

and then he took one of their babies home. (functions as an outcome for the goal of Taking the frog home)

The following codes were assigned to the plot units in the stories. These codes were adapted from Gibney (1995) and are based on the work of Trabasso and Nickels (1992), Trabasso et al. (1992), and Trabasso and Rodkin (1994).

**Plot Unit Type**

Each plot unit was coded according to its main purpose in the story. There were three plot unit types: those related to a frog goal plan, those related to a nonfrog goal plan, and those not related to a goal plan (nongoal).

A plot unit was coded as relating to a frog goal plan if it involved any information pertaining to the primary plot line. The primary plot line involves the three main frog goals: searching for the frog, finding the frog and taking the frog home. It also involves any information at the beginning of the story that establishes a setting or motivates the frog goals, for example: character introductions, statement of a relationship between characters, and opening or initiating events. For example,

One day a boy caught a frog (primary plot line unit: functions as an opening event.

and they looked behind a log (primary plot line unit: functions as a search attempt)

Nonfrog goal plan units were also coded. A nonfrog goal plan is an event that is narrated that is not part of the primary plot line. For a nonfrog event to be considered a part of a goal plan, it had to involve at least an initiating event that motivated the
development of a goal, and an attempt to achieve that goal. Examples of nonfrog goals in the story are: the rescue goal of the boy when his dog falls out the window, the goal of the dog to escape from angry bees, and the goal of the angry deer to throw the boy over the cliff. For example,

*the bees were chasing the dog* (Nonfrog goal: attempt by dog to escape from angry bees)

*he leaned on some branches that were actually antlers* (Nonfrog goal: initiating event that leads to the goal of the deer to throw the boy off the cliff)

Nongoal units were those plot units in the story that were not part of any goal plan but were still a part of the narrative. This category is described in further detail below.

**The Frog Goals**

There are three main frog related goals: the superordinate goal of getting the frog back (referred to as the Take goal because it involves taking the frog back home), and the two subordinate goals of Finding and Searching for the frog (referred to as the Find and Search goals). These are three main goals in the story as described by Trabasso and his colleagues. It is the inclusion of the superordinate and subordinate goals that make up a hierarchical goal plan. According to Trabasso and Rodkin (1994), "the plan is hierarchical because a superordinate goal, namely to retrieve a lost goal object (the frog), motivates subordinate goals, namely to find the frog by searching for it in various locations" (1994, p. 88). Trabasso and Nickels (1992) claim that the inclusion of a hierarchical goal plan develops around the age of 5 years. The following criteria were originally drawn from the work of Trabasso and Nickels, and Berman and Slobin (1994),
and adapted from Gibney (1995, pp. 32-35). They were used to determine if sufficient information was present in a narrative to infer the inclusion of each of the three frog goals. Some discrepancies exist in the criteria of Berman and Slobin and that of Trabasso and Nickels, for example, the criteria for inferring a Take goal. Berman and Slobin suggest that the main goal of the story is resolved if there is an explicit mention of the protagonist finding his frog (or a substitute frog). Trabasso and Nickels state that this would be a resolution of the Find goal and that the Take goal is not resolved unless it can be inferred that the protagonist then takes the frog home. The present study adopts Trabasso and Nickels's criteria for the coding of a Take goal.

**Take Goal:** In order for the Take goal to be coded, the narrator either had to include an explicit statement of wanting to get the frog back or enough information for the goal to be inferred. Following Gibney (1995), if the narrator provided at least three of the following, the Take goal was inferred:

1. A stated relationship between the boy and the frog (stating this relationship serves to motivate the boy to want to get his frog back).

2. Noticing that the frog was missing from the jar or a statement that includes the boy's realization that the frog was gone.

3. An attempt to take the frog home at the end of the story.

4. The existence of Find or Search goals in the story these subordinate goals naturally entail the superordinate Take goal. This type of information could only be counted once. For example, if Find and Search goals were coded three times, this was not sufficient by itself to infer a Take goal.

Examples:

LN7: *then they saw the frog was gone* (realization statement).

LN8: *then he took one home with him*  (attempt to take a frog home).

LN9: *and the little boy looked in his boot* (Search/Find goal, entails a Take goal.).
Find goal: This goal was coded if the narrator included an explicit statement about the boy wanting to find his frog or the inclusion of any of the following:

1. An explicit statement was made about finding the frog.
2. Attempts were made to find the frog (also entails search goal).
3. The frog was found at the end of the story.

Examples:

LN7: *the boy looked down in a hole to see if froggie was in there* (attempt)

LN9: *then they looked over a log and said lookit there’s my frog* (statement that frog was found)

Search goal: The search goal was coded if the search was carried out at more than one location. Search goals always entailed the higher order Find and Take goals.

Primary Plot Line Functions

As described above, the primary plot line involves all plot units pertaining to the three frog goal plans. Each frog goal plan unit was further specified for its specific function in the story.

1. Character Introductions: Character introductions were coded because they are important in establishing a setting for the story and for achieving global coherence. The following is an example of a character introduction:

   LN7: *once there was a little boy and a frog and a dog*

2. Opening Event: an opening event was any event that occurred at the beginning of the story that was related to the primary plot line but was not considered an
initiating event of a goal plan. Opening events also serve to establish a setting for
the story. Examples:

LN10: *one day a boy caught a frog
that night he kept it in a jar*

3. Stated relationship: this was coded if there was an explicit mention of the boy’s
possessive relationship with the frog. This is important for motivating the boy’s
desire to get the frog back. Example:

LN2: *he’s looking at his frog*

4. Initiating event: These included any of the following as listed by Trabasso et al,
1992). These events are directly related to the boy’s establishment of a goal plan:

The boy falls asleep (enabling frog to escape)
The frog escapes from the jar and/or leaves
The boy wakes up (after the frog has escaped)
The boy finds the jar empty
The boy realizes the frog is gone
The boy reacts to the frog being gone

5. Attempt: An action was coded as an attempt to find the frog if it involved looking,
searching, yelling, checking, or calling for the frog in various locations. An
attempt was also coded if the subject included a direct quotation of the boy saying
“Froggie where are you?” Example:

LN6: *then he looked in a gopher hole*

6. Purpose: A purpose was encoded any time an attempt included an explicit reason
for why the attempt was made. This includes prepositional phrases such as
“looking for the frog”. A purpose was also encoded if the narrator included a purposeful comment in the form of the protagonist’s dialogue.

Example:

LN10: trying to look for froggie

7. Nonattempt event: this was coded any time an event was described that had to do with the frog goals but did not fall into any of the other coding categories.

Example:

LN7: the boy heard something (occurs just before he finds the frog).

8. Internal response: this includes any statement that refers to the protagonist’s cognitions, emotions, or beliefs. Example:

LN10: he was mad at the owl

9. Outcomes: Outcomes were coded for each of the three frog goals. An outcome for the Search goal could either be an unsuccessful or a successful outcome. Unsuccessful outcomes were encoded when it was explicitly stated that the frog was not found in a given location. A successful outcome was encoded if there was explicit mention of finding his frog at the end of the story. This also entailed an outcome for the Find goal. An outcome for the Take goal was encoded if there was explicit mention of taking the frog back home. Examples:

LN6: he wasn’t in there (unsuccessful search outcome)

LN10: and there was his frog (Search/Find outcome)

LN5: he picked up him and went back home (Take outcome)
Nonfrog goals

There are at least three opportunities in the frog story for a narrator to include an episode that is not related to the primary plot line. These are: the dog falling out of the window and the boy coming to rescue him; the dog finding a beehive and being chased by the bees; the boy leaning on some branches that turn out to be deer antlers and the deer throwing him off a cliff. These events were coded as nonfrog goal plans if they contained sufficient information to infer goal-directed behaviour. At the very least they needed to include an initiating event and an attempt to achieve a goal. If there was not enough information to infer a goal plan then these events were coded as nongoal units.

As for the frog goal plans, the nonfrog goal plans were coded for the following: initiating events, internal responses, attempts, purposes, nonattempt events and outcomes.

The following is an example of a nonfrog goal plan:

\[\textit{and then the doggie fell down from the big heavy bowl}\]
(initiating event: sets up rescue goal)

\[\textit{and then the boy came out to see if he was okay}\]
(attempt)

\[\textit{he was okay}\]
(outcome)

\[\textit{but the boy was all mad because he broke the bowl}\]
(internal response)

Nongoal units

Nongoal units were any plot units in the story that were part of the narrative but were not a part of a frog or a nonfrog goal plan. These plot units were coded as one of the following:
1. Description of Event: any described event not pertaining to a goal plan.  
   Example:  
   IL2: he's barking at the beehive

2. Description of State: A described state that was pictured or imagined:  
   IL2: owl was in the hole

3. Name of an object or person: giving a label for a pictured object or person.

4. Narrator strategy: this was any statement that was included for the benefit  
   of the listener. This included statements like:  
   and who do you think he saw?

Inter-rater reliability

Two transcripts, one from an LN subject and one from an IL subject, were given  
 to a Master's student in Speech Language Pathology to code in order to determine inter-rater reliability. Each code was described in detail to the student, and a sample transcript was provided. The transcripts were compared and inter-rater reliability was calculated as the percentage of codes that were agreed upon by both coders. Reliability was determined to be 85% between the two coders. The codes that were not agreed upon were ones that did not affect the analysis. For example, there was some discrepancy in the specific nongoal categories (description of event, state, name, narrator strategy), and what was coded as an opening event rather than an initiating event.

Analysis

Measures of narrative complexity and coherence were conducted and compared across the three groups: the language-impaired kindergarten students (IL), the normal language kindergarten students (LN), and the normal language 4-year-olds (4LN). As previously mentioned, this analysis is based on the work of Berman and Slobin (1994),

Complexity measure

Complexity was measured by calculating the total number of plot units in the narrative. Plot units include frog goal plan units, nonfrog goal plan units, and nongoal units. Utterances that related to events outside of the story, such as events in their own life, negotiations, and other comments about distractions during the session, were not included.

It was hypothesized that the LN group would produce significantly more complex narratives than both the IL and 4NL groups, and that no significant difference would be found for the IL and 4NL groups.

Coherence measures

1. Proportion of primary plot line units:

   The proportion of primary plot line units was included as a measure of global coherence. Stories that contain more information relevant to the primary plot line are more globally coherent. In the Frog story, this involves information relevant to each of the three frog goals. While nonfrog goal units contribute to local coherence as they make up local episodes within the story, it has been observed that they do not contribute to the global coherence of the story (Gibney, 1995).

   For all participants, the number of primary plot line units was divided by the overall number of plot units to obtain the proportion of the narrative relevant to the primary plot line:
Total # of primary plot line units = Proportion of narrative related to primary plot line
Total # of plot units

It was hypothesized that the LN group would produce a significantly higher proportion of primary plot line units than both the IL and 4NL groups. It was also hypothesized that no significant group difference would be found between the IL and 4NL groups.

2. Proportion of nongoal units:

The proportion of nongoal units in the narrative was included as another measure of global coherence. High proportions of nongoal units in a narrative have a negative effect on global coherence.

The proportion of the narrative devoted to nongoal information was obtained by dividing the total number of nongoal units by the total number of plot units for each subject:

Total # of nongoal units = proportion of narrative devoted to nongoal information
Total # of plot units

It was hypothesized that the IL and 4NL groups would produce a significantly higher proportion of nongoal units than the LN group. It was also predicted that no significant difference would be found between the IL and 4NL groups.

3. Encoding of each of the three frog goals:

Because the Frog story contains a hierarchical goal plan (one superordinate and two subordinate goals), a coherent telling of the story should include sufficient information to infer the inclusion of each of the three frog goals. The superordinate goal
of getting the frog back entails the subordinate goal of finding the frog, which in turn entails another subordinate goal of searching for the frog. A narrative that does not include each of the goals is less coherent than one that does. Also, difficulties encoding the hierarchical goal plan may be indicative of deficits in planning and intentional knowledge. Each narrative was analyzed to determine if sufficient information was included in order to infer each of the three frog goals. Each narrative was scored as either positive (+) or negative (-) for the encoding of all three goals.

It was hypothesized that a significantly higher proportion of LN narrators, than both IL and 4NL narrators, would encode all of the frog goals. No significant group difference was expected between the IL and 4NL groups.

4. Proportion of purposeful attempts:

Trabasso et al. (1992) suggest that attempts encoded with an explicit purpose, or purposeful attempts, contribute to the global coherence of the narrative. They found that the explicit conjoining of purposes with attempts increases substantially at age 5 (p. 144). A purposeful attempt was coded any time an attempt was conjoined with a purpose (see coding).

The number of overall attempts and the proportion of purposeful attempts was calculated for each subject. Group means were compared. The proportion of purposeful attempts was obtained by dividing the number of explicit purposes by the total number of attempts:

\[
\text{Total # of purposes} = \frac{\text{Proportion of purposeful attempts}}{\text{Total # of attempts}}
\]
It was hypothesized that the LN group would produce significantly higher proportions of purposeful attempts than both the IL and 4NL groups. No significant group difference was expected between the IL and 4NL groups.

5. Inclusion of a complete nonfrog episode:

The narratives were analyzed for whether or not they included at least one complete nonfrog episode. A nonfrog episode was considered complete if it included an initiating event, an attempt, and an outcome. While nonfrog episodes that included an initiating event and an attempt were coded as nonfrog goals, they were considered to be incomplete nonfrog episodes.

Trabasso and Rodkin (1994) describe episodic structure in terms of Goal-Attempt-Outcome sequences (GAO sequences). This measure is based on this structure, and is included as a measure of local coherence. The initiating event was considered to be a statement of goal-oriented behaviour, hence filling the role of “Goal” in the GAO sequence.

Although the nonfrog episodes are not part of the primary plot line, the ability to narrate a complete local episode not only contributes to coherence at a local level, but is also another indication of a narrator’s goal plan knowledge.

Each narrative was assigned a positive or negative value (+/-) for the inclusion of a complete nonfrog episode. The proportion of narrators in each group that included at least one complete nonfrog episode was then calculated.

\[
\frac{\text{# of complete episode narrators in group}}{\text{total # of narrators in group}} = \text{proportion of narrators in each group who narrated at least one complete nonfrog episode}
\]
It was hypothesized that a significantly higher proportion of LN narrators, than both IL and 4NL narrators, would narrate at least one complete nonfrog episode. No significant group difference was expected between the II and 4NL groups.

6. Coherence of the onset, unfolding, and resolution of the plot:

The final coherence measure is taken from Berman and Slobin (1994). They state that there are three core components that need to be coherently narrated in order for the story to be interpreted as being organized around an overall plotline (p. 46). These are: the onset, unfolding, and resolution of the plot. In order to infer the coherence of each of these components, Berman and Slobin specify the following criteria:

**Onset**: required explicit mention of the boy’s noticing that the frog is missing; a child who merely refers to the jar as empty without relating it to the boy’s discovery was not credited.

**Unfolding**: explicit mention must be made of searching (or looking, or calling) for the frog, and this must go beyond the initial search inside the bedroom.

**Resolution**: the frog that the boy takes home at the end of the story must explicitly be described as being the same as or substituting for the frog the boy has lost.¹ (Berman & Slobin, 1994, p. 46)

Each narrative was assigned a positive or negative (+/-) value for the inclusion of a coherent narration of each of the three core components, and for the inclusion of all three components. The proportion of narrators in each group that coherently narrated each individual component, as well as the proportion of narrators that coherently narrated all of the components was calculated.

¹ Following Berman and Slobin (1994) a coherent resolution was credited if the narrator explained that the frog (or a substitute frog) was found even if they failed to state that the boy then took the frog home. This differs from Trabasso et al.’s criteria.
It was hypothesized that a significantly higher proportion of LN narrators would narrate coherent plot openings, unfoldings, and resolutions. It was also hypothesized that a higher proportion of them would narrate all three components. No significant group difference was expected between the IL and 4 NL groups.

Correlation of Working Memory and Narrative Coherence:
For the normal-language kindergarten children and the language-impaired children, a correlation of working memory capacity and narrative ability was conducted. Working memory capacity, as defined by performance on the working memory task described earlier in this chapter, was correlated with all of the complexity and coherence measures described above. It was predicted that a correlation of working memory and at least some of the narrative measures would be revealed.

Summary of Analyses
In summary, the following null hypotheses were tested:

1) There will be no difference in the number of plot units included in the narratives of the 4-year-olds, the normal-language and language-impaired children.

2) There will be no difference in the proportion of primary plot units in the narratives of each group.

3) There will be no difference in the proportion of nongoal units in the narratives of each group.

4) There will be no difference in the proportion of narrators in each group who encoded each of the three frog goals.
5) There will be no group differences in the proportion of purposeful attempts included by each narrator.

6) There will be no difference in the proportion of narrators of each group who produced at least one complete nonfrog episode.

7) There will be no difference in the proportion of narrators of each group who told a coherent plot opening, unfolding, and resolution, and proportion who told a wholly coherent narrative.

8) Working-memory capacity will not correlate with any of the above measures.
CHAPTER THREE
RESULTS

Overview

The results of the complexity, coherence, and working memory analyses are presented in this chapter. Results are discussed according to the order of analyses presented in chapter two. The group results on each measure are presented in the tables in the following order: normal kindergarten-aged group (LN), language-impaired kindergarten-aged group (IL), and normal 4-year-old group (4NL).\(^1\) The following group comparisons will be made: LN to IL, IL to 4NL, and NL to 4NL.

It was hypothesized that the LN group would produce more complex and coherent narratives than both the IL and 4NL groups. It was also hypothesized that the narratives of the IL group would be more similar to the less mature 4NL group, and therefore, the IL group would not have significantly different scores on the measures of complexity and coherence. Statistical analyses were conducted to test the null hypotheses.

Complexity

Individual scores on the complexity measure are presented in Table 3.1. Complexity was determined by calculating the total number of plot units in the narrative. The narratives of

\(^1\) Please note that 4NL subject 6 from Gibney (1995) has been eliminated from this analysis because this child had turned 5-years-old during the 1995 study. In all 4NL tables, the subjects are numbered from 1-11 with the exclusion of 6.
Table 3.1
Number of Plot Units Included by Normal-Language Kindergarten (LN), Language-Impaired (IL), and Normal-Language 4-Year-old (4NL) Participants

<table>
<thead>
<tr>
<th>Normal-Language Kindergarten Participants</th>
<th># of plot units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>LN1</td>
</tr>
<tr>
<td>LN1</td>
<td>28</td>
</tr>
<tr>
<td>LN2</td>
<td>39</td>
</tr>
<tr>
<td>LN3</td>
<td>33</td>
</tr>
<tr>
<td>LN4</td>
<td>64</td>
</tr>
<tr>
<td>LN5</td>
<td>34</td>
</tr>
<tr>
<td>LN6</td>
<td>54</td>
</tr>
<tr>
<td>LN7</td>
<td>48</td>
</tr>
<tr>
<td>LN8</td>
<td>34</td>
</tr>
<tr>
<td>LN9</td>
<td>53</td>
</tr>
<tr>
<td>LN10</td>
<td>53</td>
</tr>
<tr>
<td>LN11</td>
<td>39</td>
</tr>
<tr>
<td>Mean</td>
<td>43.55</td>
</tr>
<tr>
<td>SD</td>
<td>11.41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language-Impaired Kindergarten Participants</th>
<th># of plot units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>IL1</td>
</tr>
<tr>
<td>IL1</td>
<td>36</td>
</tr>
<tr>
<td>IL2</td>
<td>15</td>
</tr>
<tr>
<td>IL3</td>
<td>53</td>
</tr>
<tr>
<td>IL4</td>
<td>40</td>
</tr>
<tr>
<td>IL5</td>
<td>37</td>
</tr>
<tr>
<td>IL6</td>
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</tr>
<tr>
<td>IL7</td>
<td>29</td>
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<tr>
<td>Mean</td>
<td>36.14</td>
</tr>
<tr>
<td>SD</td>
<td>11.87</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal-Language 4-Year-old Participants</th>
<th># of plot units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>4LN1</td>
</tr>
<tr>
<td>4LN1</td>
<td>28</td>
</tr>
<tr>
<td>4LN2</td>
<td>52</td>
</tr>
</tbody>
</table>
the LN group were the most complex (mean = 43.6, SD = 11.41), followed by the 4NL group (mean = 37, SD = 11.87). The narratives of the IL group were the least complex (mean = 36.14, SD = 13.81). Differences between the groups were not found to be statistically significant using a one-way ANOVA with group (3) as the independent variable and number of plot units as the dependent variable (p > .05).

There was a large amount of within-group variability for this measure. The NL scores ranged from 28–64, the IL from 15–53, and the 4NL from 16–51. Note the overlap of ranges for the three groups. However, it is worth noting that an IL subject produced the least complex narrative (plot units = 15), and an NL subject produced the most complex narrative (plot units = 64). Also, as predicted, the ranges for the IL and 4NL groups are very similar.

**Coherence**

**Proportion of Primary Plot Line Units**

A high proportion of primary plot line (ppl) units is suggestive of a more coherent narrative. The proportion of primary plot line units in each narrative was calculated by dividing the total number of primary plot line units by the total number of plot units. It was predicted that the LN group would produce narratives with higher proportions of primary plot line units than both the IL and 4NL groups, and that the IL group’s narratives would be more similar to the 4NL group than to the LN group.

The proportions of primary plot line units of each narrative are shown in Table 3.2. Group means indicate that the LN group produced narratives with the highest proportion of primary plot line units (Mean = .51, SD = .09). This was followed closely
Table 3.2
Proportion of Primary Plot Line Units (ppl) for Normal-Language Kindergarten (LN), Language-Impaired (IL), and Normal-Language 4-Year-old (4NL) Participants

<table>
<thead>
<tr>
<th>Normal-Language Kindergarten Participants</th>
<th>Proportion ppl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1 (LN1)</td>
<td>.64</td>
</tr>
<tr>
<td>Participant 2 (LN2)</td>
<td>.38</td>
</tr>
<tr>
<td>Participant 3 (LN3)</td>
<td>.63</td>
</tr>
<tr>
<td>Participant 4 (LN4)</td>
<td>.42</td>
</tr>
<tr>
<td>Participant 5 (LN5)</td>
<td>.44</td>
</tr>
<tr>
<td>Participant 6 (LN6)</td>
<td>.59</td>
</tr>
<tr>
<td>Participant 7 (LN7)</td>
<td>.52</td>
</tr>
<tr>
<td>Participant 8 (LN8)</td>
<td>.59</td>
</tr>
<tr>
<td>Participant 9 (LN9)</td>
<td>.49</td>
</tr>
<tr>
<td>Participant 10 (LN10)</td>
<td>.49</td>
</tr>
<tr>
<td>Participant 11 (LN11)</td>
<td>.44</td>
</tr>
<tr>
<td>Mean</td>
<td>.51</td>
</tr>
<tr>
<td>SD</td>
<td>.09</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language-Impaired Kindergarten Participants</th>
<th>Proportion ppl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1 (IL1)</td>
<td>.61</td>
</tr>
<tr>
<td>Participant 2 (IL2)</td>
<td>0</td>
</tr>
<tr>
<td>Participant 3 (IL3)</td>
<td>.25</td>
</tr>
<tr>
<td>Participant 4 (IL4)</td>
<td>.38</td>
</tr>
<tr>
<td>Participant 5 (IL5)</td>
<td>.41</td>
</tr>
<tr>
<td>Participant 6 (IL6)</td>
<td>.63</td>
</tr>
<tr>
<td>Participant 7 (IL7)</td>
<td>.59</td>
</tr>
<tr>
<td>Mean</td>
<td>.41</td>
</tr>
<tr>
<td>SD</td>
<td>.23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal-Language 4-Year-old Participants</th>
<th>Proportion ppl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1 (4NL1)</td>
<td>.61</td>
</tr>
<tr>
<td>Participant 2 (4NL2)</td>
<td>.58</td>
</tr>
<tr>
<td>Participant 3 (4NL3)</td>
<td>.36</td>
</tr>
<tr>
<td>Participant 4 (4NL4)</td>
<td>.40</td>
</tr>
<tr>
<td>Participant 5 (4NL5)</td>
<td>.39</td>
</tr>
<tr>
<td>Participant 6 (4NL7)</td>
<td>.66</td>
</tr>
<tr>
<td>Participant 7 (4NL8)</td>
<td>.24</td>
</tr>
<tr>
<td>Participant 8 (4NL9)</td>
<td>.48</td>
</tr>
<tr>
<td>Participant 9 (4NL10)</td>
<td>.43</td>
</tr>
<tr>
<td>Participant 10 (4NL11)</td>
<td>.75</td>
</tr>
<tr>
<td>Mean</td>
<td>.49</td>
</tr>
<tr>
<td>SD</td>
<td>.16</td>
</tr>
</tbody>
</table>
by the 4NL group (Mean = .49, $SD = .16$). The narratives of the IL group contained the lowest proportion of primary plot line units (Mean = .41, $SD = .23$).

Using a one-way ANOVA with group (3) as the independent variable and proportion of plot units as the dependent variable, between group differences were not statistically significant for this measure ($p > .05$). There was also a substantial amount of variability within the IL and 4NL groups (IL range = $0 - .63$, 4NL group range = $.24 - .75$). The variability of the IL group scores is noteworthy, in that the lowest IL score is much lower than the lowest scores of both the LN and 4LN group, while the highest IL score is similar to the highest score in the LN group overall. There was considerably less variability within the LN group (.38 -.64). Again, the ranges for the three groups overlap.

**Proportion of Nongoal Units**

The proportion of nongoal (nog) units, plot units that do not contain information pertaining to a goal plan, was calculated for each narrative. Results are shown in Table 3.3. High proportions of nongoal units have a negative impact on narrative coherence. It was predicted that the LN group would produce lower proportions of nongoal units than both the IL and 4NL groups, and that the IL and 4NL proportions would not be significantly different.

The narratives of the LN group contained the lowest proportions of nongoal units (mean = .16, $SD = .11$). The narratives of the 4NL group contained the next lowest proportion of nongoal units (mean = .38, $SD = .21$), and the narratives of the IL group contained the highest proportion of nongoal units (mean = .45, $SD = .28$).
Table 3.3
Proportion of Nongoal Units (nog) of Normal-Language Kindergarten (LN), Language-Impaired (IL), and Normal-Language 4-Year-old (4NL) Participants

<table>
<thead>
<tr>
<th>Normal-Language Kindergarten Participants</th>
<th>Proportion nog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant LN1</td>
<td>.25</td>
</tr>
<tr>
<td>Participant LN2</td>
<td>.21</td>
</tr>
<tr>
<td>Participant LN3</td>
<td>.15</td>
</tr>
<tr>
<td>Participant LN4</td>
<td>.17</td>
</tr>
<tr>
<td>Participant LN5</td>
<td>.38</td>
</tr>
<tr>
<td>Participant LN6</td>
<td>.07</td>
</tr>
<tr>
<td>Participant LN7</td>
<td>.04</td>
</tr>
<tr>
<td>Participant LN8</td>
<td>.09</td>
</tr>
<tr>
<td>Participant LN9</td>
<td>.17</td>
</tr>
<tr>
<td>Participant LN10</td>
<td>.08</td>
</tr>
<tr>
<td>Participant LN11</td>
<td>.31</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>.16</strong></td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td><strong>.11</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language-Impaired Kindergarten Participants</th>
<th>Proportion nog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant IL1</td>
<td>.28</td>
</tr>
<tr>
<td>Participant IL2</td>
<td>1.0</td>
</tr>
<tr>
<td>Participant IL3</td>
<td>.38</td>
</tr>
<tr>
<td>Participant IL4</td>
<td>.63</td>
</tr>
<tr>
<td>Participant IL5</td>
<td>.32</td>
</tr>
<tr>
<td>Participant IL6</td>
<td>.37</td>
</tr>
<tr>
<td>Participant IL7</td>
<td>.17</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>.45</strong></td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td><strong>.28</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal-Language 4-Year-old Participants</th>
<th>Proportion nog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 4NL1</td>
<td>.32</td>
</tr>
<tr>
<td>Participant 4NL2</td>
<td>.17</td>
</tr>
<tr>
<td>Participant 4NL3</td>
<td>.64</td>
</tr>
<tr>
<td>Participant 4NL4</td>
<td>.60</td>
</tr>
<tr>
<td>Participant 4NL5</td>
<td>.27</td>
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<tr>
<td>Participant 4NL6</td>
<td>.34</td>
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<tr>
<td>Participant 4NL7</td>
<td>.76</td>
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<tr>
<td>Participant 4NL8</td>
<td>.18</td>
</tr>
<tr>
<td>Participant 4NL9</td>
<td>.30</td>
</tr>
<tr>
<td>Participant 4NL10</td>
<td>.25</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>.38</strong></td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td><strong>.21</strong></td>
</tr>
</tbody>
</table>
As predicted the LN group produced significantly lower proportions of nongoal units than both the IL and 4NL group and the null hypotheses were rejected. Using a one-way ANOVA with group (3) as the independent variable and proportion of nongoal units as the independent variable, significant group differences were found, $F(2,25) = 5.09, p < .05$. A post hoc test (Tukey HSD for unequal N) indicated a pairwise difference between the LN group and both the IL and 4NL groups, $p < .05$ (one-tail). No significant difference was found between the IL and 4NL groups. When interpreting these results it is important to remember that, by definition, because the measures are proportions, as the primary plot line proportion increases, the proportion of nongoal units decreases.

It is apparent from the scores on this measure that IL2’s score is much higher than all of the other subjects. Because this child told a much shorter narrative and failed to include any goal-related information, each clause of this narrative was coded as a nongoal unit. This narrator did not tell a “story,” but rather described what was occurring in each picture. A $t$-test was conducted for the IL and LN groups with the exclusion of IL2’s data in order to determine if a significant group difference would still be found. The proportion of nongoal units of the LN group was still found to be significantly lower than that of the IL group ($p < .05$).

Encoding of the Three Frog Goals

Each narrative was analyzed for whether or not it contained sufficient information to be able to infer the inclusion of each of the three frog goals (getting the frog back, finding the frog, and searching for the frog). The global coherence of this story is largely
dependent on an effective narration of its hierarchical goal plan. It was predicted that a larger proportion of the LN narrators would encode all three goals as compared to both the IL and 4NL groups, and that no significant difference would be found between the IL and 4NL groups.

Individual results for this measure are presented in Table 3.4. As predicted, the proportion of LN narrators who encoded the three frog goals is significantly higher than that of the IL narrators. While 10 of 11 (or .91) LN narrators encoded all of the goals, only 3 of 7 (.43) IL narrators produced sufficient information relevant to each of the goals. A nonparametric Kruskal-Wallis test, with group (3) as the dependent variable and whether or not the three goals were encoded as the independent variable, indicated a significant group difference, $p < .05$. A post hoc analysis (Mann-Whitney U test) indicated a pairwise difference between the LN and IL groups, $p < .05$.

The results of the 4NL group did not support the prediction that they would perform similarly to the IL group. In fact, their performance was very similar to that of the LN group. Nine of the 10 (.9) 4NL narrators were able to encode all of the frog goals. The post hoc analysis (Mann-Whitney U test) revealed that the proportion of 4NL narrators who encoded all three frog goals was significantly higher than for the IL group, $p < .05$, and not significantly different from the LN group, $p > .05$.

Proportion of Purposeful Attempts

The proportion of purposeful attempts of each narrative was calculated by dividing the number of explicit purposes by the total number of attempts. The inclusion
Table 3.4
Encoding of Three Frog Goals by Normal-Language Kindergarten (LN), Language-Impaired (IL), and Normal-Language 4-Year-old (4NL) Participants

<table>
<thead>
<tr>
<th>Normal-Language Kindergarten Participants</th>
<th>Take (+/-)</th>
<th>Find (+/-)</th>
<th>Search (+/-)</th>
<th>Encoded all 3 Frog Goals (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LN1</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN2</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
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<td>LN3</td>
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<td>+</td>
<td>+</td>
<td>+</td>
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<td>LN6</td>
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<td>LN7</td>
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<td>LN8</td>
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<td>LN9</td>
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<td>LN10</td>
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<td>+</td>
</tr>
<tr>
<td>LN11</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><strong>Proportion of group (+)</strong></td>
<td><strong>.91</strong></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Language-Impaired Kindergarten Participants</th>
<th>Take (+/-)</th>
<th>Find (+/-)</th>
<th>Search (+/-)</th>
<th>Encoded all 3 Frog Goals (+/-)</th>
</tr>
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<tbody>
<tr>
<td>IL1</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
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<td>IL2</td>
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<td>IL3</td>
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<td>IL7</td>
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<td>+</td>
</tr>
<tr>
<td><strong>Proportion of group (+)</strong></td>
<td><strong>.43</strong></td>
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<table>
<thead>
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<th>Normal-Language 4-year-old Participants</th>
<th>Take (+/-)</th>
<th>Find (+/-)</th>
<th>Search (+/-)</th>
<th>Encoded all 3 Frog Goals (+/-)</th>
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</thead>
<tbody>
<tr>
<td>4NL1</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
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</tr>
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<td>+</td>
</tr>
<tr>
<td>4NL7</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4NL8</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4NL9</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4NL10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4NL11</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Proportion of group (+)</strong></td>
<td><strong>.90</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
of purposeful attempts contributes to the coherence of the story and is reported to increase with age. Again, it was predicted that the LN group would produce more purposeful attempts than both the IL and 4NL groups, and that the IL and 4 NL groups would have similar scores. Results are shown in Table 3.5.

Mean proportions of purposeful attempts for each group were as follows: LN group (mean = .6, SD = .26), IL group (mean = .33, SD = .23), and 4NL group (mean = .47, SD = .27). A one-way ANOVA with group (3) as the independent variable and proportion of purposeful attempts as the dependent variable indicated no significant group differences. However, both a post hoc (Tukey HSD for unequal N) and a t-test for two independent variables revealed a pairwise difference between the NL and LL groups, p < .05 (one-tail).

These results show that as predicted, the LN group produced a significantly higher proportion of purposeful attempts than the IL group. However, contrary to what was predicted, the proportion of purposeful attempts of the 4NL group was lower than the proportion of the LN group but higher than that of the IL group, and not significantly different from either group.

Narration of a Complete Nonfrog Episode

All narratives were examined for the inclusion of a complete nonfrog episode. Nonfrog episodes are local episodes within the story that are not directly related to the primary plot line. The narration of a complete nonfrog episode is indicative of the narrator's ability to encode goal plans at a local level. This contributes to the local coherence of the narrative. It was predicted that a higher proportion of LN narrators than
Table 3.5
Proportion of Purposeful Attempts (Purp. Atts.) of Normal-Language (LN), Language-Impaired (IL), and Normal-Language 4-Year-old (4NL) Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th># Attempts</th>
<th># Purposes</th>
<th>Proportion Purp. Atts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LN1</td>
<td>6</td>
<td>2</td>
<td>0.33</td>
</tr>
<tr>
<td>LN2</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>LN3</td>
<td>5</td>
<td>2</td>
<td>0.40</td>
</tr>
<tr>
<td>LN4</td>
<td>5</td>
<td>3</td>
<td>0.60</td>
</tr>
<tr>
<td>LN5</td>
<td>3</td>
<td>3</td>
<td>1.0</td>
</tr>
<tr>
<td>LN6</td>
<td>7</td>
<td>4</td>
<td>0.57</td>
</tr>
<tr>
<td>LN7</td>
<td>6</td>
<td>3</td>
<td>0.50</td>
</tr>
<tr>
<td>LN8</td>
<td>3</td>
<td>2</td>
<td>0.67</td>
</tr>
<tr>
<td>LN9</td>
<td>8</td>
<td>4</td>
<td>0.50</td>
</tr>
<tr>
<td>LN10</td>
<td>7</td>
<td>5</td>
<td>0.71</td>
</tr>
<tr>
<td>LN11</td>
<td>4</td>
<td>3</td>
<td>0.75</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>5.36</strong></td>
<td><strong>2.81</strong></td>
<td><strong>0.60</strong></td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td><strong>1.55</strong></td>
<td><strong>0.81</strong></td>
<td><strong>0.26</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participant</th>
<th># Attempts</th>
<th># Purposes</th>
<th>Proportion (Purp. Atts.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL1</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IL2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IL3</td>
<td>5</td>
<td>2</td>
<td>0.40</td>
</tr>
<tr>
<td>IL4</td>
<td>8</td>
<td>5</td>
<td>0.63</td>
</tr>
<tr>
<td>IL5</td>
<td>4</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>IL6</td>
<td>7</td>
<td>2</td>
<td>0.29</td>
</tr>
<tr>
<td>IL7</td>
<td>7</td>
<td>3</td>
<td>0.43</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>5</strong></td>
<td><strong>1.85</strong></td>
<td><strong>0.33</strong></td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td><strong>1.65</strong></td>
<td><strong>1.31</strong></td>
<td><strong>0.23</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participant</th>
<th># Attempts</th>
<th># Purposes</th>
<th>Proportion Purp. Atts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4NL1</td>
<td>4</td>
<td>2</td>
<td>0.50</td>
</tr>
<tr>
<td>4NL2</td>
<td>6</td>
<td>6</td>
<td>1.0</td>
</tr>
<tr>
<td>4NL3</td>
<td>4</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>4NL4</td>
<td>3</td>
<td>2</td>
<td>0.67</td>
</tr>
<tr>
<td>4NL5</td>
<td>9</td>
<td>3</td>
<td>0.33</td>
</tr>
<tr>
<td>4NL7</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4NL8</td>
<td>5</td>
<td>2</td>
<td>0.40</td>
</tr>
<tr>
<td>4NL9</td>
<td>2</td>
<td>1</td>
<td>0.50</td>
</tr>
<tr>
<td>4NL10</td>
<td>7</td>
<td>2</td>
<td>0.29</td>
</tr>
<tr>
<td>4NL11</td>
<td>3</td>
<td>1</td>
<td>0.33</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>5</strong></td>
<td><strong>2</strong></td>
<td><strong>0.47</strong></td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td><strong>2.1</strong></td>
<td><strong>1.41</strong></td>
<td><strong>0.27</strong></td>
</tr>
</tbody>
</table>
IL or 4NL narrators would include at least one complete nonfrog episode. It was hypothesized that no significant difference would be found between the IL and 4NL groups. Results are shown in Table 3.6.

Within the LN group, 10 of the 11 (.91) participants included at least one complete nonfrog episode. This was significantly higher than the proportion of IL narrators who included a complete nonfrog episode. Only two of the seven (.29) IL narrators were credited for including a complete nonfrog episode. A Kruskal-Wallis test and post hoc analysis (Mann-Whitney U test), using group (3) as the independent variable and presence of a complete nonfrog episode as the dependent variable, revealed a pairwise difference for the LN and IL groups, \( p < .05 \).

Five of the 10 (.5) 4NL narrators included a complete nonfrog episode. As predicted, this was significantly lower than the LN group (Mann-Whitney U test revealed \( p < .05 \)), and not significantly different from the IL group (Mann-Whitney U test revealed \( p > .05 \)).

These results show that the LN group, as predicted, contained the highest proportion of narrators who included at least one complete nonfrog episode. They were followed by the 4NL group, and finally the IL group.

Coherence of Plot Opening, Unfolding, and Resolution

The criteria for determining the coherence of the opening, unfolding, and resolution of the plot were developed by Berman and Slobin (1994). It was predicted that a higher proportion of LN narrators would achieve a positive score on each of the three components (opening, unfolding, and resolution) than in either the IL and 4NL groups. It
Table 3.6
Narration of a Complete Nonfrog Episode (NOF) by Normal-Language Kindergarten (LN), Language-Impaired, and 4-Year-old (4NL) Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>Complete NOF (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LN1</td>
<td>-</td>
</tr>
<tr>
<td>LN2</td>
<td>+</td>
</tr>
<tr>
<td>LN3</td>
<td>+</td>
</tr>
<tr>
<td>LN4</td>
<td>+</td>
</tr>
<tr>
<td>LN5</td>
<td>+</td>
</tr>
<tr>
<td>LN6</td>
<td>+</td>
</tr>
<tr>
<td>LN7</td>
<td>+</td>
</tr>
<tr>
<td>LN8</td>
<td>+</td>
</tr>
<tr>
<td>LN9</td>
<td>+</td>
</tr>
<tr>
<td>LN10</td>
<td>+</td>
</tr>
<tr>
<td>LN11</td>
<td>+</td>
</tr>
</tbody>
</table>

Proportion of group (+) .91

<table>
<thead>
<tr>
<th>Participant</th>
<th>Complete NOF (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL1</td>
<td>-</td>
</tr>
<tr>
<td>IL2</td>
<td>-</td>
</tr>
<tr>
<td>IL3</td>
<td>+</td>
</tr>
<tr>
<td>IL4</td>
<td>-</td>
</tr>
<tr>
<td>IL5</td>
<td>-</td>
</tr>
<tr>
<td>IL6</td>
<td>-</td>
</tr>
<tr>
<td>IL7</td>
<td>+</td>
</tr>
</tbody>
</table>

Proportion of group (+) .29

<table>
<thead>
<tr>
<th>Participant</th>
<th>Complete NOF (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4NL1</td>
<td>+</td>
</tr>
<tr>
<td>4NL2</td>
<td>+</td>
</tr>
<tr>
<td>4NL3</td>
<td>-</td>
</tr>
<tr>
<td>4NL4</td>
<td>-</td>
</tr>
<tr>
<td>4NL5</td>
<td>+</td>
</tr>
<tr>
<td>4NL7</td>
<td>-</td>
</tr>
<tr>
<td>4NL8</td>
<td>-</td>
</tr>
<tr>
<td>4NL9</td>
<td>+</td>
</tr>
<tr>
<td>4NL10</td>
<td>+</td>
</tr>
<tr>
<td>4NL11</td>
<td>-</td>
</tr>
</tbody>
</table>

Proportion of group (+) .50
was also predicted that more of the LN narrators would achieve a positive score for the coherent narration across all of the components, showing that they are more able to tell a wholly coherent story. IL and 4NL group differences were predicted not to differ on this measure. Results are shown in Table 3.7.

Plot opening coherence was achieved by 8 of the 11 (.73) LN narrators, 6 of the 10 (.6) 4NL narrators, and 2 of the 7 (.29) IL narrators. Plot unfolding coherence was achieved by 9 of the 11 (.82) LN narrators, 7 of the 10 (.7) 4NL narrators, and 4 of the 7 (.57) IL narrators. All of the subjects performed well on the measure of the coherence of the plot resolution. All of the narrators in both the LN and 4LN groups, and five of the seven (.71) IL subjects narrated coherent plot resolutions. For all of the groups, coherence increased across the three components, with plot opening showing the lowest proportion of coherent narrations, and plot resolution showing the highest proportion of coherent narrations.

Group differences did not reach statistical significance for any individual plot component, $p > .05$. However, when the coherence of the whole plot was examined, significantly more of the LN narrators than IL narrators were able to produce wholly coherent narratives. Seven of the 11 LN subjects (.64) produced wholly coherent narratives while only one of the seven IL subjects (.14) was able to tell a wholly coherent narrative. A Kruskal-Wallis test, and post hoc analysis (Mann-Whitney U test) using group (3) as the independent variable and production of a wholly coherent narrative as the dependent variable revealed a pairwise difference between the LN and IL groups, $p < .05$. 
Table 3.7
Narration of a Coherent Plot Opening (PO), Unfolding (PU), and Resolution (PR) by Normal-Language Kindergarten (LN), Language-Impaired (IL), and Normal-Language 4-Year-old (4NL) Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>PO</th>
<th>PU</th>
<th>PR</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal-Language Kindergarten Participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LN1</td>
<td>+</td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN2</td>
<td>-</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>LN3</td>
<td>+</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>LN4</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN5</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN6</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN7</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN8</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>LN9</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN10</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>LN11</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Proportion</td>
<td>.73</td>
<td>.82</td>
<td>1.0</td>
<td>.64</td>
</tr>
<tr>
<td>Language-Impaired Kindergarten Participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL1</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>IL2</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>IL3</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>IL4</td>
<td>-</td>
<td>+</td>
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<td>-</td>
</tr>
<tr>
<td>IL5</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>IL6</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>IL7</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Proportion</td>
<td>.29</td>
<td>.57</td>
<td>.71</td>
<td>.14</td>
</tr>
<tr>
<td>Normal-Language 4-Year-old Participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4LN1</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4LN2</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4LN3</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4LN4</td>
<td>-</td>
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<td>+</td>
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<tr>
<td>4LN5</td>
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<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4LN7</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4LN8</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4LN9</td>
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<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4LN10</td>
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<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4LN11</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Proportion</td>
<td>.60</td>
<td>.70</td>
<td>1.0</td>
<td>.40</td>
</tr>
</tbody>
</table>
Four of the 10 4NL subjects told wholly coherent narratives. The proportion of 4NL narrators who told a wholly coherent narrative (.4) was not significantly different from either the LN group or the IL group.

The predictions for this measure were partially supported; a significantly higher proportion of LN than IL narrators told a wholly coherent story. Also, as predicted, no significant difference was found between the 4NL and IL groups. However, it was predicted that the LN group would perform significantly better than the 4NL group. This hypothesis was not supported because no significant difference was found for these two groups.

**Correlation of Working Memory and Narrative Ability**

**Results of the Working Memory Task**

The results for the working memory task are recorded in Table 3.8. Within the LN group, working memory capacity for four of the subjects could not be defined because they did not pass the first level which was the basal score. Five subjects had a 3-word capacity, and two had a 4-word capacity.

Of the four subjects who did not pass the 3-word level, two received a score of 0/3 and two received a score of 1/3. Seven subjects went on to the 4-word level. Two passed this level and five failed. Of the five subjects who did not pass, three achieved a score of 0/3, and two received a score of 1/3. These five subjects were defined as having a 3-word capacity for this task.
Table 3.8.

Scores on Working Memory Task for Normal-Language Kindergarten (LN) and Language-Impaired (IL) Participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>3-word level (score/3)</th>
<th>4-word level (score/3)</th>
<th>5-word level (score/3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LN1</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>LN2</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>LN3</td>
<td>3</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td>LN4</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>LN5</td>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>LN6</td>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>LN7</td>
<td>3</td>
<td>1</td>
<td>n/a</td>
</tr>
<tr>
<td>LN8</td>
<td>3</td>
<td>1</td>
<td>n/a</td>
</tr>
<tr>
<td>LN9</td>
<td>2</td>
<td>0</td>
<td>n/a</td>
</tr>
<tr>
<td>LN10</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>LN11</td>
<td>2</td>
<td>0</td>
<td>n/a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participant</th>
<th>3-word level (score/3)</th>
<th>4-word level (score/3)</th>
<th>5-word level (score/3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL1</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>IL2</td>
<td>0</td>
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<td>n/a</td>
</tr>
<tr>
<td>IL3</td>
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</tr>
<tr>
<td>IL4</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>IL5</td>
<td>1</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>IL6</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>IL7</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

2 Bolded numbers indicate the level at which working memory capacity was defined for a given subject
Of the two subjects that continued on to the 5-word level, both received a score of 0/3. These subjects were defined as having a 4-word capacity for this task.

Working memory capacity for this task could not be specifically defined for any of the SLI subjects. None of these subjects passed the 3-word level. Of the 7 IL subjects, 6 achieved a score of 0/3 at the 3-word level and 1 achieved a score of 1/3. Working memory was defined as being “below the 3-word level” for these subjects.

Correlation Results

A Pearson product-moment correlation of working memory and plot complexity (number of plot units) and all of the coherence measures (proportion of ppl units, proportion of nongoal units, encoding of the 3 frog goals, proportion of purposeful attempts, narration of a complete nonfrog episode, or coherence of the plot opening, unfolding, and resolution) was first conducted with the inclusion of both the LN and IL groups. The results of this correlation showed that working memory correlated significantly with the proportion of nongoals \((r = - .49)\). Two other coherence measures nearly reached significance: the number of plot units \((r = .46)\), and the proportion of purposeful attempts \((r = .46)\).

A second correlation was conducted including only the LN group because the results of the first correlation may have been unreliable due to confounding variables for the IL group (see chapter 4). For this measure, no significant correlation was found with working memory ability and the measures of plot complexity and coherence. However,
some of the correlations were stronger than others and merit some discussion.\textsuperscript{3} It is possible that with a larger sample population, the following correlations would have reached statistical significance.

First, the number of plot units seemed to correlate somewhat with working memory capacity ($r = .55$). Second, a slight negative correlation was found for the proportion of nongoal units and working memory capacity ($r = - .49$). Although these correlations are not statistically significant, they do warrant further investigation. The results of the working memory correlations will be discussed further in chapter four.

\textit{Summary of Results}

1) **Plot Complexity:** The NL group produced the most complex narratives while the IL group produced the least complex narratives. However, results were not statistically significant.

2) **Proportion of Primary Plot Line Units:** No significant differences were found between any of the groups for this measure. However, the NL group had the highest proportion of primary plot line units while the IL group had the lowest. The performance of the 4NL group was very similar to the LN group.

3) **Proportion of Nongoal Units:** The IL and 4NL groups produced significantly more nongoal units than the LN group. The 4NL group produced slightly fewer nongoal units than the IL group, however, this difference was not statistically significant.

\textsuperscript{3} A parametric Pearson product-moment correlation using the total number of correct responses on the working memory task (rather than the level at which working-memory was defined) was conducted for the LN group. It is likely that these correlations are slightly overestimated because of the number of tied scores.
4) **Encoding of the 3 Frog Goals:** A significantly higher proportion of LN narrators encoded all frog goals as compared to the IL group. Contrary to what was predicted, the 4NL performed similarly to the LN group, and scored significantly higher than the IL group for this measure.

5) **Proportion of Purposeful Attempts:** The LN group produced significantly more purposeful attempts than the IL group. The 4NL group’s performance was better than the IL group, and worse than the LN group, but not significantly different from either.

6) **Narration of a Complete Nonfrog Episode:** The LN group had a significantly higher proportion of narrators who narrated a complete nonfrog episode, than both the IL and 4NL groups. No significant difference was found between the IL and 4NL groups.

7) **Coherence of Plot Opening, Unfolding, and Resolution:** A significant group difference was found only on the narration of a wholly coherent story and only for the LN and IL groups. Significantly more LN narrators than IL narrators told a wholly coherent story. The 4NL group’s performance was between the LN and IL groups.

8) **Working Memory Correlation:** Working memory did not significantly correlate with any of the plot measures for the LN group. However, two of the measures – plot complexity and proportion of nongoal units – had a slight correlation.
CHAPTER FOUR

DISCUSSION

Overview

The narratives of eleven kindergarten students with normal language (LN), seven kindergarten students with language impairments (IL), and ten 4-year-olds with normal language (4NL) were analyzed using seven measures of plot complexity and coherence. It was predicted that the LN group would produce significantly more coherent and complex narratives than both the IL and 4NL groups. It was also predicted that no significant group differences would be found between the IL and 4NL groups. The research hypotheses were supported for two of the measures (proportion of nongoal units, and narration of a complete nonfrog episode), and partially supported for three of the measures (proportion of purposeful attempts, encoding of the three goals, and coherence of three plot components. The hypotheses were not supported for two of the analyses (complexity and proportion of primary plot line units).

A correlation of working memory capacity and narrative ability was first conducted with the inclusion of both the LN and IL groups. Due to the confounding language deficits of the IL group, the results of this correlation were difficult to interpret. This led to a second correlation, which included only the LN group. The result of this
correlation will be discussed in this chapter. A slight correlation was found for plot complexity (positive) and proportion of nongoal units (negative).

This chapter provides an interpretation and discussion of the results presented in chapter three. The first section presents some methodological issues of the present study and their implications. This is followed by an interpretation of the results for each of the measures of plot complexity and coherence, and an overall discussion of the results based on the hypotheses stated in chapter one. Following this is a discussion of the clinical implications of the results. Finally, directions for future research are suggested.

Methodological Issues

Some methodological limitations are important to consider when interpreting the results of the current study. One example is the relatively small sample size. There were a total of 28 subjects, 11 normal-language kindergarten students, 7 language-impaired kindergarten students, and 10 normal-language 4-year-olds. Due to the small sample size, caution must be used when interpreting statistical results. Some of the results of this study did not reach statistical significance (e.g., working memory correlation) and it is possible that with more subjects, the results would have been significant. Also, there was a considerable amount of within-group variability on some of the measures, especially within the language-impaired group. Less variability and overlap of ranges may have been observed with a larger number of subjects.

Another limitation is the use of the pre-existing data from the 4-year-olds (Gibney, 1995). This has some possible implications for the comparability with the data collected for the current study. First, the 4-year-old subjects were recruited from a
different metropolitan area, which may have implications for socioeconomic status.

Second, the 4-year-old subjects did not participate in a formal language assessment and, therefore, they could not be matched by language level to the language-impaired subjects. Consequently, although it was assumed that the language-impaired subjects would be comparable to younger children with less mature language abilities, the results must be interpreted with caution.

Finally, there are limitations with the use of the Columbia Mental Maturity Scale (1972) to assess nonverbal intelligence. Because the test only includes one type of nonverbal task (choosing the "different" item in an array of visual stimuli), particularly one that is an identification rather than a problem-solving task, the nonverbal abilities of some children may be overestimated. A true measure of nonverbal intelligence should include tasks that require higher level, abstract thought. The Test of Noverbal Intelligence–3 (TONI – 3) (Brown, Sherbenou, & Johnsen, 1997) has more of a problem-solving component (analogies and geometric sequencing), which may be a more accurate reflection of nonverbal ability. Unfortunately, the TONI–3 is not appropriate for kindergarten-aged children and could not be used in the current study.

Discussion of Results

The results of each of the measures of narrative complexity and coherence are discussed individually. This is followed by a general discussion of the overall results.
Plot complexity

No significant group differences were found for plot complexity. There was a large amount of variability within each group, particularly within the IL group. Although some researchers have found that narrative length increases with development (Umiker-Sebeok, 1977), this was not replicated in the current study. There were no significant differences between the LN and younger 4NL group. There are several possibilities for why significant differences were not found for this measure.

First, Umiker-Sebeok's (1977) finding that narrative complexity increased with development is based on short personal narratives produced spontaneously in conversation, not fictional narratives. The difference in the narrative task may partially explain why these findings were not replicated in the current study. Fictional narratives, in general, tend to be more complex than personal narratives. Also, the present study included visual stimuli (pictures) and adult modeling for the subjects, which may have influenced the length of the narration. The picture sequence itself, dictates to some extent, the length of the narrative. Gibney (1995) also found that narrative length did not consistently increase between the ages of three and four. This was attributed to personal narrative style, "Some children told very brief narratives with little extraneous detail (15-35 unified predicates), while other children told rambling, detailed stories of up to 118 unified predicates (Gibney, p. 111).

Second, it is possible that narrative length does not accurately reflect narrative complexity for fictional narratives. The longer narratives of the IL subjects tended to be less coherent, because they included much more information that was not relevant to the
main plot line (see nongoal unit analysis). Some of the shorter narratives of the LN group were simply more concise, rather than less complex. However, narrative length did seem to correlate with complexity for some of the LN narrators. The four LN narrators who produced the longest narratives (LN4, LN6, LN9, LN10) also produced narratives that were the most complex in terms of their inclusion of global and local goal plans. It may have been more informative if plot complexity had been measured as the total number of episodes (both local and global) that were included in the narrative.

Proportion of Primary Plot Line Units

No significant group differences were found for the primary plot line units measure; however, although the differences were not statistically significant, the pattern of results was somewhat expected. The LN group mean was the highest, while the IL group mean was the lowest. Contrary to what was expected, the 4NL group performed more similarly to the LN group than the IL group.

The narrative task may also have influenced this measure of coherence. Because of the picture stimuli, it may have been easier for the IL subjects to generate primary plot line units. Sometimes a description of a picture could be interpreted as a primary plot line unit. For example, an utterance such as “the boy is looking in the hole” could count as an attempt, even if it was not interpreted as such by the narrator. This cannot, however, completely account for the whole picture; in order to infer a primary plot line unit, enough information must also be included to infer at least one of the frog goals. This suggests that most of the narrators (with the exception of IL2) understood the main plot line of the story to some degree, and therefore had some knowledge of goal plans.
Proportion of Nongoal Units

Significant group differences were found for the proportion of nongoal units included in the narratives. As predicted, the LN narrators produced a lower proportion of nongoal units than both the 4NL and IL groups, and there was no significant difference between the IL and 4NL groups.

Nongoal units are plot units that contain information not relevant to a goal plan of any kind. These include descriptive comments and picture labeling (e.g.: that’s an owl). While most narratives contain some nongoal units, and these sometimes add to the story, a high number of nongoal units has a negative effect on global coherence.

It is interesting that, although there were no significant group differences in the proportion of primary plot line units, there was a significantly large difference in the number of nongoal units. This indicates that while the non primary plot line units of the LN group consisted largely of nonfrog episodes (local episodes), those of the IL and 4NL group tended to be nongoal units. This suggests that the LN narrators were much more capable of telling a story that includes a hierarchical global goal plan as well as local goal plans. In contrast, the IL and 4NL groups had difficulty managing global and local goal plans simultaneously. This is consistent with Berman and Slobin’s (1994) results.

Several cognitive and linguistic abilities are required to narrate the global and local goal plans of this story. First, the ability to identify the events that make up a local episode, in other words the ability to separate foreground from background information, is needed. Second, the ability to manage two separate temporal sequences, which may involve working memory, is required to successfully narrate the hierarchical goal plan.
Finally, the ability to make use of linguistic devices such as verb tense and cohesive ties is needed to coherently distinguish foreground and background events. The results of this measure may reflect group differences in some or all of these abilities.

Encoding of the Three Frog Goals

The proportion of language-impaired narrators who encoded all of the frog goals was significantly lower than for both the normal-language kindergarten and 4-year-old narrators. The LN and 4NL groups did very well on this measure and were not significantly different from one another. It was predicted that the IL children would have more difficulty encoding the hierarchical goal plan as compared to their same-age peers. However, contrary to what was predicted, the 4-year-olds performed as well as the kindergarten subjects.

The results of this measure suggest that the LN and 4NL narrators had sufficient goal plan knowledge to narrate a story with a hierarchical goal plan. The IL narrators, however, did not show the same capability. Four of the seven IL subjects failed to narrate the entire goal plan. One of these children (IL2) produced a narrative that included no goal-related information. For three IL subjects, there was evidence in their narratives of at least some knowledge of goal plans. These children included outcomes for both the Search and Find goals, but failed to include outcomes for the Take goal, or enough information elsewhere in the story for the inference of a Take goal. Because sufficient information was not included elsewhere in the narrative, the Take goal was not inferable (see coding). The failure to narrate this superordinate goal has implications for the global coherence of the story. The outcome for this superordinate goal is the most difficult to
encode because it is dependent on the successful encoding of both of the subordinate goals. In general, it was observed that the language-impaired children showed some evidence of goal plan knowledge; however, this knowledge was insufficient for the narration of a complete hierarchical goal plan.

According to Trabasso and his colleagues, the Take outcome is the main conclusion of the story, wherein the boy successfully retrieves his frog (or a related baby frog) and returns home. Berman and Slobin's (1994) criterion for a coherent plot resolution requires only the inclusion of a Find outcome. According to them, the main conclusion of the story is simply to find the frog. Using Berman and Slobin's criterion, two of the IL narrators who did not include a Take outcome, did include a Find outcome. It is interesting to note that all but one narrator in both the NL and 4NL groups passed both Trabasso and his colleagues' criteria and Berman and Slobin's criteria. In the IL group, however, only three narrators passed both criteria, two passed only Berman and Slobin's criteria, and two did not satisfy either criterion. This discrepancy is discussed further in the coherence of plot opening, unfolding, and resolution section.

Proportion of Purposeful Attempts

The proportion of purposeful attempts was calculated as a measure of global coherence. Attempts conjoined with explicit purposeful statements (either in the form of a prepositional phrase, e.g.: looking for the frog or the protagonist's dialogue, e.g.: looked in and called, froggie where are you?), make it clear to the listener that the boy is continuously renewing his search for the frog in various locations. If the narrator does not include explicit purposes, the protagonist's intentions become more ambiguous.
As predicted, the LN subjects included a significantly higher proportion of purposeful attempts than the IL subjects. One of the IL subjects (IL4) performed as well as, and better than some LN subjects. However, for most of the IL subjects, attempts were encoded without purposes more than 50% of the time. Two of the IL subjects (IL1 and IL2) failed to include any purposeful attempts.

The 4NL group included a lower proportion of purposeful attempts than the LN group. Although the difference was not statistically significant, it follows the predicted developmental pattern. Trabasso et al. (1992) found that the ability to include explicit purposes increases substantially by age five. The results of this study support this claim to some degree, and again, more significant results may have been found if socioeconomic status or preschool history had been held constant for these two groups.

Narration of a Complete Nonfrog Episode

A complete nonfrog episode is an episode that occurs within the story that is unrelated to the main plot line and includes an initiating event, an attempt, and an outcome. Each narrative was analyzed for the inclusion of at least one complete nonfrog episode. In a nonfrog episode, all parts of the goal plan are narrated consecutively, and therefore, at a local level within the story. A successful narration of a nonfrog goal plan contributes to the local coherence of a story and is an indication of the narrator’s ability to encode local as well as global and hierarchical goal plans.

A significantly higher proportion of LN subjects than IL subjects narrated a complete nonfrog episode. Almost all of the LN narrators (with the exception of LN1) included a complete nonfrog episode, as opposed to only two of seven IL narrators. These
results suggest that most of the IL subjects were unable to narrate a local goal plan competently. However, this does not mean that they lacked local goal planning ability entirely. Many of these subjects were credited as including nonfrog episodes, because the criteria for coding a nonfrog episode required only the narration of an initiating event and an attempt. In order for the nonfrog episode to be considered complete, it required an outcome. It was observed that most of the IL narrators failed to include an outcome. This result is consistent with the finding for the global goal plan measure. For both measures, enough information was included to infer that most of the IL narrators had some knowledge of goal plans; however, the absence of outcomes suggests that they had some difficulty when it came to encoding and narrating the entire goal plan. This result, taken with the finding for the proportion of nongoal units, provides a general profile for the narratives of the IL and LN narrators. The LN subjects told stories that included plot units mostly relating to either a local or global goal plan. In contrast, the IL narrators included far more nongoal related information. Nonfrog goals were rarely complete and were more often narrated as nongoal units.

The results of the 4NL group are interesting. The proportion of 4NL subjects who included a complete nonfrog episode was significantly lower than for the LN group and not significantly different from the IL group. This suggests that, although they did not demonstrate a significant difference for their inclusion of the hierarchical frog goal plan, a difference was found at a local level. Only half of the 4NL narrators told a complete nonfrog episode. This finding suggests that the ability to narrate a global goal plan may develop before the ability to narrate a local goal plan that is unrelated to the main story line. Berman and Slobin (1994) found that 4-year-olds were generally unable to produce
narratives that were thematically motivated at a global level yet they were able to relate events at a local level (p. 51). While this may seem contrary to what was found in the current study, this discrepancy can be attributed to the difference between “event” and “episode.” The 4-year-olds in the current study were able to relate events at a local level but failed to incorporate enough information to link events together to form an episode (inclusion of an initiating event, attempt, outcome). The events referred to by Berman and Slobin (1994) were coded as “nonattempt events” in the current study, in other words, events that were not related to a goal plan.

Coherence of Plot Opening, Unfolding, and Resolution

Berman and Slobin’s (1994) criteria for a coherent plot opening, unfolding, and resolution were applied to the narratives in this study. The coherence of each plot component was analyzed individually. The narratives were also analyzed for whether they were wholly coherent, in other words, whether coherence was achieved for all of the components.

No group differences were found when the plot components were analyzed individually; however, there was a consistent pattern of results. For each component, the IL group consistently had the lowest proportion of narrators who achieved the coherence criteria. They were consistently followed by the 4NL group. Finally, the LN group consistently had the highest proportion of coherence-achieving narrators. One exception to this pattern was with the plot resolution, where all the subjects in both the LN and 4NL groups passed the criteria.
A significant group difference was found only when the three plot components were analyzed together. The proportion of LN narrators who told a wholly coherent story, as compared to the proportion of IL narrators, was significantly higher. This difference was not seen when the components were looked at individually because of the inconsistent performance pattern of the IL narrators. While few were able to tell a wholly coherent story, some told more coherent openings, while others told more coherent unfoldings or resolutions. The results of this analysis support the hypothesis that the LN narrators would tell more globally coherent stories compared to the IL group. The results of the 4NL group were between the LN and IL groups and not significantly different from either.

It is interesting to note that although only three of the seven IL narrators included an outcome for the Take goal, five of them were credited with telling a coherent plot resolution. As discussed in the encoding of the three goals section, this is because, according to Berman and Slobin's criteria, the narrator needed only to provide a statement about finding the frog; he or she did not necessarily have to state that the boy then took the frog back home. This implies that Berman and Slobin's criterion for plot resolution coherence fails to capture an important quality; regardless of whether the superordinate goal is resolved, a plot resolution can still be judged to be coherent.

Berman and Slobin (1994) found that the proportion of 4- and 5-year-old narrators who passed the coherence criteria decreased from plot opening to resolution. The reverse trend was found for the narrators in the present study. Within each group, the proportions of narrators who passed the criteria increased from plot opening to resolution. It is not clear why this discrepancy exists. It is possible that it reflects the difference in procedure.
In Berman and Slobin’s study, the story was not modeled for the subjects and the subjects told the story only once. Because the subjects in the present study had more exposure to the story and more practice telling it, it is possible that different plot elements could be included or left out.

**Working Memory and Narrative Ability**

The relation of working memory and on-line language processing was examined by conducting a correlation of working-memory capacity and the measures of plot complexity and coherence. Montgomery (2000) failed to find a correlation between working-memory capacity and sentence processing in an on-line task and suggested that a larger language unit may be necessary for examining this relationship. Following Montgomery’s (2000) suggestions, the current study examined the relationship between working memory and narrative ability.

A correlation of working-memory capacity and all of the measures of plot coherence was first conducted including both the LN and IL groups. Working memory correlated significantly with the proportion of nongoal units. The correlation of two of the other coherence measures, number of plot units and proportion of purposeful attempts, and working memory were nearly significant. While these results are interesting, they are difficult to interpret for several reasons. First, the working memory capacity for the IL subjects was not specifically defined. All of these subjects failed to pass the lowest level on the working memory task; however, this does not necessarily mean that their working memory capacities are all equal. Consequently, it may not be valid to simply define their working memory capacity as “below the 3-word level.” More problematic with this group
is the possibility of other confounding variables. It is possible that language deficits and other possible perceptual impairments influenced the results of the IL group on the working memory task. For this reason, a second correlation was conducted including only the LN group. The results of the second correlation, which included only the LN Group, are discussed below.

For the LN group, working memory was not significantly correlated with any of the plot measures; however, two of the correlations were close to being significant and stood out from the other measures. It is possible that with a larger number of subjects, the results would have been significant. The plot measures that correlated the most with working memory were plot complexity (positive) and the proportion of nongoal units (negative).

For the LN group, the correlation of complexity and working memory is an interesting one, because 90% of the LN subjects effectively narrated the hierarchical goal plan of the story and included low proportions of nongoal units. In other words, although the complexity measure only looked at the number of plot units and not the type, for some of the narrators in this group, the longer stories had more complex plots. It is logical that narrative complexity should correlate with working memory. The telling of a longer and more coherent plot would put more of a demand on working memory since the narrator would have maintain the global goal plan in working memory while simultaneously narrating several local goal plans.

A slight negative correlation was found for working memory and the proportion of nongoal units, suggesting that the subjects with lower working memory capacities included more nongoal units. As described previously, nongoal units have a negative
impact on the coherence of a story because they do not relate to the plot line or to a goal plan. Essentially, this is the reverse situation from the complexity measure. It is conceivable that the subjects with less working memory capacity would be less able to narrate local goal plans while maintaining the global goal plan in working memory. As a result, local goal plans may be replaced with nongoal units, which are less taxing on the narrator since they do not involve planning but rather tend to be simple picture descriptions. From this finding, it becomes apparent that the picture stimuli have a considerable influence on the narrative task.

Overall, the results of the working memory correlation are interesting. Although the results were not statistically significant, they were strong enough to merit some discussion. What is particularly interesting is that these correlations made sense and could be interpreted in terms of what is known about working memory function. However, it is surprising that some of the other significant coherence measures did not correlate at all. For example, the coherence of the three plot components and the proportion of purposeful attempts. Again, it is possible that more significant results would have been found given a larger subject pool.

The working memory correlation led to other interesting observations. It was observed that for the IL and LN groups, there was no correlation between the proportion of primary plot line units, the proportion of nongoal units, and the proportion of purposeful attempts. This suggests that a “trade-off” exists between these elements. For example, a narrator who included a higher proportion of primary plot line units might have included a lower proportion of purposeful attempts. This can be explained within a capacity and demands framework. It is likely that because the processing resources
required for narrating a complex plot are limited at this age, especially for the IL group, some elements of the story may be sacrificed in order to manage the narrative task. Some narrators may do this by including fewer primary plot line units; some by including more nongoal units rather than try to narrate the local episodes; and some by including less purposeful attempts. The interesting observation is that there was no consistent pattern within the groups. It appears that the inclusion of certain elements at the expense of others depends on the personal style of the narrator and what they consider to be most important in the story.

Summary of Results

This section reviews the overall results according to the hypotheses stated in chapter one. By combining the results of all of the plot measures, a general interpretation about narrative coherence can be made for each subject group.

1) Kindergarten students with language impairments should produce less coherent/complex narratives in comparison to their age-matched peers.

Overall, the results of the coherence measures supported this hypothesis. For five of the seven coherence measures, the narratives of the normal-language kindergarten subjects were significantly more coherent than those of the language-impaired subjects. The complexity results did not support this hypothesis; however, it was concluded that the complexity measure was not an accurate measure of plot complexity as it only measured the length of the narrative.
2) **Kindergarten students with language impairments should produce narratives that are developmentally immature and therefore, more similar to the narratives of 4-year-olds.**

The results, as outlined in the previous section, provide some support for this hypothesis. On two of the measures, the 4-year-old and language-impaired kindergarten subjects performed similarly. However, on two of the measures, the 4-year-olds’ performance was more similar to the normal-language kindergarten subjects. For the other measures, the 4-year-olds’ scores were between the scores of the other two groups and, therefore, not significantly different from either. It was concluded that, in general, the narratives of the 4-year-olds were generally more coherent than the language-impaired group but less coherent than the normal-language group. Also, because the 4-year-olds in this study showed more evidence of having goal plan knowledge than the 4-year-olds in Trabasso, Stein, Rodkin, Park Munger, and Baughn's (1992) study (see Gibney, 1995), it is possible that these subjects may have had more advanced narrative skills than expected for their age.

3) **Typical kindergarten students should produce significantly more coherent and complex narratives than 4-year-olds.**

The results provide some support for this claim. As described for the second hypothesis, the 4-year-olds’ performance was similar to the normal-language group on some measures, and more similar to the IL subjects on other measures, and directly in between the two groups on other measures. It was concluded that overall, the narratives of the typical kindergarten students were more coherent than those of the 4-year-olds.
4) A correlation between working memory capacity and narrative ability should exist.

A slight correlation was found for working memory capacity and three of the coherence measures. It was concluded that, while the results were not statistically significant, the results do suggest working memory correlates to some degree with plot coherence and should be further investigated.

Narrative coherence was examined using a goal plan analysis. Therefore, comments can be made regarding the subjects’ planning knowledge. In general, as highlighted by the results on the proportion of nongoal units and complete nonfrog episodes, it was found that the LN narrators told stories that contained a hierarchical global goal plan as well as local goal plans. In contrast, the IL subjects told stories that included much more nongoal related information, which had a negative impact on the coherence of their narratives. Based on this analysis, it can be concluded that the LN subjects have a well-developed knowledge of goal plans and are able to encode this knowledge in order to narrate the goals appropriately. The narratives of the language-impaired subjects indicate that their knowledge of goal plans is not as well developed as that of their same-age peers and, therefore, they are not able to produce narratives with the same degree of coherence. Their narratives, however, did provide some evidence of planning knowledge. It is possible that they understood the protagonist’s intentions and goals but had difficulty narrating the goal plans coherently. The results of the working memory correlation provide a possible explanation for these claims, if it is the case that the language-impaired subjects had difficulty narrating the global and local goal-plans due to a lower working memory capacity.
Individual Variability

It is evident that a considerable amount of variability exists in the data. While all of the IL narrators had lower scores on some of the coherence measures, some of them performed as well as and better than some of the LN narrators on other measures. It is of particular interest to examine the performances of IL3 and IL5 because they had significantly different scores from the rest of the participants on the measure of nonverbal intelligence.

IL3 was the only participant who had a below-average score on the Columbia Mental Maturity Scale (1972). It was mentioned in chapter two that this student had some difficulty attending to the task. This student’s results on the plot measures may also reflect a difficulty with attention. IL3’s narrative contained the highest number of plot units within the IL group and had more plot units than many of the LN narrators. However, this child’s narrative also contained the lowest proportion of primary plot units (with the exception of IL2, who had no primary plot line units). IL3’s narrative was mostly composed of nonfrog goal units; in fact, it was the only IL narrative that contained a complete nonfrog episode. This suggests that IL3 was more focused on the nonfrog events and may have had difficulty separating foreground from background events. As suggested for IL3’s performance on the Columbia Mental Maturity Scale, this participant’s lack of focus on the primary plot line may be due to attentional factors.

IL5’s score on the Columbia Mental Maturity was well above average and higher than all of the other participants. Interestingly, this student’s performance on the narrative task was consistently average for the IL group. One exception was for the measure of the
coherence of plot opening, unfolding, and resolution. For this measure, IL5 was the only narrator in the IL group who passed the coherence criteria for each of the plot components. IL5's overall performance is interesting in that it shows a large discrepancy between nonverbal and verbal abilities. Although this child had exceptional nonverbal abilities, significant verbal deficits were identified on both the TOLD-3 and the measures of narrative ability. The large discrepancy in nonverbal and verbal ability of this child fits the SLI profile closely.

Clinical Implications

Trabasso and Nickels (1992) found that the 5-year-olds in their study demonstrated a clear organization of the narrative according to a goal-plan of action (p. 271). The results of the typical kindergarten subjects of this study are consistent with their findings. All of the LN narrators demonstrated the ability to structure the narrative according to a goal plan of action. Consequently, it can be assumed that these subjects have age-appropriate narrative skills, and therefore, the prerequisite narrative skills for literacy acquisition. The narrative skills of most of the language-impaired subjects were significantly less developed in comparison to their same-age peers. This strongly suggests that these subjects and language-impaired children in general, are at risk for literacy problems and poor academic achievement.

The results of this study provide some insight into the difficulties that language-impaired children have producing coherent narratives. There is evidence for deficits in goal plan formulation, which may involve a working memory component. The narrative skills of language-impaired children entering the school system should be included in the assessment of their general language ability. Goal plan knowledge is best assessed at the
discourse level; and consequently some aspects of a child’s language impairment may be missed if their narrative or discourse ability is not examined. It is also important to assess the narrative skills of language-impaired children in order to develop a therapy plan that would support the development of early literacy skills.

Speech Language Pathologists, particularly those in the school system, do assess narrative ability in children with language impairments. However, in general, story grammars are used to analyze narratives. As discussed in chapter one, these fail to adequately account for the deficits observed in global coherence. A goal plan analysis is more able to reflect the narrator’s underlying knowledge, and so may be more clinically valuable. Story grammar assessments need to be replaced by analyses that focus more on the narrator’s underlying knowledge, particularly planning ability, intentional knowledge, and inferencing ability. Analyses of events and inclusion of goal plans appear to be more informative about deficits in narrative ability, and need to be more explored by Speech Language Pathologists.

The use of story grammars in the assessment of narrative ability leads to therapy activities that focuses on the teaching of story grammar components. While this is useful to some degree, because story grammars fail to address underlying deficits, these learned skills may not be applicable in other contexts. With a goal plan approach, on the other hand, therapy activities would be more likely to focus on underlying deficits. For example, if it were concluded that a child had deficits in intentional knowledge and planning ability, therapy activities might include role-playing and goal-setting in general. These skills could then be focused on in more specific contexts (e.g., narratives). This kind of approach would likely be more beneficial to a child because he or she would be
more able to use the learned skills in a variety of contexts, for example, in the comprehension of different kinds of texts (both fictional and non-fictional) as well as in other school activities that are not text-based.

**Directions for Future Research**

This study involved several different measures of plot complexity and coherence. Some of these measures were found to be more valuable than others. The following measures were found to be the most informative: the proportion of nongoal units; whether or not each of the three global goals was encoded; the proportion of purposeful attempts; and the inclusion of local goal plans. The other measures, particularly the complexity measure and the proportion of primary plot units, were not found to be as informative, and failed to reflect the differences in narrative coherence between the normal-language and language-impaired subjects. It is advisable that future researchers on the topic include some of the more valuable measures and perhaps try to develop other valuable measures particularly measures of plot complexity. As suggested earlier, a more valuable measure of plot complexity may be one that calculates the number of complete episodes, both global and local, included in the narrative.

In addition to the differences observed in goal planning ability, other interesting differences were observed between the IL and NL groups. These differences may be captured using different types of coherence analyses. For example, it would be of interest to investigate the linguistic devices that are involved in narrating local as well as global goal plans. For example, the ability to separate foreground from background information
through the use of verb tense and aspect and the inclusion of cohesive devices (e.g., causal and temporal) could be examined.

The current study had a relatively small sample size, which may have impacted the significance of some of the results. It is recommended that future studies include a larger number of subjects in order to lend more validity to the results obtained here. Specifically, a larger sample size is recommended in order to further examine the correlation of working memory and narrative ability. Working memory of children with SLI has received a great deal of attention in recent studies; further investigation into this correlation would be of great interest.

The results of this study suggest that language-impaired children may have knowledge of and the ability to formulate a goal plan but have difficulty narrating one. This relationship needs to be explored further. There is some evidence in this study that the ability to narrate goal plans effectively, particularly hierarchical goal plans, may be correlated with working memory capacity. As mentioned above, this correlation needs to be examined further.

Finally, this study has shown that analyzing the narratives of language-impaired children can provide important insight into their discourse-level deficits. Further investigation of goal planning in typical and language-impaired school-aged children would be clinically useful for Speech Language Pathologists in their assessment and therapy planning for language-impaired children. It would be useful to clinicians for assessment and therapy tools to be developed that focus on goal planning in narrative. While the literature provides some developmental information, a standardized assessment
that included normative data and some of the more useful measures of goal planning ability and would be particularly valuable.
REFERENCES


APPENDIX

CODES:

put: plot unit type
  FRO: frog goal plan
  NOF: nonfrog goal plan
  NOG: nongoal unit

fro: frog goal
  TAK: take goal
  FIN: find goal
  SEA: search goal

ppl: primary plot line unit
  CHI: character introduction
  OPE: opening event
  REL: stated relation between boy and frog
  INE: initiating event
  ATT: attempt
  PUR: purpose
  NOE: nonattempt event
  IRE: internal reaction
  OUT: outcome

nof: nonfrog goal plan
  INE: initiating event
  IRE: internal reaction
  ATT: attempt
  PUR: purpose
  NOE: nonattempt event
  OUT: outcome

nog: nongoal plan
  DEV: description of event
  DST: description of state
  NST: narrator strategy
  OTH: other

SAMPLE TRANSCRIPT

@Begin
@Participants:   LN3 Target_Child, NIC Nicky examiner
@Age of LN3:    5;7.
@Sex of LN3:     male
@Date:           17-MAY-2002
*LN3: they have a pet frog.
*put: $FRO
*fro: $TAK
*ppl: $REL
*LN3: he's X at me.
*put: $NOG
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*nog: $DEV
*LN3: and when they were sleeping.
*put: $FRO
*ppl: $INE
*LN3: he quietly jumped out the open window.
*put: $FRO
*ppl: $INE
*LN3: then when person woke up.
*put: $FRO
*ppl: $INE
*LN3: he wasn't there.
*put: $FRO
*fro: $TAK
*ppl: $INE
*LN3: and the dog looked in the jar.
*put: $FRO
*fro: $TAK $FIN $SEA
*ppl: $ATT
*LN3: and his head got stuck.
*put: $NOG
*nog: $DEV
*LN3: and he was yelling froggie out the window.
*put: $FRO
*fro: $TAK $PIN $SEA
*ppl: $ATT
*LN3: and the dog wanted to help him.
*put: $NOG
*nog: $OTH
*LN3: and the glass broke.
*put: $NOG
*nog: $DEV
*LN3: and he was yelling froggie.
*put: $FRO
*fro: $TAK $PIN $SEA
*ppl: $ATT $PUR
*LN3: and the dog was too.
*put: $FRO
*PPL: $NOE
*LN3: and the boy looked in a little hole.
*put: $FRO
*fro: $TAK $FIN $SEA
*ppl: $ATT
*LN3: and somethin bit his nose.
*put: $FRO
*ppl: $OUT
*LN3: and the dog was barking at the beehive.
*put: $NOF
*nof: $NOE
*LN3: and it fell.
*put: $NOF
*nof: $INE
*LN3: and all the bees were chasing him.
*put: $NOF
*nof: $ATT
*LN3: and the boy looked in the big hole in the tree.
*put: $FRO
*fro: $TAK $FIN $SEA
but it was a owl.
and he got scared so much.
that he fell in the tree.
and he was holding on to some branches.
but it wasn't some branches.
and it was a deer.
he went to the ledge of a pond.
and he dumped him into the pond.
and they heard sumpin.
while they were in the pond.
and they heard it closer.
and it was their froggies.
and he gotta take a baby one home.
and he gotta take a baby one's on the ground still.
and the end.